Abstract Book

National Congress of Whole Bread and Grain Products

Int J Nutr Sci 2025;10(1-Supplement)

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Congress Abstract Proceeding

National Congress of Whole Bread and Grain Products
Shiraz University of Medical Sciences

January 1-2,
Shiraz, Iran

Congress Scientific Secretary Address:
Razi Blvd.,
School of Nutrition and Food Sciences,
Shiraz University of Medical Sciences,
Postal code: 7153675500, Shiraz, Iran.
Tel: +98-71-37251001
Fax: +98-71-37267056
Email: scnutrition@sums.ac.ir

International Journal of Nutrition Sciences

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CONGRESS PRESIDENT MESSAGE

Congress President Message in The National Congress of Whole Bread and Grain Products January 1-2, Shiraz, Iran

In the Name of God

Bread as considered the main food in Iranian society and its average consumption per capita in Iran is 117 kg, while about 50% of the daily energy and protein and 30% of the micronutrients required by the body are provided through bread consumption. Therefore, the bread nutritional quality and safety is very important regarding the health status of the Iranian society. Unfortunately, one of the problems in relation to bread consumption in the Iranian society is consumption of breads with less bran and no sprouts especially for wholesome traditional breads that is associated with the challenge of bread wastes. These challenges can be due to the cheapness of bread based on government subside policies, the lack of competition in the production and supply of bread, and insufficient government support for flour and bread producers.

As several studies have revealed the role of bread and whole grain consumption in prevention of chronic diseases, it seems that a revise in the government subsidy policies for flour and bread is crucial and an important step to improve the bread quality and develop a culture toward consumption of whole and healthy breads. In the last decade at a global level, lots of attention has been paid to production and supply of cereal-based foods; but unfortunately, Iran's share in production and supply of cereal-based food market is small. Therefore, "*The National Congress of Whole Bread and Grain Products*" during January 1-2 in Shiraz, Iran has provided an opportunity for university faculty members, flour and bread manufacturers, policy makers and implementers in the country to help improve the quality of wheat and flour and traditional and local breads. In this relation, specialized panels would be held on issues such as bread and whole grain policies, the beneficial effects of bread and whole grains, introduction of modern technologies in flour production, manufacturing of foods based on grains for special patients, and finally ways to improve the wheat and flour quality to lead production of better traditional and local breads in the country.

It is hoped that the holding this congress would provide more opportunities for efforts at a national level to improve the quality of bread and to promote the policies to increase the production and consumption of bread and whole grain products in the country.

Seyed Mohammad Mazloomi, DVM, PhD,
President of the Congress of
The National Congress of Whole Bread and Grain Products
January 1-2, Shiraz, Iran.

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Congress Scientific Secretary Message

Scientific Secretary's Speech in The National Congress of Whole Bread and Grain Products January 1-2, Shiraz, Iran

In the Name of the Unique Creator

"*National Congress of Whole Bread and Grain Products*" has considered the tireless activities of the last few years and the achievements of Fars province, southern Iran in the field of research, promotion and application of scientific, executive and operational departments in planning and preparing bread made from available whole meal flour.

In this congress in Shiraz, Iran during January 1-2, we are trying to bring together researchers, policymakers and executives in the field of healthy bread production to take practical and effective steps in order to promote the scientific level and increase the production and consumption of bread made from whole meal flour in order to improve the health status of the society. It is hoped that this scientific-operational congress would be a start to improve the culture to increase healthy bread made from whole meal flour in the country, increase the health status and reduce the burden of non-communicable diseases.

Siavash Babajafari, MD, PhD,
Scientific Secretary of
The National Congress of Whole Bread and Grain Products
January 1-2, Shiraz, Iran.

Int J Nutr Sci 2025;10(1-Supplement)

International Journal of Nutrition Sciences

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Closing Statement of the National Congress of Wholemeal Bread and Cereal Products
Scientific Committee of the National Congress of Wholemeal Bread and Cereal Products, Shiraz, Iran: January 2-3, 2024

The National Congress of Whole Grain Bread and Cereal Products was held at Shiraz University of Medical Sciences with the participation of more than 700 faculty members, researchers, experts, and students from universities, research institutions and centers, policymakers, executive agencies, and producers of flour, bread, and cereal products in Iran. More than 500 articles were submitted to the Congress Secretariat, and ultimately 218 articles were accepted as posters and 60 as lectures, which were presented in 8 specialized panels. The Scientific Committee of the Congress, while appreciating all researchers, policymakers, and executives in the field of whole grain bread and grain products production, summarized their opinions and suggestions in 8 paragraphs as follows:

1. Nutrition panel and health effects of wholemeal bread and grain products:

Complete and accurate scientific information regarding the role of whole grains and grain products in preventing various diseases such as cardiovascular diseases, diabetes, fatty liver, infertility, as well as weight control, especially in children, was presented and discussed in the panel. It is necessary to examine the challenges in society regarding the consumption of healthy bread and grain products, to provide more opportunities for the consumption of these products, and to use scientific findings and experiences from other countries in this regard.

2. Policy panel in the field of production and consumption of wholemeal bread and grain products:

This panel discussed the grouping of wheat based on basic parameters, focusing on producing healthy bread, not necessarily wholemeal bread, considering the shelf life of the product, the safety and quality of bread, people's tastes and culture, using the roller mill method to produce wholemeal flour, principled and incentive pricing for producing healthy and wholemeal bread, and the necessity of monitoring and controlling wholemeal flour in bakeries. In this working group, it was proposed that phytate measurement be included in the Iranian national standard.

3. Panel of traditional and native wholemeal bread types in Iran:

Traditional breads were examined in this panel. It is necessary to take measures to increase the consumption of traditional wholemeal breads, as well as to modify the baking method (proper fermentation, appropriate baking time, appropriate percentage of gluten in the flour used, etc.), train bakers, and apply scientific findings to improve the safety and quality of traditional Iranian breads, including Sangak, Taftun, or Berberi bread.

4. Panel of factors affecting the quality, safety and shelf life of wholemeal bread and grain products:

This panel discussed the use of artificial intelligence to increase productivity and quality in the production of healthy and whole grain bread and healthy grain products, the use of natural functional additives and fermentation to increase the nutritional value of bread and reduce its staleness, the challenges of implementing the whole bread project in 33 bakeries in Shiraz, Iran and ways to control and reduce bread waste. This expert panel emphasizes the need for comprehensive research to examine the safety and quality of whole grain bread and grain products.

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5. Bread and cereal products panel for celiac and special patients:

This panel discussed and exchanged views on the measures taken in the last two years in Fars province, southern Iran regarding nutritional support for Celiac patients, as well as physical and mental complications and problems, epidemiology, causative factors, etc., the problems of providing appropriate food products for Celiac patients and special patients, and the management challenges to support these patients. This panel emphasized the need to identify and attract the support of policymakers to address financial and medical problems, as well as support for the provision, diversity, and easy and inexpensive access to appropriate food products for them, and the application of the experiences of other countries in nutritional support for these patients.

6. Panel on the potential of Iranian wheat for the production of wholemeal flour and bread:

This panel stated that the quality of Iranian wheat varies and it should be determined what product each type of wheat can be used to produce in the market, and that wheat should be improved to produce different products. These cases require extensive scientific information about wheat, wholemeal flour, and various breads. Technical and engineering research institutions have announced their readiness to conduct the necessary research and create a culture of producing wholemeal and healthy bread. Flour and bread in Iran face numerous challenges that require precise and scientific planning to resolve them, and therefore, the production of wholemeal bread will also face more and more specific issues, as will the Iranian flour and bread industry.

7. Flour and Cereal Products Technology Panel:

The effect of the type of equipment and method used in preparing flour from wheat was discussed. The use of starch and other food additives to reduce the glycemic index of bread and improve the process ability of different flours was investigated. It was emphasized that by using different milling methods and using healthy additives, which in many cases are derived from wheat itself, one can ultimately achieve flour with different and appropriate technological and nutritional properties.

8. Wholemeal bread and functional grain products panel:

This panel examined various methods of increasing nutritional properties and converting bread and cereal products into a functional quantity. In this panel, adding micronutrients such as iron and folic acid was suggested as an efficient method for producing bread and eliminating the anemia epidemic in society, and cereal products were introduced as a suitable carrier for many vitamins and nutraceuticals. The use of modified starch in the production of grain products, as well as the enrichment of rice, was emphasized, given that it is the dominant grain among Iranians after bread.

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Int J Nutr Sci 2025;10(1-Supplement)

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Int J Nutr Sci 2025;10(1-Supplement):S1.

International Journal of Nutrition Sciences

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ORAL

The Role of Fat Replacers in Enhancing the Health and Quality of Whole Grain-Based Bakery and Confectionery Products: A Review

Behzad Masoumi[1], Solmaz Abedinzadeh[2], Elham Babaali[3], Habib Abbasi[1,4*]

1. Department of Food Science and Technology, Hazrat Zainab College of Nursing, Larestan University of Medical Sciences, Lar, Iran
2. Food Science and Technology Unit, National Standard Organization, Karaj, Iran
3. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
4. Department of Chemical Engineering, Jundishapur University of Technology, Dezful, Iran

ARTICLE INFO

Keywords:
Fat
Oleogels
Emulgels
Bakery
Health

**Corresponding author:*
Habib Abbasi, PhD;
Department of Chemical Engineering, Jundishapur University of Technology, Dezful, Iran.
Email: habib.abbasi@hotmail.com

ABSTRACT

Whole grain breads, even nutritionally advantageous often face technological challenges as low volume, coarse and dense texture, dark crust, bitter taste, and reduced shelf life. So this review assessed role of fat replacers in enhancing health and quality of whole grain-based bakery and confectionery products. Google Scholar database was searched using related keywords. To enhance texture and delay staling, inclusion of fats and oils in bread formulations are conducted. Various fat replacers were explored, including hydrogels, emulgels, and oleogels, demonstrating their effectiveness in reducing fat content and saturated fatty acids in bakery products. Different methods for these replacers were examined to improve technical and sensory characteristics. Sensory evaluations showed that products with partial fat replacement, especially those using oleogels, are more acceptable in terms of taste and texture. It can be concluded that saturated fats are commonly used to improve texture and delay staling, while their health implications have prompted development of alternatives. Oleogels emerge as innovative fat replacers are capable of offering similar semi-solid properties and provide a healthier fat profile.

Please cite this article as: Masoumi B, Abedinzadeh S, Babaali E, Abbasi H. The Role of Fat Replacers in Enhancing the Health and Quality of Whole Grain-Based Bakery and Confectionery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S1.

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Int J Nutr Sci 2025;10(1-Supplement):S2.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Innovations in Production of Healthier Bakery Products: A Review

Azam Abbasi*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bakery product
Fat and sugar replacement
Acrylamide
Health

ABSTRACT

Bakery product such as biscuits, cracker, and muffins contain wheat flour as main ingredient are used by all sectors of the society. These products have a series of nutritional problems. They have high content of simple sugars, high solid fat content with high trans fatty acid, high allergen protein such as egg or wheat gluten, high content of starch or low amount of dietary fiber because of application of purified wheat or other cereal flours and high acrylamide content. Innovations in production of healthier bakery products were the aims of this review. The researchers investigated three international databases, including PubMed, Science Direct, and Google Scholar. Particular keywords for international databases included bakery product, fat and sugar replacement, acrylamide content. In this work replacing of these less healthy ingredients by some healthy and functional compound was reviewed. Application of artificial or natural sweetener, plant extract as amylase inhibitor, whole cereal grain, and food fiber can decrease glycemic index of the bakery product. There are some ways to reduce the amount of shortening in bakery products Using vegetable liquid oil instead of shortening is nutritionally good but it is not practical. Practical problems of oil application could be resolved by oleogel or hydrogel systems. Allergen protein can be substituted by gluten-free cereal flours and functional protein such as isolated proteins, hydrocolloids, emulsifiers and enzymes. Control of surface browning, addition of antioxidant, amino acids/proteins or asparaginase is example of some practical action for reduction of acrylamide content. It was concluded that high glycemic index carbohydrates, proteins, and fats may be successfully replaced by high nutritional value and safe substances.

*Corresponding author:
Azam Abbasi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: azamabbasi1387@gmail.com

Please cite this article as: Abbasi A. Innovations in Production of Healthier Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S2.

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Int J Nutr Sci 2025;10(1-Supplement):S3.

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Oral

The Effect of Biological Preservatives Based on *Lactobacillus Plantarum* on Improvement of the Quality and Preservation of Whole Bread: A Review

Arghavan Madani, Maryam Abbasvali*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole bread
Lactobacillus plantarum
Biological preservatives
Preservation
Quality

**Corresponding author:*
Maryam Abbasvali, PhD,
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences,
Shiraz University of Medical Sciences, Shiraz, Iran.
Email: abbasvali.m@gmail.com

ABSTRACT

Whole grain bread is made from whole wheat flour without removing the bran and wheat germ that is rich in dietary fibers, minerals, phytochemicals, antioxidants and vitamins; but it is susceptible to fungal infections. This review was conducted to evaluate the effect of biological preservatives based on *Lactobacillus plantarum* on improvement of the quality and preservation of whole bread. Web of Science, Pubmed and Scopus databases were searched using keywords of whole bread, *L. plantarum*, improvement, quality and preservation. Organic acids, carbon dioxide, ethanol, hydrogen peroxide, fatty acids, aceton, diacetyl, cyclic dipeptides, bacteriocins, lactic and acetic acids as the main products of carbohydrate fermentation by *L. plantarum* were shown to have antifungal activities. Also, their utilization in sourdough can improve viscoelasticity, water holding capacity and a more regular gluten secondary structure. The LB-1, F-3 and F-50 of *L. plantarum* play a significant role to improve the quality of the aroma and taste of bread. The FST 1.7 of *L. planarum* can also be used to increase the quality and shelf life of gluten-free breads. So it can be concluded that the use of lactic acid bacteria or cell-free supernatant in combination with bread sourdough can have a significant impact on quality and preservation of whole bread. In this regard, *L. plantarum* with the ability to produce high antifungal metabolites can be considered as a green strategy.

Please cite this article as: Madani A, Abbasvali M. The Effect of Biological Preservatives Based on *Lactobacillus Plantarum* on Improvement of the Quality and Preservation of Whole Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S3.

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Int J Nutr Sci 2025;10(1-Supplement):S4.

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ORAL

Advantages and Challenges on Consumption of Low-Protein Products for Patients with Inborn Errors of Amino Acid Metabolism: A Review

Seyedeh Maryam Abdollahzadeh[1*], Maryam Ghafouri[2]

1. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Student Research Committee, Department of Nutrition, School of Medicine, Hormozgan University of Medical Sciences, Bandar Abbas, Iran

ARTICLE INFO

Keywords:
Low-protein product
Inborn error
Amino acid
Metabolism
Food label

**Corresponding author:*
Seyedeh Maryam Abdollahzadeh, PhD;
Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: maryamabdh@gmail.com

ABSTRACT

Low protein products nowadays continue to become more vastly used by patients with different Inborn Errors of Metabolism (IEAAM), not only phenylketonuria, but also other IEAAM and organic acidemia. This review assessed advantages and challenges on consumption of low-protein products for patients with inborn errors of amino acid metabolism. Google scholar was searched using related keywords. To add more variety to patient's meals and diet, an increasing number of both cereal and non-cereal-based low protein products are continuously introducing to food industry. Though, low protein content of the products allow metabolic dietitians to prescribe more food volume to satisfy the appetite of teens and adults, while still maintaining proper metabolic control, the challenge of food labeling still exists; since 0.0 g protein on food label is a rounded figure, and it may contain up to 0.49 g protein. Besides, the low protein- and disorder-specific amino acid (DSAA)-contents of the products can cause the patients to consume ad libitum, that lead to overweight and obesity. In conclusion, this complication is a challenging issue to both patient and his/her metabolic dietitian, since the process of weight loss is accompanied by catabolism, which in turn causes metabolic crisis (decompensation), DSAA release in to blood stream, and subsequently uncontrolled disease.

Please cite this article as: Abdollahzadeh SM, Ghafouri M. Advantages and Challenges on Consumption of Low-Protein Products for Patients with Inborn Errors of Amino Acid Metabolism: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S4.

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Int J Nutr Sci 2025;10(1-Supplement):S5.

International Journal of Nutrition Sciences

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ORAL

Whole Bread and Nuclear Factor Erythroid 2-Related Factor 2 (Nrf2) Antioxidant Pathway: A Review

Marzieh Akbarzadeh[1*], Mehrdad Behzadi[2]

1. Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole bread
Fiber
Nuclear factor erythroid 2-related factor 2
Antioxidant pathway
Glycation

**Corresponding author:*
Marzieh Akbarzadeh, PhD;
Department of Community Nutrition, School of Nutrition and Food Sciences,Shiraz University of Medical Sciences, Shiraz, Iran.
Email: m_akbarzadeh@sums.ac.ir

ABSTRACT

Whole bread has several nutritional benefits much higher than white bread. One of the important issues related to the whole bread is its superior benefits to human health. Its advantages on health are not only related to its fibers and lower glycemic index, but also due to its association with some antioxidative pathways in the body. The present study aimed to investigate the associations between whole bread and cellular antioxidants systems. We did a literature search in Web of Science, Scopus and Medline finding the associations of whole bread with cell antioxidant defense system. One of the important cell protective ways against endogenous and exogenous insults is the pathway centered by a transcription factor, Nuclear factor erythroid 2-related factor 2 (Nrf2). The Nrf2 pathway is an upstream regulatory pathway activating several antioxidant genes in the cell such as glutathione disulfide, glutathione peroxidase, glutathione transferase, thioredoxin and thioredoxin reductase. Whole bread was shown to act as an activator to this signaling pathway and therefore increase cytoprotective ways. This activation occurs through the advanced glycation end products (AGEs) in the whole bread. In conclusion, whole bread and specially AGEs in it can be considered as activators of Nrf2 pathway and increasing cellular antioxidant enzymes.

Please cite this article as: Akbarzadeh M, Behzadi M. Whole Bread and Nuclear Factor Erythroid 2-Related Factor 2 (Nrf2) Antioxidant Pathway: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S5.

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Int J Nutr Sci 2025;10(1-Supplement):S6.

International Journal of Nutrition Sciences

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Oral

Biofortification Cereals as a Solution for Addressing Malnutrition: A Review

Elham Ashrafi-Dehkordi*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Biofortification
Cereals
Genetic engineering
Malnutrition

ABSTRACT

Malnutrition among mothers and children causes for 45% of all deaths in children under five years of age in poor countries. Additionally, over two billion people worldwide suffer from micronutrient deficiencies, including deficiencies in vitamin A, iron, and zinc. A practical and cost-effective way to provide micronutrients is through biofortified cereals. This review evaluated biofortification cereals as a solution for addressing malnutrition. Google Scholar was searched using related keywords. Various fortification techniques have been developed to improve nutritional quality and promote public health by reducing the risk of adverse health outcomes. These methods include agricultural practices, traditional plant breeding, and modern biotechnology. Traditional breeding techniques involve applying mineral fertilizers through soil or foliar applications, utilizing microbes to enhance nutrient absorption, and cross-breeding plants to achieve optimal gene combinations for effective nutrient availability. In contrast, new breeding methods such as transgenic breeding, genome editing and RNA interference focus on creating balanced nutritional profiles in genetically modified plants by transferring genes from other species, overexpressing genes, and silencing genes. It took nearly a decade to achieve success in cereal crops following the initial development of transgenic plants. Biofortification is considered more economically sustainable compared to other fortification strategies with estimates suggesting that every dollar spent on developing biofortified crops could save up to $17. In conclusion, transgenic biofortified cereals, such as corn, wheat, and rice, have been produced through genetic engineering with increased levels of vitamins (A, B9, C, and E), iron, and zinc.

*Corresponding author:
Elham Ashrafi-Dehkordi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: elhamashrafi@gmail.com

Please cite this article as: Ashrafi-Dehkordi E. Biofortification Cereals as a Solution for Addressing Malnutrition: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S6.

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Int J Nutr Sci 2025;10(1-Supplement):S7.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Unveiling the Nutritional and Health Benefits of Khorasan Wheat; Composition, Advantages, and Challenges: A Review

Mohammad Jafar Dehzad[1], Zahra Moghdani[1], Siavash Babajafari[2*]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat
Antioxidant
Anti-inflammatory
Cardiovascular diseases
Blood glucose

**Corresponding author:*
Siavash Babajafari, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: mj.dehzad@gmail.com

ABSTRACT

Khorasan wheat, an ancient wheat variety that originated in the Khorasan region of Iran, has garnered attention for its distinct nutritional profile and potential health benefits. Compared to common wheat, Khorasan wheat exhibits higher levels of protein, fiber, vitamins, minerals, and antioxidants, making it a healthier option. This review consolidates existing research on the nutritional composition, health advantages, and challenges associated with Khorasan wheat consumption. Google Scholar database was searched using the related keywords. Its unique composition is linked to improved blood glucose regulation, enhanced cardiovascular health, and anti-inflammatory effects. The antioxidant and anti-inflammatory properties of Khorasan wheat may also enhance immune function, reduce oxidative stress, and support gut health. While Khorasan wheat presents several health benefits, its lower yields, and higher cost pose challenges for its large-scale adoption. It can be concluded that further researches are necessary to fully understand the mechanisms underlying its benefits and to address the challenges associated with its production and incorporation into modern diets. Nevertheless, Khorasan wheat's exceptional qualities make it a valuable addition to a balanced diet, offering a range of health benefits.

Please cite this article as: Dehzad MJ, Moghdani Z, Babajafari S. Unveiling the Nutritional and Health Benefits of Khorasan Wheat; Composition, Advantages, and Challenges: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S7.

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Int J Nutr Sci 2025;10(1-Supplement):S8.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Bread Waste in Iran and Strategies for Reduction it: A Review

Haniyeh Naji, Mina Babashahi*

Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Waste management
Sustainability
Iran

**Corresponding author:*
Mina Babashahi, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: m.babashahi21@gmail.com

ABSTRACT

Bread is a significant staple food, providing essential nutritional and cultural value to the Iranian diet and diets worldwide. However, bread waste is an economic and ecological challenge. A significant amount of bread is wasted due to its perishability. This review quantified bread waste in Iran, specifically in Shiraz by identifying the causes, and explore strategies to reduce it. Web of Science, PubMed, and Scopus from 1999 to June 6, 2024 were searched using related keywords. Grey literature was also reviewed. The strategy utilized specific keywords related to bread waste, food supply chains, and waste reduction strategies. Initial search results were screened, and eligible studies were selected for data extraction. After reviewing 129 articles, data was extracted from 25 studies on bread waste. Key waste areas included farms, food service establishments, households, and subsidized bakeries. Shiraz's household bread waste rate was 1.80%, with traditional and non-traditional breads accounting for 1.70% and 2.50%, respectively. The primary reasons for waste were poor flour quality, improper dough preparation, and consumer issues like inappropriate storage and over-purchasing. Waste management included awareness campaigns, the use of surplus bread, eliminating subsidies, and enhancing packaging. In conclusion, tackling this problem necessitates a joint effort by government, industry, and the public. Part of the solution includes establishing wheat growing directives, enhancing equipment used for baking, developing bakers' abilities, and creating an awareness campaign to reduce the amount of bread that goes to waste.

Please cite this article as: Naji H, Babashahi M. Bread Waste in Iran and Strategies for Reduction it: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S8.

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Int J Nutr Sci 2025;10(1-Supplement):S9.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

New Strategies to Extend Bread Shelf Life: A Review

Zohreh Ahmadi, Farzaneh Vaseghi, Enayat Berizi*

Food Hygiene Unit, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Bio-preservation
Shelf life
Spoilage control

ABSTRACT

Extending the shelf life of bread is crucial; while packaging plays an important role by using bio-preservatives such as lactic acid bacteria, animal-derived products like whey, and essential oils. The natural approaches offer a safer way to enhance bread shelf life and ensuring food safety. This review assessed new strategies to extend bread shelf life and utilized a comprehensive literature search strategy using the keywords of bread, bio-preservation, shelf life, and spoilage control across databases of PubMed, Scopus, Web of Science, and Semantic Scholar. Innovative bio-preservation strategies to extend bread shelf life by optimizing formulation and processing were investigated to minimize staling and microbial growth. Sourdough, a traditional method for producing flavorful, long-lasting bread, has gained renewed interest for its role in natural fermentation and bio-preservation. Lactic acid bacteria are central to this process, producing antifungal compounds and organic acids that lower pH, creating an unfavorable environment for spoilage organisms. Notably, strains such as *Lactobacillus plantarum* display significant antifungal properties, enabling a 30% reduction in calcium propionate without affecting shelf life. Incorporating whey protein as another natural method not only extends shelf life but also enhances the nutritional value. The use of hydrolyzed whey in pita bread has been shown to extend shelf life by two days, achieving a one-log reduction in fungal growth and an 85-100% decrease in mycotoxin production. Furthermore, efforts to inhibit mold growth, particularly of *Penicillium* and *Aspergillus* species, have shown that essential oils like cinnamon, clove, and thyme effectively combat bread molds, with eugenol and cinnamaldehyde exhibiting significant antifungal activity. In conclusion, innovative bio-preservation strategies were shown to effectively extend the shelf life of bread while enhancing its nutritional quality and safety to meet growing consumer demand for healthier products.

**Corresponding author:*
Enayat Berizi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: enayat.berizi@gmail.com

Please cite this article as: Ahmadi Z, Vaseghi F, Berizi E. New Strategies to Extend Bread Shelf Life: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S9.

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Int J Nutr Sci 2025;10(1-Supplement):S10.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Ethical and Cultural Principles in Whole Bread Consumption: A Review

Lotfollah Dezhkam[1], Mansour Darvishi Tafvizi[2]*

1. Islamic Education, Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Ethics
Culture
Whole bread

**Corresponding author:*
Mansour Darvishi Tafvizi, PhD;
Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Tafvizi.m@gmail.com

ABSTRACT

Whole bread was shown to reduce complications of some diseases. Culturalization requires a deep and long-term effort in order to change the vision, attitude and behavioral pattern of the people of the society towards the consumption of this product. This review assessed ethical principles in culturalization of whole bread consumption. Google Scholar was searched using related keywords. It was shown that the most attention was paid to ethical considerations in the field of supply chain of whole bread, food security, culturalization and consumption pattern of whole bread. The return of the ethical guidelines presented in the field of culturalization of whole bread is to the two key concepts of social justice and human dignity. Social justice is emerging in the field of whole bread culture as a powerful coordinating concept to for driving social change to address food inequities from a more-than-human perspective. Human dignity is an inherent and inalienable concept of humans. In culturalization, whole bread entitles the people of the society to the rights that can be considered in the individual, collective (especially in the field of human research) and social dimensions. In conclusion, ethics in culturalization of whole bread including supply chain, processing and preparation of bread, access and trade of bread, consumption of whole bread as well as in research, education and advertising based on common, basic and agreed concepts, social justice and human dignity can be organized. It reveals the position of bread as the dominant strength and the main food of the people and the main basis for developing ethical guidelines.

Please cite this article as: Dezhkam L, Darvishi Tafvizi M. Ethical and Cultural Principles in Whole Bread Consumption: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S10.

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Int J Nutr Sci 2025;10(1-Supplement):S11.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Effect of Lactic Acid Bacteria Protective Cultures on Improving Microbial Shelf Life of Tiri Bread

Sara Mazidi[1], Mohammad Hadi Eskandari[1*], Mehrdad Niakousari[1], Reza Mostowfizadeh Ghalamfarsa[2], Mahboobeh Fazaeli[1]

1. Department of Food Science and Technology, School of Agriculture, Shiraz University, Shiraz, Iran
2. Department of Plant Protection, School of Agriculture, Shiraz University, Shiraz, Iran

ARTICLE INFO

Keywords:
Antifungal activity
Lactic acid bacteria
Microbial shelf life
Tiri flat bread

**Corresponding author:*
Mohammad-Hadi Eskandari, PhD;
Department of Food Science and Technology, School of Agriculture, Shiraz University, Shiraz, Iran.
Email: eskandar@shirazu.ac.ir

ABSTRACT

Background: Tiri bread is a single-layered unleavened soft traditional flatbread. Dry Tiri bread has a long shelf life if stored appropriately at room temperature, but soft Tiri bread gets moldy with off-flavor 3-4 days after baking. This study determined shelf life of Tiri bread.

Methods: The physicochemical characteristics and spoiling factors of Tiri bread were examined at 4°C and 25°C. The strains of lactic acid bacteria were screened for antifungal activities against the spoiling factors of Tiri bread. Sourdough and protective culture powder were prepared from the selected lactic acid bacteria and added to the Tiri bread formulation. The physicochemical, microbial, and sensorial characteristics of Tiri bread samples containing sourdough and protective culture powder were investigated too.

Results: Tiri bread properties were thickness (0.4-0.9 mm), water activity (0.82-0.90), moisture content (18.08-24.13%), salt content (1.59-3.24%), pH (5.75-5.95), and total titrable acidity (2.00-2.90 mL;0.1 N NaOH). Spoiling factors were *Aspergillus niger* (31.38%) and shelf life was 10 and 4 days at 4 and 25°C, respectively. The highest fungal growth inhibition was related to *Lactobacillus plantarum* PTCC1896, *L. casei* NCDO151, *and L. helveticus*. *L. plantarum* PTCC1896 powder bread showed the highest shelf life at 4°C (29 days). The highest shelf life was related to calcium propionate bread (9 days), *L. plantarum* PTCC1896 powder bread (8 days), and sourdough *L. plantarum* PTCC1896 bread (7 days) at 25°C. Sourdough and protective culture powder obtained the highest sensory evaluation scores.

Conclusion: *L. plantarum* PTCC1896 was shown to be applied as a biopreservative to improve the shelf life of Tiri bread.

Please cite this article as: Mazidi S, Eskandari MH, Niakousari M, Mostowfizadeh Ghalamfarsa R, Fazaeli M. The Effect of Lactic Acid Bacteria Protective Cultures on Improving Microbial Shelf Life of Tiri Bread. Int J Nutr Sci. 2025;10(1-Supplement):S11.

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Int J Nutr Sci 2025;10(1-Supplement):S12.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Role of Breeding Program in Development of Wheat Quality in Iran: A Review

Mohsen Esmaeilzadeh Moghadam*, Goodarz Najafian, Fariba Naghipour

Seed and Plant Improvement Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran

ARTICLE INFO

Keywords:
Wheat
Bread
Quality
Breeding
Glutenin

ABSTRACT

Bread wheat (*Triticum aestivum* L.) is the most widely grown field crop worldwide. The area grown to wheat is estimated 218 million hectares with a total annual production of about 650 million tons. Wheat is the major crop in 43 countries and supplies food for at least 35% of the world population. Wheat seed storage proteins represent an important source of food and energy and are involved in determination of baking quality. The protein content in wheat grain is highly dependent on genotype, but it is strongly influenced by environmental conditions such as nitrogen availability, water access and temperature during growth especially through the grain filling period. This review determined the role of breeding program in developing wheat quality in Iran. Google Scholar was searched using related keywords. Since 1941, cereal research department at Seed and Plant Improvement Institute (SPII) released 160 wheat types including 144 bread wheat and 16 durum wheat. In this breeding program, different traits were considered to select pure lines to be candidate for release. High yield potential, resistance to biotic and abiotic stresses, high bread making quality and good agronomic traits are selected criteria in wheat breeding program in Iran. Breeding program is long period and during the process, different quality traits were used for testing breeding pure lines. In middle steps, protein quantity and quality such as protein content percentage, zeleny sedimentation value, wet and dry gluten percentage, SDS-sedimentation test were employed to screen breeding materials. For promising lines, dough properties, based on farinograph and extensograph were used to select the candidate line/lines. High and low molecular weight subunits of promising lines with genotypic values for bread making quality determine promising/candidate lines in this wheat breeding program. In conclusion, with these methods, cultivars such as Mehregan, Chamran 2, Sirvan, Barat, etc. with high protein content and strong gluten were released for farmers.

*Corresponding author:
Mohsen Esmaeilzadeh Moghaddam, PhD;
Seed and Plant Improvement Institute, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran.
Email: Esmaeilzadehmohsen@ymail.com

Please cite this article as: Esmaeilzadeh Moghadam M, Najafian G, Naghipour F. The Role of Breeding Program in Development of Wheat Quality in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S12.

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Int J Nutr Sci 2025;10(1-Supplement):S13.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Addressing Key Challenges in Medical Nutrition Therapy of Patients with Celiac Disease: A Review

Sahar Foshati*

Nutritional Sciences, Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Gluten-free diet
Patient compliance
Food insecurity
Nutrition policy

ABSTRACT

The cornerstone of celiac disease (CD) management is a strict gluten-free diet (GFD), which presents challenges for both children and adults. This review outlines key obstacles in medical nutrition therapy for CD patients. Multiple databases such as PubMed, Scopus, and Web of Science as well as the Google Scholar search engine were searched using appropriate keywords up to December 2024 using the keywords of celiac disease, gluten-free diet, patient compliance, food insecurity, food quality, nutrient deficiency and nutrition policy. Adherence to a GFD is often hampered by limited availability and high costs of gluten-free products, coupled with insufficient labeling and the risk of cross-contamination. Social and psychological factors further complicate adherence; children may feel excluded from school events featuring gluten-containing foods, while adults struggle in dining situations, leading to anxiety and social isolation. Nutritionally, CD patients frequently experience deficiencies in iron, calcium, and vitamins D and B12, highlighting the need for ongoing education and support. Additionally, the treatment burden and potential adverse effects of a GFD, along with the quality defects of gluten-free products, pose significant obstacles. Addressing these challenges requires tailored nutrition therapy, often with the guidance of an expert dietitian, although access to such specialized care can be limited for many patients. It can be concluded that managing CD with a GFD involves significant challenges, including high costs, limited availability, and social isolation. Enhanced education, tailored nutrition therapy, and improved access to specialized care are essential for supporting patients effectively.

*Corresponding author:
Sahar Foshati, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: S.Foshati@gmail.com

Please cite this article as: Foshati S. Addressing Key Challenges in Medical Nutrition Therapy of Patients with Celiac Disease: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S13.

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Int J Nutr Sci 2025;10(1-Supplement):S14.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

National Program of Wheat Flour Fortification Using Iron and Folic Acid to Reduce Iron Deficiency and Iron Deficiency Anemia: A Review

Majid Ghayour-Mobarhan[1]*, Khadijeh Bavafa-Valenlia[2]

1. International UNESCO Center for Health-Related Basic Sciences and Human Nutrition, Department of Nutrition, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran
2. Department of Nutrition, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Keywords:
Wheat flour
Fortification
Folic acid
Iron deficiency
Iron deficiency anemia

**Corresponding author:*
Majid Ghayour_Mobarhan, PhD; International UNESCO Center for Health-Related Basic Sciences and Human Nutrition, Department of Nutrition, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
Email: ghayourm@mums.ac.ir

ABSTRACT

WHO report revealed iron deficiency is the most important cause of anemia worldwide and nutritional deficiencies in Iran. This review evaluated national program of wheat flour fortification using iron and folic acid to reduce iron deficiency and iron deficiency anemia. Google Scholar was searched using related keywords. The main cause of iron deficiency anemia (IDA) in developing countries is low iron bioavailability in diet that can be covered with food fortification. In Iran, flour fortification with iron (30 ppm ferrous sulfate) and folic acid (1/5 ppm) began in 2001, and then in 2006. The prevalence of anemia in women in 2000, 2005, 2010, and 2019 was 27.4%, 24.5%, 23%, and 24.1%, respectively. The prevalence of IDA in children under 5 years of age was 32% (2003-2011), 14% (2016-2017), 16.42% (2019), and 19.5% (2022). The prevalence of IDA in Iranian pregnant women was 12.40% (2009), 19.90% (2022), and 15.71% (2024). Its prevalence in women aged 18-49 years was 14.50% (2000), 16% (2013-2011), 12.8% (2011), and 19% (2016-2018) and In 2022, the prevalence of anemia during pregnancy was 19.9%, in children under 5 years of age was 19.5%, in children 5-18 years was 19.9%, and in people older than 18 years of age was 22.6%. By gender, IDA was 12.6% and 17.4% in men aged 5-18 and 19-55 years, respectively, and 22.9% and 15.2% in women aged 5-18 and 19-55 years, respectively. In conclusion, different results of flour fortification with iron and folic acid were shown indicating the special importance of reviewing the flour fortification process.

Please cite this article as: Ghayour-Mobarhan M, Bavafa-Valenlia K. National Program of Wheat Flour Fortification Using Iron and Folic Acid to Reduce Iron Deficiency and Iron Deficiency Anemia: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S14.

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Int J Nutr Sci 2025;10(1-Supplement):S15.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Formulation and Production of Special Improver for Whole Meal Flour in Bread Production

Mehdi Ghiafeh Davoodi[1*], Mehdi Karimi[1], Fariba Naghipour[2]

1. Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center (AREEO), Mashhad, Iran
2. Seed and Plant Improvement Institute, Agriculture Research, Education and Extension Organization (AREEO), Karaj, Iran

ARTICLE INFO

Keywords:
Bread
Whole meal flour
Gluten
Improver
Staling

**Corresponding author:*
Mehdi Ghiafeh Davoodi, PhD;
Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, Mashhad, Iran.
Email: mehdidavoodi@yahoo.com

ABSTRACT

In recent years, due to the increase in the world population and the prominent role of bread in the food basket, efforts have been made to produce whole meal bread with high technological and nutritional quality. This review assessed formulation and production of special improver for whole meal flour in bread production. Google Scholar was searched using related keywords. This depends on extensive factors in the production chain to consumption, including use of wheat varieties with high protein content, method of production and storage of flour, quality of dough production, production process, distribution and storage. In bread production, presence of any disturbing factor in formation of the gluten network is destructive for the dough and bread, and in the process of producing whole meal bread, bran particles weaken the viscoelastic gluten network. In order to reduce the technical problems of whole meal bread production, the use of additives and improvers is one of the most appropriate solutions. Typically, these compounds are used to improve texture, strengthen the gluten network, create softness, uniformity and delay staleness. Among the essential ingredients in formulation of this group of improvers are emulsifiers, which improve the binding of starch and gluten, improve the dough strength, control the size of gas bubbles in the texture and increase the softness of the texture. Another important ingredient in the formulation of whole meal bread improver is ascorbic acid, which is a reducing agent that, by creating disulfide bonds, strengthens the gluten network, increases the ability to retain gas, and produces bread with a fine and uniform cellular structure and ultimately softness of the bread crumb. In conclusion, by providing a suitable improver formulation, the defects that can be predicted in the production of bread from whole meal flour can be eliminated.

Please cite this article as: . Ghiafeh Davoodi M, Karimi M, Naghipour F. Formulation and Production of Special Improver for Whole Meal Flour in Bread Production Int J Nutr Sci. 2025;10(1-Supplement):S15.

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Int J Nutr Sci 2025;10(1-Supplement):S16.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Detection of Pesticide Residues in Iran's Cereals Using Novel Solid Phase Microextraction and QuEChERS Methods

Fatemeh Kardani[1,2,3], Aniseh Zarei Jelyani[1,4], Mohammad Hashemi[5,6*], Marzieh Rashedinia[7,8,9], Saeedeh Shariati[10,11], Rouhollah Mirzaei[4], Masoud Mahdavinia[11], Seyyed Mohammad Ali Noori[5,11]

1. Food and Drug Laboratory Research Center, Food and Drug Administration, MOH&ME, Tehran, Iran
2. Food and Drug Administration, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
3. Chemistry Department, College of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran
4. Food and Drug Administration, Shiraz University of Medical Sciences of Shiraz, Iran
5. Department of Nutrition, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
6. Medical Toxicology Research Center, Mashhad University of Medical Sciences, Mashhad, Iran
7. Food and Supplements Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
8. Medicinal Plants Processing Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
9. Department of Pharmacology and Toxicology, Faculty of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran
10. Student Research Committee, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
11. Department of Toxicology, Faculty of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

ARTICLE INFO

Keywords:
Solid phase microextraction
Molecular imprinted polymer fiber
QuEChERS
Pesticide residues
Iran

**Corresponding author:*
Mohammad Hashemi, PhD;
Medical Toxicology Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
Email: Hashemimd@mums.ac.ir

ABSTRACT

Background: Several researches were conducted to develop a new solid phase microextraction based on integrated molecular imprinted polymer fiber (SPME-MMIPF) method for detection of pesticides in cereal samples using gas chromatography-mass spectrometry (GC-MS), high-performance liquid chromatography-ultraviolet (HPLC-UV) detector and comparison with the conventional QuEChERS method. This study assessed detection of pesticide residues in Iran's cereals using novel solid phase microextraction and quechers methods.

Methods: In QuEChERS method, acetonitrile used as extraction solvent and magnesium sulfate used as water absorbing agent. For SPME-MMIPF method, an MMIPF was synthesized by polymerization of methacrylic acid in presence of ethylene glycoldimethacrylate and azo (bis)-isobutyronitrile. The optimal conditions for the SPME-MMIPF method are: extraction time 30 min, desorption time with toluene 20 min and string speed of the aqueous sample 600 rpm.

Results: Under optimal extraction condition, the figures of merit were obtained for two methods and compared. The linear range of 1-300 µg kg-1 for SPME-MMIPF and 10-250 µg kg^{-1} for QuEChERS was obtained. The detection limit of SPME-MMIPF (0.321-0.335 µg kg^{-1}) method was better than the QuEChERS (0.9-2.6 µg kg^{-1}) method.

Conclusion: The results showed a quantification limit of 0.8-2.2 µg kg^{-1} for SPME-MMIPF and 1.5-5.2 µg kg^{-1} for QuEChERS. The recoveries were in the range of 92-102% and 68-127% for SPME-MMIPF and QuEChERS, respectively.

Please cite this article as: Kardani F, Zarei Jelyani A, Hashemi M, Rashedinia M, Shariati S, Mirzaei R, Mahdavinia M, Noori SMA. Detection of Pesticide Residues in Iran's Cereals Using Novel Solid Phase Microextraction and QuEChERS Methods. Int J Nutr Sci. 2025;10(1-Supplement):S16.

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Int J Nutr Sci 2025;10(1-Supplement):S17.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Effect of Biscuit Fortified with Whey Protein and Wheat Bran on Quality of Life and Mood in Overweight or Obese Adults

Zahra Hassanzadeh-Rostami[1*], Shiva Faghih[2], Azam Abbasi[3]

1. Sepidan Bagherololoom Health Higher Education College, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
3. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Obesity
Whey protein
Wheat bran
Quality of life
Mood

**Corresponding author:*
Zahra Hassanzadeh-Rostami, PhD; Sepidan Bagherololoom Health Higher Education College, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Hassanzadeh_z8@yahoo.com

ABSTRACT

Background: Functional foods are a proper approach to control overweight and obesity, together with weight-loss diets. Poor quality of life and depressed mood are associated problems reported with obesity. This study assessed effect of biscuit fortified with whey protein isolate and wheat bran on quality of life and mood among overweight or obese adults.

Methods: Ninety-six overweight or obese subjects randomly received biscuit fortified with whey protein isolate and wheat bran, whey protein, wheat bran, and control group for 8 weeks. All participants followed a 500 kcal deficit balanced-macronutrients diet. The scores of quality of life and mood were measured as pre- and post-intervention. Quality of life was measured for physical function, functional limitation due to physical problem, functional limitation due to emotional problem, fatigue and lack of energy, emotional well-being, social function, pain, public health, and change in health status. Mood was assessed for socialization, activity level, helplessness, anxiety, and anger.

Results: Quality of life was not significantly different among study groups. No significant difference was seen in mood domains, among the study groups.

Conclusion: Consumption of biscuit fortified with whey protein with or without wheat bran could not improve quality of life and mood in overweight or obese persons.

Please cite this article as: Hassanzadeh-Rostami Z, Faghih S, Abbasi A. The Effect of Biscuit Fortified with Whey Protein and Wheat Bran on Quality of Life and Mood in Overweight or Obese Adults. Int J Nutr Sci. 2025;10(1-Supplement):S17.

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Int J Nutr Sci 2025;10(1-Supplement):S18.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Factors Affecting the Starch Digestibility in Bread: A Review

Sara Hedayati[1]*, Siavash Babajafari[2]

1. Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Starch
Digestibility
Glycemic index

**Corresponding author:*
Sara Hedayati, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: s_hedayati@sums.ac.ir

ABSTRACT

Many starch-rich cereal-based products such as bread made from diverse raw materials such as flour, hydrocolloids, proteins, and lipids have medium to high glycemic indices. Breads undergo baking as a thermal processing, during which, interactions between starch and other molecules modify starch digestibility. The degree of starch digestion affects the caloric content of bread, the amount of glucose available and the amount of starch that reaches the colon. In this review, factors affecting the starch digestibility in bread were evaluated. Google Scholar was searched using related keywords. To investigate this, in vitro methods have been developed to assess the fermentation of indigestible carbohydrates. These evaluations are conducted under anaerobic conditions using fecal samples from healthy donors who have followed a specific diet free from antibiotics for at least three months prior to donation. Baking enhances the digestion of polysaccharides in bread. However, interactions with other elements such as lipids, proteins, non-starch polysaccharides, and phytochemicals, as well as the interactions among starch chains (retrogradation), can slow down the rate of starch hydrolysis or increase its resistance to hydrolysis. Starch digestion can vary significantly depending on the presence of other macro and micronutrients. Two primary mechanisms that can reduce starch hydrolysis have been identified: the modulation of digestive enzymes and the formation of complexes between starch and dietary compounds. In conclusion, dietary compounds influence starch bioavailability and the glycemic index of bread in various ways, and thermal processes can create interactions between starch and dietary compounds that alter the nutritional properties of bread.

Please cite this article as: Hedayati S, Babajafari S. Factors Affecting the Starch Digestibility in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S18.

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Int J Nutr Sci 2025;10(1-Supplement):S19.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Effect of Postbiotics of Lactic Acid Bacteria on Microbial Contamination in Bread: A Review

Hossein Bozorgpour Samakoush, Fatemeh Dezhgard, Fatemeh Hemmati*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Postbiotic
Lactic acid bacteria
Microbial contamination
Antimicrobial

ABSTRACT

Postbiotics are products derived from microbial metabolites, cell wall components of microorganisms, and bioactive compounds produced by microorganism and contain enzymes, peptides, polysaccharides, short-chain fatty acids, and components of inactivated microbial cells. These metabolites reduce the growth of harmful microorganisms and serve as natural preservatives. This review assessed the effect of postbiotics of lactic acid bacteria on microbial contamination in bread. Databases of PubMed, Google Scholar, and Scopus were searched using related keywords. The use of sourdough instead of direct postbiotic LAB spray is a more effective method for controlling mold contamination in bread. However, this approach may reduce control over the bacterial composition and fermentation conditions, as sourdough naturally contains a variety of microorganisms. Among the strains of lactic acid bacteria, *Lactobacillus plantarum* has been predominantly used as a postbiotic, with its metabolites showing the greatest antifungal effects. Postbiotics not only improve the texture of bread but also extend its shelf life, on average from 3 to 6 days. In some studies, an increase in bread shelf life of up to 10 days has been reported. Postbiotics can create a significant transformation in the baking industry and promote healthier and more sustainable food options. Postbiotic compounds offer numerous health benefits, including reducing blood sugar levels, increasing satiety, and improving nutritional quality. In conclusion, the addition of postbiotics to bakery products represents a promising frontier as an innovative approach to enhance product quality, reduce food waste, and improve consumer health.

*Corresponding author:
Fatemeh Hemmati, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Fhemmati88@gmail.com

Please cite this article as: Bozorgpour Samakoush H, Dezhgard F, Hemmati F. The Effect of Postbiotics of Lactic Acid Bacteria on Microbial Contamination in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S19.

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Int J Nutr Sci 2025;10(1-Supplement):S20.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

The Influence of Sourdough on Improvement of the Quality of Whole Bread: A Review

Ali Heshmati*

Nutrition and Food Safety Department, Hamadan University of Medical Science, Hamadan, Iran

ARTICLE INFO

Keywords:
Sourdough
Whole bread
Bakery products
Lactic acid bacteria
Acetic acid bacteria

**Corresponding author:*
Ali Heshmati, PhD;
Nutrition and Food Safety Department, Hamadan University of Medical Sciences, Hamadan, Iran.
Email: a.heshmati@umsha.ac.ir
ali_heshmaati@yahoo.com

ABSTRACT

The use of sourdough as a leavening agent in place of yeast for whole bread fermentation could resolve some of problems regarding to whole bread quality. The goal of this study was to show the potency of sourdough in quality improvement of whole bread. SID, PubMed, Scopus, Wiley Science Direct and Google scholar were searched for studies published between 2000 and 2024. Sourdough, whole bread, yeast, acetic acid bacteria, lactic acid bacteria, bakery products, and fermentation were used as search terms. The articles that the role of sourdough in quality improvement of bread reported were collected. Sourdough could be produced by spontaneous fermentation of flour-water mixture (Type 1), starter culture-initiated fermentation processes (Type 2), and dehydrated type 2 (Type 3). The quality of sourdough depends on dough yield, inoculated microorganisms, fermentation temperature and time, substrate, etc. Sourdough could effectively improve whole bread's nutritional and sensory attributes (taste, aroma, flavor, and texture), reduce stale rate, and extend shelf life. In addition, sourdough has various health benefits. In conclusion, the benefits of using sourdough to improve the quality of whole bread require the varieties of high-quality sourdough commercially available throughout Iran.

Please cite this article as: Heshmati A. The Influence of Sourdough on Improvement of the Quality of Whole Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S20.

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Int J Nutr Sci 2025;10(1-Supplement):S21.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Celiac Disease in Children: A Review

Naser Honar*

Neonatal Research Center, Pediatric Gastroenterology Unit, Department of Pediatrics,Shiraz University of Medical Sciences, School of Medicine, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Pediatric
Children
Gluten

*Corresponding author:
Naser Honar, MD;
Neonatal Research Center, Pediatrics Gastroenterology Unit, Department of Pediatrics, School of Medicine, Namazi Teaching Hospital, Abu Ali Sina for Medicine and Organ Transplant Hospital, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: honarn@sums.ac.ir

ABSTRACT

Celiac disease, also known as gluten-sensitive enteropathy, is a common immune-mediated inflammatory disease of the small intestine caused by sensitivity to dietary gluten and related proteins in genetically predisposed individuals. This review assessed Celiac disease in children. Google Scholar was searched using related keywords. The prevalence of celiac disease, as detected by screening programs using specific antibodies, is substantially increased in the high-risk groups when compared to the general population. For these groups, the risk of celiac disease is approximately 3-10-fold higher than in the general population. In the past, celiac disease was classically presented in infants and young children with malabsorption and failure to thrive. Now, with the increasing recognition of subclinical and non-classical presentations and widely available serologic testing, celiac disease is often diagnosed in older children with milder gastrointestinal or non-gastrointestinal manifestations. Classically, celiac disease presented between 6 and 24 months of age, after the introduction of gluten into the diet. The children have chronic diarrhea, anorexia, abdominal distension and pain, and failure to thrive or weight loss; some may also have vomiting. If the diagnosis is delayed, children may present with signs of severe malnutrition. In conclusion, treatment of the pediatric patient with celiac disease begins with dietary counseling to establish a gluten-free diet. It also includes addressing micronutrient deficiencies, monitoring the response to gluten elimination, and further evaluating patients who do not respond.

Please cite this article as: Honar N. Celiac Disease in Children: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S21.

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Int J Nutr Sci 2025;10(1-Supplement):S22.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Association of Whole Grain Consumption with Inflammation and Cardiovascular Risks: A Review

Mohammad Javad Hosseinzadeh-Attar[1,2*]

1. Department of Clinical Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran
2. Cardiac Primary Prevention Research Center, Cardiovascular Diseases Research Institute, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Whole grains
Nutrition
Cardiovascular diseases
Inflammation

**Corresponding author:*
Mohammad Javad Hosseinzadeh-Attar, MD, PhD;
Department of Clinical Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran.
Email: hosseinzadeh.MD.PhD@gmail.com

ABSTRACT

Even though several studies investigated the association between the consumption of whole grains and cardiovascular diseases (CVD) events, death from any cause, and inflammation, the findings have not shown a definitive conclusion. This review evaluated association of whole grain consumption with inflammation and cardiovascular risks. Databases of PubMed, MEDLINE, EMBASE, and Web of Science were searched until December 1, 2024 using proper keywords. No correlation was noticed between whole grain consumption and inflammation; nevertheless, a 30 g increase in whole grain intake could reduce the incidence of stroke, coronary heart disease, and overall mortality. This may be attributed to whole grains potentially mitigating CVD and overall mortality due to their high dietary fiber content, which is negatively correlated with CVD and all-cause mortality. The whole grains may reduce CVD by alleviating cardiometabolic risk factors. It was shown that consumption of whole grains significantly lowers fasting glucose levels, systolic blood pressure, and both LDL and total cholesterol. Participants with high whole-grain diets exhibited reduced body weight in comparison to those with the lowest whole grain consumption. Third, inflammation significantly contributes to CVD, and the intake of whole grains has been associated with reduced levels of C-reactive protein and interleukin-6. Ultimately, whole grains may mitigate cardiovascular disease by providing antioxidant benefits via their phytochemical constituents, including carotene and polyphenols. In conclusion, whole grains are a good source of fiber that could reduce the risk of CVDs and all-cause mortality.

Please cite this article as: Hosseinzadeh-Attar MJ. Association of Whole Grain Consumption with Inflammation and Cardiovascular Risks: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S22.

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Int J Nutr Sci 2025;10(1-Supplement):S23.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Chemical Contaminants in Bread and Their Health Impacts: A Review

Gholamreza Jahed Khaniki*

Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Bread safety
Polycyclic aromatic amines
Acrylamide
Mycotoxins
Toxic metals

ABSTRACT

Bread is an important part of the human diet, as a source of energy and high contents of essential materials, nutritious proteins, and dietary fiber; it also supplies important minerals, vitamins, and other micronutrients that are essential for the maintenance of optimal health. But the raw materials and processed bread might be contaminated to a variety of chemical contaminants of bread caused by processing and its environmental origin in varying quantities at various stages of bread production. This review assessed materials and sources of chemical contaminants in bread, public health concerns and the methods of chemical contamination control in bread and bakery products. This study by designing relevant keywords searched in PubMed, Scopus, Google Scholar, SID and Science- direct databases. Acrylamide, furan and furan derivatives, polycyclic aromatic amines, monochloropropanediols, glycidol, and their esters are carcinogens that are being formed in starchy and high-protein foodstuffs, including bread, through baking, roasting, steaming, and frying due to the Maillard reaction. Other groups of bread contaminants are mycotoxins, toxic metals, and pesticides. Unpermitted additives such as baking soda, potassium bromide, sodium hydrosulfite (Blankit), etc. may be intentionally added by workers to improve the quality of traditional bread. In conclusion, all chemical contaminants can be hazardous exposure effects to human health. Some of these chemical contaminants can be neurotoxic, hepatotoxic, nephrotoxic, mutagenic and a probable carcinogenic to humans.

*Corresponding author:
Gholamreza Jahed Khaniki, PhD;
Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: ghjahed@sina.tums.ac.ir, ghjahedkh@yahoo.com

Please cite this article as: Jahed Khaniki GR. Chemical Contaminants in Bread and Their Health Impacts: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S23.

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Int J Nutr Sci 2025;10(1-Supplement):S24.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Healthy Bread Role in Traditional Iranian Medicine: A Review

Amir Mohammad Jaladat*, Mohammad Hossein Sharif

Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Healthy bread
Traditional medicine
Nutrition
Grain
Dough

**Corresponding author:*
Amir Mohammad Jaladat, PhD;
Research Center for Traditional Medicine and History of Medicine, Department of Persian Medicine, School of Medicine,Shiraz University of Medical Sciences, Shiraz, Iran.
Email: drjaladat@gmail.com

ABSTRACT

Bread in Iran has a history as old as the history of ancient Iran, the word *nan* (bread in Persian) has its roots in the Sasanian Pahlavi language, and bakers have had a high social position as the producers of Iranian predominant food, and the oldest windmills have been identified in the land of Iran, Nashtifan. Therefore, the experiences left by Iranian scientists regarding bread are a valuable scientific source, and we try to review this written heritage. Healthy bread in traditional Iranian medicine was assessed in this review. In this study, first, data related to bread were extracted from the well-known scientific sources of traditional Iranian medicine, including Canon of Medicine written by Avicenna and Makhzan-Al-Aadvieh of Aghili Khorasani Shirazi. Then these findings were compared and discussed with current scientific evidences in PubMed and Google Scholar databases. According to traditional Iranian medicine texts, bread can be prepared from various grains, including wheat, barley, rice, rye, and even the fruit of the carob tree. Of course, the consumption of each of these breads is recommended according to different physical characteristics, such as body fat, digestive power, and individual metabolic assessment (body heat or coldness). There are also interesting points about choosing the right grain, dough rising, additives, and the time of bread consumption, which can improve bread digestion. These points are consistent with recent known characteristics of healthy bread and the nutritional and medicinal properties of different grains. In conclusion, using Iranian traditional resources along with today's scientific findings about healthy bread can lead to better nutrition and a healthier society.

Please cite this article as: Jaladat AM, Sharif MH. Healthy Bread Role in Traditional Iranian Medicine: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S24.

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Int J Nutr Sci 2025;10(1-Supplement):S25.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Wheat Composition and Their Impact on Challenges of Whole Bread Production: A Review

Akbar Jokar*

Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Fars, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole bread
Gluten
Starch
Gliadin
Glutenin

ABSTRACT

Whole grain bread has attracted increasing attention in recent years due to their high health benefits. Wheat typically has 13-17% bran, 80-85% endosperm and 2-3% germ. Whole wheat flour contains all of the parts of wheat especially germ and bran. Some parts of wheat, especially bran insoluble fibers, adversely influence the quality of dough and bread. This review determined wheat composition and their impact on challenges of whole bread production. Google Scholar was searched using related keywords. The most important compositions in wheat and their effects on the quality of dough and bread will be discussed. The content and quality of protein, starch and fibers in wheat, damaged starch, particle size of flour, active enzymes, and flour degree of extraction are crucial characteristics of wheat and flour for bread producing. During the preparation of dough and baking bread, a large number of physicochemical phenomena such as the formation of the gluten network, the expansion of gas/air cells in dough, starch gelatinization, and gluten and starch-gluten thermal fixation occur. These phenomena are influenced by rheological properties of flour, which in turn are affected by the composition and genetics of wheat, as well as the milling of wheat and the degree of flour extraction. Gluten is made up of gliadin and glutenin; while gliadin is spherical and responsible for the plasticity of the dough and glutenin is in the form of filaments or polymers and is responsible for strength and stability of dough. Starchy carbohydrates have positive effects on the quality of bread; while non-starchy carbohydrates or fibers have negative effects. In conclusion, as the degree extraction of wheat whole flour is nearly 100%, and this has a negative effect on the formation of the gluten network of the dough, the quality of the wheat must be in the highest rank.

*Corresponding author:
Akbar Jokar, PhD;
Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Shiraz, Iran.
Email: a.jokar@areeo.ac.ir

Please cite this article as: Jokar A. Wheat Composition and Their Impact on Challenges of Whole Bread Production: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S25.

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Int J Nutr Sci 2025;10(1-Supplement):S26.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Improving the Quality of Flour in Whole Bread Production: A Review

Mahdi Karimi[1*], Zahra Sheikholeslami[2], Arezou Rouhi[2]

1. Technical Research and Agricultural Engineering Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO Mashhad, Iran
2. Department of Food Science and Technology, Ferdowsi University of Mashhad, Mashhad, Iran

ARTICLE INFO

Keywords:
Whole bread
Whole flour
Wheat quality
Quality
Rheological improvement

**Corresponding author:*
Mahdi Karimi, PhD;
Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran.
Email: mahdikarimi753@yahoo.com

ABSTRACT

Whole wheat flour presents several unique challenges for milling and the flour industry, offering flours with very different particle sizes and functionalities. Additionally, whole wheat flour contains higher levels of enzymatic activity, lipids, and antioxidants compared to regular wheat flour, which can affect its final usage and storage characteristics. This review attempts to introduce the various classes of wheat commonly found around the world and to assess their suitability for different types of flour and flour-based products. Additionally, a comparison is made between three types of whole flour produced using three different milling methods, along with an exploration of the challenges associated with each. Google Scholar was searched using proper keywords. The results of this study indicate that whole flour, if not made from suitable wheat, can create problems for bakers during the baking process. To address the deficiencies in the flour, enzymes, gums, emulsifiers, and oxidizing agents can be used to improve its properties and make whole flour suitable for baking. In conclusion, whole flour should be made from strong wheat with high protein content, and if the flour does not have the appropriate consistency and quality, it should be modified to ensure that the resulting bread is of high quality and suitable for consumption.

Please cite this article as: Karimi M, Sheikholeslami Z, Rouhi A. Improving the Quality of Flour in Whole Bread Production: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S26.

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Int J Nutr Sci 2025;10(1-Supplement):S27.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Application and Importance of Yeast Extract Use as a Salt Substitute in Bread: A Review

Asma Kazemi*, Siavash Babajafari

Nutrition Research Center, School of Nutrition and food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Salt substitute
Yeast extract
Bread
Sodium chloride

**Corresponding author:*
Asma Kazemi, PhD;
Nutrition Research Center, School of Nutrition and food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: kazemiasma66@gmail.com

ABSTRACT

The average salt intake in Iran is about twice the maximum permissible recommended by the World Health Organization. A practical way to reduce sodium from salt consumption is to replace sodium chloride with a salt substitute. Previous studies on salt substitutes have mostly investigated the effects of potassium and magnesium salts. These salt substitutes may have side effects for diseases such as stroke and acute coronary syndrome. Also, the use of potassium and calcium salts beyond a certain limit causes a metallic and bitter taste. In this study, we reviewed the studies that investigated the effect of yeast extract as a partial salt substitute on various characteristics of product, especially bread. Moreover, we assessed its effects on health outcomes. To find related articles, Google Scholar, Embase, PubMed, Web of Science, and Scopus databases were searched. Numerous studies have investigated the effect of yeast extract as a salt replacement in various foods, mainly in meat products. Only one study assessed the effect of yeast extract on various characteristics of bread. Results of this study indicted acceptable sensory evaluations, physicochemical characteristics, microbial count, and shelf life of the bread with reduced salt containing yeast extract. No study investigated the effect of foods that their salt has been substituted by yeast extract on health outcomes. East extract could be considered as an acceptable inexpensive alternative salt substitute. In conclusion, partial replacement of bread salt with yeast extract could be as an effective approach in reducing dietary sodium intake. Future studies should assess health impact of yeast extract as a slat substitute on various health outcomes.

Please cite this article as: Kazemi A, Babajafari S. Application and Importance of Yeast Extract Use as a Salt Substitute in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S27.

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Int J Nutr Sci 2025;10(1-Supplement):S28.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Health Impact of Functional Foods Including Bread and Its Products: A Review

Nabi Shariatifar, Razieh Noroozi, Seyedeh Mahsa Khodaei*

Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Bread
Functional foods
Health

**Corresponding author:*
Seyedeh Mahsa Khodaei, PhD student; Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: mahsa.kh2016.2016@gmail.com

ABSTRACT

Functional foods are defined as foods that provide health benefits beyond basic nutrition, particularly in preventing chronic diseases through essential elements and bioactive compounds. This concept emerged in Japan during the 1980s, driven by the increasing prevalence of diet-related diseases, which led to the fortification of foods with dietary fibers, poly-alcohols, fatty acids, peptides, and vitamins. The primary aim of functional foods is to enhance overall health and prevent conditions such as neural tube defects, osteoporosis, digestive disorders, and arthritis. This review assessed functional foods including bread and its products. Google Scholar was searched using related keywords. A review of 50 articles on functional bread revealed significant insights into its health benefits. Statistics indicate that diet contributes to one in three cancer deaths, highlighting the importance of dietary choices. Incorporating calcium, minerals, and other beneficial components into foods can improve heart and bone health while reducing risks associated with cancer, diabetes, high blood pressure, and degenerative diseases. Given that bread is a staple in the Iranian diet and a key carbohydrate source, transforming it into a functional food could positively impact dietary habits. Effective strategies for producing functional bread include reducing calories, substituting fats and sugars, increasing fiber content, and utilizing natural ingredients instead of artificial additives. Furthermore, incorporating antioxidant-rich compounds like phenolic acids and polyphenols, along with herbs and spices such as ginger and green tea extract, can enhance its health benefits. In conclusion, functional bread has the potential to significantly contribute to improved health outcomes and chronic disease prevention.

Please cite this article as: Shariatifar N, Noroozi R, Khodaei SM. Health Impact of Functional Foods Including Bread and Its Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S28.

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Int J Nutr Sci 2025;10(1-Supplement):S29.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Composition and Health-Promoting Effects of Whole Bread: A Review

Zahra Sohrabi[1], Atefeh Kohansal[2*], Amirhossein Asadi[2]

1. Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Endosperm
Bran
Germ
Whole bread
Health

ABSTRACT

Wheat contains various bioactive compounds including polyphenols, phenolic acids, ferulic acids, alkylresorcinols, flavonoids, lignans, sterols, and the like. While comparing the whole grain versus white grain, the whole grain encompasses bran, endosperm, and germ. However, the white grain is only composed of endosperm. This review assessed health-promoting effects and composition of whole bread. Google Scholar was searched using the related keywords. Whole bread could exert beneficial effects regarding its composition. The wheat germ is a unique source of highly concentrated nutrients such as proteins, lipids, sugars and minerals, as well as tocopherols (vitamin E), B-group vitamins, carotenoids, flavonoids, phytosterols, and policosanols, all of which could bear health-promoting effects such as lowering plasma and liver cholesterol, reducing cholesterol absorption, inhibiting platelet aggregation, improving physical endurance, retarding aging, improving fertility, and preventing and curing carcinogenesis. Another important layer is the wheat bran. The aleurone layer in the bran is particularly rich in nutrients like the minerals iron, magnesium, zinc, calcium, and almost all of the B-group vitamins. The inner layer called endosperm is the layer holding carbohydrates, protein, and small amounts of some B vitamins and minerals. Epidemiological studies have shown that consumption of whole grains is associated with the reduced risk of oxidative-stress related chronic diseases and age-related disorders, such as cardiovascular diseases, carcinogenesis, type 2 diabetes, obesity, and all-cause mortality. The 2015-2020 Dietary Guidelines for Americans recommend that at least half of all grain intakes come from whole grains. In conclusion, regarding all health-promoting effects, whole bread is highly recommended for various populations especially for preventing chronic diseases and reducing mortality and morbidity.

**Corresponding author:*
Atefeh Kohansal, MSc;
Student Research Committee,
Shiraz University of Medical
Sciences, Shiraz, Iran.
Email: atefeh.kohan1991@yahoo.com

Please cite this article as: Sohrabi Z, Kohansal A, Asadi AH. Composition and Health-Promoting Effects of Whole Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S29.

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Int J Nutr Sci 2025;10(1-Supplement):S30.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Impact of Accelerated Ageing Condition on Physicochemical Characteristics of Wheat Flour

Neda Maftoonazad[1*], Shekoofeh Sarikhani[2]

1. Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran
2. Seed and Plant Improvement Department, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat flour
Accelerated ageing
Storage time
Storage temperature
Gluten

**Corresponding author:*
Neda Maftoonazad, PhD;
Agricultural Engineering Research Department, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran.
Email: n.maftoon@areeo.ac.ir

ABSTRACT

Background: Wheat flour needs to be stored in suitable condition to retain its good quality for nutrition and industrial uses and decreases economic losses. This study evaluated impact of accelerated ageing condition on physicochemical characteristics of wheat flour.

Methods: Wheat samples (cv. *Pishgam*) were obtained from Eghlid, Iran and winnowed, while broken grains were separated. They were placed in the air tight buckets of uniform size for each treatment and stored in different temperatures (30, 40 and 50°C) for specified times (2, 5 and 8 days) after increasing their moisture content (16, 18 and 20%) by addition of water. Samples were then milled and physicochemical properties (moisture content, protein, ash, wet gluten, pH and falling number) were determined. Response surface methodology with central composite design was applied to determine the significance of the factors.

Results: Increasing storage temperature and time resulted in increasing protein, falling number and ash, while wet gluten, pH and moisture content decreased. By increasing moisture content, wet gluten, protein, ash and falling number decreased while moisture content and pH increased. The optimum condition for accelerated ageing of wheat grain contained 16% moisture content, storage temperature of 40.74°C for 2.57 days.

Conclusion: Accelerated ageing of wheat by applying higher temperatures for a specific period of time with controlled humidity can improve wheat grains to obtain the appropriate quality of flour after milling.

Please cite this article as: Maftoonazad N, Sarikhani S. The Impact of Accelerated Ageing Condition on Physicochemical Characteristics of Wheat Flour. Int J Nutr Sci. 2025;10(1-Supplement):S30.

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Int J Nutr Sci 2025;10(1-Supplement):S31.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Evaluation of Public Knowledge and Attitude toward Whole-Bread Consumption

Maryam Maharat*, Ourang Eelami, Marzie Kamran, Seyedeh Parisa Moosavian, Azam Farmani, Zeinab Rashidi, Sare Mooze

Department of Community Nutrition, Vice-Chancellery for Health, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole bread
Knowledge
Attitude
Iran

**Corresponding author:*
Maryam Maharat, MSc;
Department of Community Nutrition, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Maharatnut@mail.com

ABSTRACT

Background: Whole bread consumption can improve the function of the digestive system, prevents obesity and overweight, and reduces diabetes, cardiovascular diseases and cancer. Therefore, this study investigated public knowledge and attitude toward whole-bread.

Methods: In a cross-sectional study, 720 adults in Shiraz, Iran were enrolled and their data were collected through face to face interviews.

Results: Totally, 78% of the participants were women, 22% were men, 62.2% had a diploma or higher education, 54.2% consumed lavash, 34% Sangak, 2.7% Barbari and 9.1% other breads (Taftoon, fancy, and local bread). Regarding adult's knowledge about various breads, 76.2% distinguished between these two breads, and 57.6% of them stated that whole bread contains bran, but only 16.9% of people had correct knowledge (containing bran and germ). About 26.5% of participants were aware of one of the benefits of whole bread and 43.9% mentioned all the benefits considered by the researcher (prevention of obesity and overweight, fatty liver, high blood pressure, diabetes, and cardiovascular disease).

Conclusion: Considering the importance and effective role of bread in the health of the society, it is expected that appropriate policies will be made in order to increase the awareness of the people and increase the number of bakeries that supply whole bread. Also, according to the results of the present study, the main reason for not consuming whole bread is unknowing the location of the bakeries that bake whole bread. Therefore, it is recommended to plan for proper notification to the community.

Please cite this article as: Maharat M, Eelami O, Kamran M, Moosavian SP, Farmani A, Rashidi Z, Mooze S. Evaluation of Public Knowledge and Attitude toward Whole-Bread Consumption. Int J Nutr Sci. 2025;10(1-Supplement):S31.

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Int J Nutr Sci 2025;10(1-Supplement):S32.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Importance of Functional Grain-Based Products: A Review

Razzagh Mahmoudi[1*], Leila Manafi[2]

1. Department of Food Hygiene and Safety, Health School, Medical Microbiology Research Center, Qazvin University of Medical Sciences, Qazvin, Iran
2. Department of Food Hygiene and Safety, Health School, Health Products Safety Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

ARTICLE INFO

Keywords:
Functional food
Functional grains
Probiotics
Public health
Cancer

**Corresponding author:*
Razzagh Mahmoudi, PhD;
Medical Microbiology Research Center, Qazvin University of Medical Sciences, Qazvin, Iran.
Email: r.mahmodi@yahoo.com

ABSTRACT

Nowadays, due to the increasing awareness of most consumers around the world about the health benefits of "functional foods" or "functional foods", their production has increased relatively; These products contain probiotics, prebiotics, omega-3 fatty acids, vitamins, antioxidants, and minerals. Due to their functional characteristics, functional products provide energy and basic nutrition, but they also significantly contribute to health and prevent diseases that threaten consumers' health. This study assessed the importance of functional grain-based products. Google Scholar, Pub Med, and Science Direct databases were searched using keywords of functional food, probiotics, public health, and grain-based products. Functional grains have beneficial effects on the human digestive system due to their high content of indigestible carbohydrates, phytochemicals, and fiber. Including these healthy food combinations in people's diets helps prevent chronic diseases such as high blood pressure, cancer, diabetes, cardiovascular disease, and high cholesterol in people at risk. There are currently two types of grain-based functional foods available on the market, including the conventional type, which includes whole grains such as barley and brown rice. The other includes the modified type, in which the basic cereal composition is enriched with fatty acids, vitamins, fiber, and mineral salts; from this type, we can refer to enriched pasta and bread. In conclusion, considering the importance of these products in providing health, increasing household awareness about the daily and regular consumption of functional grains is a very important step towards improving public health.

Please cite this article as: Mahmoudi R, Manafi L. The Importance of Functional Grain-Based Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S32.

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Int J Nutr Sci 2025;10(1-Supplement):S33.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Natural Additives and Fermentation Methods for Delaying Staling and Enhancing Nutritional Value in Bread: A Review

Safoora Pashangeh[1], Majid Majlesi[2]*, Mahsa Firoozabadi[3]

1. Faculty of Agriculture, Jahrom University, Jahrom, Iran
2. Faculty of Health and Nutrition Sciences, Yasuj University of Medical Sciences, Yasuj, Iran
3. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Quality
Nutrition
Fermentation
Staling

*Corresponding author:
Majid Majlesi, PhD;
Faculty of Health and Nutrition Sciences, Yasuj University of Medical Sciences, Yasuj, Iran.
Email: majid.majlesi@yums.ac.ir

ABSTRACT

Bread staling and nutritional quality are key factors in consumer acceptance, especially for gluten-free and functional breads. In this review, natural additives and fermentation methods to delay staling and enhancing nutritional value in bread were assessed. Google Scholar database was searched using proper keywords up to 2024. Ingredients such as acorn and carob flour were shown to improve gluten-free bread by increasing fiber and antioxidant levels, thus enhancing nutritional value and slowing staling. Sourdough fermentation with strains like *Pediococcus acidilactici* and *Pediococcus pentosaceus* also improves bread quality by reducing mechanisms related to staling, such as starch retrogradation and gluten degradation. Studies on black bean flour combined with fermented wheat bran have demonstrated significant improvements in the texture and baking quality of composite breads, attributed to bean proteins and acidity from sourdough fermentation. Additionally, fermentation with *Ganoderma lucidum* acts as a quality enhancer and staling inhibitor for wheat bread, helping retain moisture and softness. The combined effects of these natural additives and fermentation processes have consistently resulted in breads with longer shelf life, improved texture, and higher nutritional value. It can be concluded that the integration of functional ingredients with sourdough or fungal fermentation offers promising strategies to improve bread quality and delay staling. These approaches support innovations in producing more nutritious and longer-lasting breads.

Please cite this article as: Pashangeh S, Majlesi M, Firoozabadi M. Natural Additives and Fermentation Methods for Delaying Staling and Enhancing Nutritional Value in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S33.

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Int J Nutr Sci 2025;10(1-Supplement):S34.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Recent Advances in Application of Biosurfactants/Bio-emulsifiers in Bakery Products: A Review

Habib Abbasi[1,2], Maryam Ranjbar Zahediani[3], Nastaran Nikjoo[4], Behzad Masoumi[5*], Delara Moradi Mirhesari[6]

1. Department of Chemical Engineering, Jundi-Shapur University of Technology, Dezful, Iran
2. Department of Food Science and Technology, School of Nursing, Larestan University of Medical Sciences, Lar, Iran
3. Department of Nutrition Sciences, Ewaz School of Health, Larestan University of Medical Sciences, Ewaz, Iran
4. Food Safety and Hygiene, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
5. Department of Food Science and Technology, School of Nursing, Larestan University of Medical Sciences, Lar, Iran
6. Food Hygiene and Safety, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Biosurfactants
Bio-emulsifiers
Bakery products
Clean label
Sustainable ingredient

**Corresponding author:*
Behzad Masoumi, PhD;
Department of Food Science and Technology, School of Nursing, Larestan University of Medical Sciences, Lar, Iran.
Email: masoumi.bhz@gmail.com

ABSTRACT

The rising demand for clean-label and a sustainable ingredient in food industry has heightened interest in biosurfactants and bio-emulsifiers. This review assessed recent advances in application of biosurfactants/bio-emulsifiers in bakery products. PubMed, Scopus and Google Scholar database was searched utilizing proper keywords. Biosurfactants could markedly improve sensory qualities in whole bread, including texture, flavor, and aroma that are compatible with consumer demand for allergen-free and vegan-friendly products. However, cost-effectiveness, regulatory approvals, and scalability present ongoing barriers to widespread adoption. It can be concluded that biosurfactants and bio-emulsifiers offer multifunctional benefits in the bakery sector, supporting clean-label trends and sustainable innovation in bread products.

Please cite this article as: Abbasi H, Ranjbar Zahediani M, Nikjoo N, Masoumi B, Moradi Mirhesari D. Recent Advances in Application of Biosurfactants/Bio-emulsifiers in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S34.

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Int J Nutr Sci 2025;10(1-Supplement):S35.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Dietary Intake of Chromium and Barium through Consumption of Bread and Cereals among Shiraz Population, Southern Iran

Maryam Safarirad[1], Mohsen Shahdadi[1], Enayat Berizi[2], Azam Abbasi[2], Fatemeh Hemmati[2], Seyed Mohammad Mazloomi[2*]

1. Food Safety and Hygiene, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Cereal
Chromium
Barium
Diet

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

Background: The presence of heavy metals in cereals and bread products can be a safety risk. This study investigated the amount of chromium and barium in diet through consumption of bread and cereals among Shiraz population, Southern Iran.

Methods: Sampling of different breads and cereal products was done from 5 different parts of Shiraz city and then heavy metals were extracted in the laboratory by wet digestion method. ICO-OES was used to determine the amount of metal and relevant analyzes.

Results: Average daily intake of chromium and barium and the contribution of each to entry of metals into the body for different breads of lavash (0.071, 0.076), Berberi (0.077, 0.024), Sangg (0.184, 0.043) and Tufton (0.009, 0.004) mg per day were determined. These measures for cereals as rice (0.191, 0.024), corn (0.021, 0.003), pasta (0.00, 0.287), vermicelli (0.00, 0.001), string (0.012, 0.002) mg per day were identified. Based on risk analysis, the amount of HQ for bread was 0.0004 for chromium and 2.20E-7 for barium. The amount of HQ for grain was 0.0008 for chromium and 6.4 E-7 for barium. Total carcinogenic risk (TCR) of chromium was 4.98 E-7 for bread and 9.58E-7for cereals.

Conclusion: Based on findings, it can be concluded that the bread and cereals consumed by the population of Shiraz do not pose a health risk in terms of the contribution of metals to the body.

Please cite this article as: Safarirad M, Shahdadi M, Berizi E, Abbasi A, Hemmati F, Mazloomi SM. Dietary Intake of Chromium and Barium through Consumption of Bread and Cereals among Shiraz Population, Southern Iran. Int J Nutr Sci. 2025;10(1-Supplement):S35.

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Int J Nutr Sci 2025;10(1-Supplement):S36.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Effect of Different Processes on Reduction of Aflatoxin in Cereals: A Review

Farzaneh Mohammadi[1], Azra Salehi[2], Seyed Mohammad Mazloomi[2*]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Aflatoxin
Aspergillus flavus
Aspergillus parasiticus
Cereal

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

Aflatoxins, especially those produced by *Aspergillus flavus* and *A. parasiticus*, are harmful mycotoxins that contaminate various grains and nuts and can poses immunosuppressive, mutagenic, teratogenic, and carcinogenic health risks and economic challenges. Aflatoxin contamination mainly occurs during the cultivation, harvesting, and storage of grain production. The high moisture content at harvest, inadequate drying methods, and poor storage conditions significantly increase the risk of aflatoxin presence in grains. This review assessed the effect of different processes on reduction of aflatoxin in cereals. Google Scholar was searched using proper keywords. Processing techniques to remove aflatoxin in grains are classified into physical (de-hulling, color classification through UV fluorescence and multispectral analysis, dry milling, and sorting and washing techniques), chemical (aflatoxin reduction via acid treatment and ozone treatment), and biological approaches (antagonistic yeasts, such as *Kluyveromyces lactis*, as well as natural extracts like garlic and kalonji oil). In chemical approaches, use of citric acid or sodium bicarbonate resulted in significant decreases in aflatoxin levels. Ozone is effective in degrading aflatoxins in various grains. Biological methods involve using. The biological detoxification achieved with these extracts can reduce aflatoxin concentrations; while maintaining grain quality. Effectively managing aflatoxin contamination in grains is essential for ensuring food safety and upholding trade standards. In conclusion, a comprehensive strategy that integrates physical, chemical, and biological methods can greatly reduce aflatoxin levels. Ongoing research into these processing techniques will improve their applicability and effectiveness in diverse agricultural settings.

Please cite this article as: Mohammadi F, Salehi A, Mazloomi SM. The Effect of Different Processes on Reduction of Aflatoxin in Cereals: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S36.

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Int J Nutr Sci 2025;10(1-Supplement):S37.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Effective Methods in Reduction of Phytic Acid of Grains: A Review

Azra Salehi[1], Farzaneh Mohammadi[2], Seyed Mohammad Mazloomi[1]

1. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Phytic acid
Grain
Reduction method

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD; Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

1, 2, 3, 4, 5, 6-hexakis dihydrogen phosphate, phytic acid, inositol hexophosphate or IP6, is a polyphosphate derived from plant tissues of cereal, legumes, and bran. This compound has anti-cancer and antioxidant properties. It interacts with divalent minerals (such as calcium) to produce insoluble complexes. For this reason, phytic acid significantly reduces the bioavailability of minerals and acts as an anti-nutrient. Hence, its reduction in cereals is essential. This review evaluated the effective methods for reduction of phytic acid in grains. Science Direct, PubMed, and Google Scholar were searched using the keywords of reduction, phytic acid, and grain. Eight articles were randomly selected between 1998 and 2025. Several Methods are effective in the reduction of phytic acid in cereals. These methods include germination, enzymatic, soaking, and milling. (i) Phytase enzyme activity can increase during Germination. Therefore, this method can reduce phytic acid content by about 40%. (ii) Enzyme treatment via exogenous phytase enzymes can effectively hydrolyze phytic acid. Phytase can be extracted from microbial, plant, and animal sources. Also, microbial phytase is extracted from bacteria, fungi, and yeast. (iii) Soaking that increases the endogenous enzymes in grains. This process is done by immersing the grains in water, which activates the endogenous phytase enzymes by about 2-23% in the grains. The optimal temperature and pH for this method are 45-65˚C and 5-6, respectively. Soaking time can also affect its reduction. (iv) Milling that can effectively reduce the levels of phytic acid in grains. This is due to the removal of the outer layers of the grain, where phytic acid is concentrated. However, milling has major disadvantages, such as the removal of minerals and dietary fiber. In conclusion, in order to increase and improve the nutritional quality of cereals, it is essential to reduce phytic acid. The results showed that reducing phytic acid levels is possible using various processes.

Please cite this article as: Salehi A, Mohammadi F, Mazloomi SM. Effective Methods in Reduction of Phytic Acid of Grains: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S37.

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Int J Nutr Sci 2025;10(1-Supplement):S38.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Impact of Whole Grain Bread on Cardiovascular Health: A Review

Abdolhamid Mosallanezhad*, Zahra Mosallanezhad, Mohammad Jalali

Nutrition Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain bread
Cardiovascular health
Dietary fiber
Glycemic control

ABSTRACT

Cardiovascular diseases (CVDs) remain the leading cause of mortality globally, with dietary factors playing a pivotal role in prevention and management. Whole grain bread, a dietary staple rich in fiber, vitamins, minerals, and bioactive compounds, has been associated with improved cardiovascular outcomes. This review highlighted the evidence supporting the cardioprotective effects of whole grain bread consumption. Google Scholar was searched using related keywords. The primary mechanism underlying these benefits is the high dietary fiber content, particularly soluble fiber, which improves lipid profiles by reducing LDL cholesterol and increasing HDL cholesterol. Whole grains also have a low glycemic index, promoting better glycemic control, a critical factor in mitigating diabetes-related cardiovascular risks. Additionally, whole grain bread is abundant in antioxidants such as phenolic acids, which combat oxidative stress, a major contributor to atherosclerosis. Epidemiological studies suggest that regular consumption of whole grain products, including bread, is associated with a reduced risk of coronary artery disease, stroke, and hypertension. Clinical trials further support these findings, demonstrating improved arterial flexibility and reduced markers of inflammation, such as C-reactive protein (CRP), in individuals who consume whole grain bread compared to refined bread. However, challenges remain in promoting whole grain bread consumption, including consumer preference for refined bread and varying definitions of "whole grain" in food labeling. Strategies to overcome these barriers include public health campaigns, reformulation of bread to improve palatability, and clearer labeling standards. In conclusion, incorporating whole grain bread into the diet is a simple yet effective strategy to enhance cardiovascular health. Policymakers and health professionals should emphasize its role in dietary recommendations to curb the burden of CVDs globally. Further research is needed to explore the long-term effects and the potential for personalized dietary interventions.

*Corresponding author:
Abdolhamid Mosallanezhad, PhD;
Nutrition Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Hamid2011.Mosl@yahoo.com

Please cite this article as: Mosallanezhad A, Mosallanezhad Z, Jalali M. The Impact of Whole Grain Bread on Cardiovascular Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S38.

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Int J Nutr Sci 2025;10(1-Supplement):S39.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Association between Whole Grain Intake, Diet Quality, and Nutrient Intake in Children: A Review

Fatemeh Shafiee[1], Zahra Mousavi-Shirazi-Fard[2*], Sahand Behzadi-Azad[3], Zahra Mirshekaran[3]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Children
Diet
Quality
Nutrients

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Grains and its products are the main food of people all over the world. This review investigated the relationship between whole grain consumption, diet quality, and nutrient intake in children. PubMed, Scopus and Google Scholar databases were searched using related keywords. Children who consumed higher amounts of whole grains had significantly better diet quality compared to those who consumed lower amounts. These children showed higher intake of some nutrients such as dietary fiber, vitamin B6, iron, magnesium, folate and phosphorus. Whole grain consumption was shown to be associated with a decrease in total fat, protein and cholesterol intake. It can be concluded that whole grains play an important role in improving diet quality and nutrient intake in children. Despite challenges in increasing whole grain consumption such as taste and flavor preferences, and lack of awareness, the benefits make it crucial to promote whole grain intake from an early age. Effective strategies include parents and healthcare professional education, improving taste and acceptance, increasing the availability and persuade food manufacturing companies to manufacture healthier whole grain products.

Please cite this article as: Shafiee F, Mousavi-Shirazi-Fard Z, Behzadi-Azad S, Mirshekaran Z. The Association between Whole Grain Intake, Diet Quality, and Nutrient Intake in Children: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S39.

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Int J Nutr Sci 2025;10(1-Supplement):S40.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Assessment of Baking Quality of Wheat Produced by Farmers in Iran during 2018-2023

Fariba Naghipour*, Goodarz Najafian, Mohsen Esmaeilzadeh Moghadam, Tohid Najafi Mirak, Sara Sanjani, Shahriyar Jasemi

Seed and Plant Improvement Institute, Agriculture Research, Education and Extension Organization (AREEO), Karaj, Iran

ARTICLE INFO

Keywords:
Wheat
Protein
Quantity
Quality
Bakery

**Corresponding author:*
Fariba Naghipour, PhD;
Assistant Professor of Seed and Plant Improvement Institute, Agriculture Research, Education and Extension Organization (AREEO),Karaj, Iran.
Email: faribanaghipour@yahoo.com

ABSTRACT

Background: In recent years, the attention of seed producers and farmers, in addition to maximum efficiency production, has also been focused on improving the quality characteristics of wheat. Therefore, the current research was implemented in Seed and Plant Improvement Institute in order to know the quality status of wheat produced in different regions of the country during 2018-2023.

Methods: For this purpose, 9791 wheat samples were collected from 31 provinces. Then, the quality was evaluated after the aging time and the quality status was reported in the form of quality maps.

Results: The results showed that the average of hectoliter weight was 78.10 Kg/hL, which was placed in the very heavy class. In addition, the average of the protein content was 11.75% and was in the middle class. Accordance by the national standard of Iran (No. 104), wheat produced in Hormozgan province, Iran with the highest amount of protein (12.57%), first-grade wheat, and Zanjan province, Iran with the lowest amount of protein (10.74%), produced third-grade wheat. Also, the five-year average for wet gluten content was 26.22% and SDS sedimentation height was 67.92 mm.

Conclusion: According to the obtained qualitative information and the quality zoning maps that show the state of wheat quality in the country in a simple way, it can be said that the wheat produced in the southern and southwestern provinces of the country have acceptable bakery quantity and quality; hence, with the proper distribution of wheat in the country, we can expect uniform and favorable quality from the final product.

Please cite this article as: Naghipour F, Najafian G, Esmaeilzadeh Moghadam M, Najafi Mirak T, Sanjani S, Jasemi S. Assessment of Baking Quality of Wheat Produced by Farmers in Iran during 2018-2023. Int J Nutr Sci. 2025;10(1-Supplement):S40.

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Int J Nutr Sci 2025;10(1-Supplement):S41.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Epidemiology and Presentation of Celiac Disease: A Review

Ramin Niknam*

Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Epidemiology
Prevalence
Celiac disease
Anti-transglutaminase

ABSTRACT

Celiac disease (CD) is a common autoimmune disorder. CD can present with different clinical patterns of symptoms including gastrointestinal (GI) and non-GI. The prevalence of CD in the general population is approximately 1%. This review assessed epidemiology and presentation of Celiac disease. Google Scholar was searched using proper keywords. Some studies conducted by the Fars Celiac Registry Center (Accreditation ID: IR.SUMS.REC.1399.525) affiliated with Shiraz University of Medical Sciences showed that non-GI manifestations of CD are increased and associated with some variables. For example, increasing age can increase the chances of developing neurological diseases, osteoporosis/osteoporosis and thyroid diseases in CD patients, while there was no significant association between the level of anti-transglutaminase antibodies and these disorders. In conclusion and in addition to genetic factors, other potential risk factors for CD such as smoking, exposure to infection in early life, mode of delivery, types of infant milk consumption, and age of gluten intake have also been investigated, but the results are inconclusive and further research is needed.

**Corresponding author:*
Ramin Niknam, MD;
Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: niknamramin@yahoo.com

Please cite this article as: Niknam R. Epidemiology and Presentation of Celiac Disease: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S41.

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Int J Nutr Sci 2025;10(1-Supplement):S42.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Application of Artificial Intelligence in Bakery Industry: A Review

Seyed Mohammad Ali Noori[1,2*]

1. Toxicology Research Center, Medical Basic Sciences Research Institute, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
2. Department of Nutrition, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

ARTICLE INFO

Keywords:
Artificial intelligence
Bakery
Food industry

***Corresponding author:**
Seyed Mohammad Ali Noori, PhD;
Department of Nutrition, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.
Email: Sma.noori@gmail.com

ABSTRACT

Bakery industry is undergoing a transformation with the integration of artificial intelligence (AI) that offers opportunities to enhance various aspects of the baking process, from production to inventory management and recipe development and customer experience. In this review, application of AI-driven methods in the bakery industry was assessed. Google Scholar was searched using related keywords. AI algorithms can analyze ingredient properties, vast datasets of recipes, and personalize nutritional profiles, consumer preferences to generate novel flavor combinations, and optimize existing recipes for taste, texture, and cost-effectiveness. AI-powered sensor technologies and vision systems ensuring consistent product quality can enable precise monitoring of baking parameters, and minimizing waste. AI not only reduces operational costs and enhances efficiency; but also unlocks possibilities for innovation and personalized product offerings, and catering to evolving consumer demands. AI-powered forecasting models optimize inventory level predict demand with greater accuracy, and minimizing waste from overproduction or spoilage. Smart packaging, equipped with sensors and AI provides real-time information on product freshness and quality, reducing food waste at the consumer level, and enhancing consumer trust. AI-powered chatbots and personalized recommendation systems enhance customer engagement and drive sales through targeted marketing and customized product offerings. In conclusion, by embracing AI, the bakery industry can achieve greater efficiency, consistency, and innovation, paving the way for a future where technology and culinary artistry converge to create exceptional baked goods and customer experiences.

Please cite this article as: Noori SMA. Application of Artificial Intelligence in Bakery Industry: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S42.

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Int J Nutr Sci 2025;10(1-Supplement):S43.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Whole Grain Impact on Microbiota and Health Status: A Review

Zamzam Paknahad*

Department of Clinical Nutrition, School of Nutrition, Isfahan University of Medical Sciences, Isfahan, Iran

ARTICLE INFO

Keywords:
Whole grains
Microbiota
Health

ABSTRACT

Intestinal microbial balance is closely relevant to human diseases and health status. The gut microbiota provides essential capacities for the fermentation of non-digestible substrates like dietary fibers and endogenous intestinal mucosa. Diet is a major factor to determine the types and proportion of the microorganisms present in gut microbiota. With an unhealthy diet, bacterial imbalance can occur and results in inflammation, infection, gastrointestinal diseases, and possible contributions to diabetes mellitus and obesity. So this review assessed whole grains effect on microbiota and health status. In order to select the relevant articles, databases including Google Scholar, PubMed, and Scopus were searched employing keywords of whole grains, microbiota and health status. Dietary fibers escape digestion in the upper gastrointestinal tract and are fermented by bacteria in the colon and produce beneficial metabolites, such as short-chain fatty acids, which have been proven to be advantageous for human health. The short-chain fatty acids can improve gut barrier integrity, glucose, and lipid metabolism, and regulate the immune system, the inflammatory response, and blood pressure. Therefore, targeting the gut microbiota with dietary strategies that leads to an increased production of short-chain fatty acids may benefit cardio-metabolic health too. Increased consumption of whole grains as a major source of fiber is recommended across the world due to their association with a reduced risk of chronic diseases. One of the proposed mechanisms behind these protective effects is the fermentation of prebiotic cereal dietary fibers by the colonic microbiota. It can be concluded that society's health can be changed through food and dietary recommendations.

*Corresponding author:
Zamzam Paknahad, PhD;
Department of Clinical Nutrition,
School of Nutrition,
Isfahan University of Medical Sciences,
Isfahan, Iran.
Email: paknahad@hlth.mui.ac.ir

Please cite this article as: Paknahad Z. Whole Grain Impact on Microbiota and Health Status: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S43.

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Int J Nutr Sci 2025;10(1-Supplement):S44.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Modeling the Effects of Wheat Bran Quantity and Particle Size on Certain Bread Dough Properties Using Response Surface Methodology

Majid Majlesi[1], Safoora Pashangeh[2]*, Shiva Rouhi[3]

1. Faculty of Health and Nutrition Sciences, Yasuj University of Medical Sciences, Yasuj, Iran
2. Faculty of Agriculture, Jahrom University, Jahrom, Iran
3. Department of Food Hygiene, Veterinary Faculty, Kazerun Branch, Islamic Azad University, Kazerun, Iran

ARTICLE INFO

Keywords:
Bread
Bran
Dough
Particle size
Quantity

**Corresponding author:*
Safoora Pashangeh, PhD;
Faculty of Agriculture, Jahrom University, Jahrom, Iran.
Email: s.pashangeh@jahromu.ac.ir

ABSTRACT

Background: Wheat bran is widely added to bread dough to enhance its nutritional value; while bran can alter dough characteristics and impact the bread's texture, volume, and consumer acceptance. This study examined the effects of wheat bran on bread dough.

Methods: Wheat bran was added at levels of 5%, 10%, and 15% by weight and particle sizes of fine, medium, and coarse. Dough rheology, bread volume, and crumb structure were later assessed. Dough samples were prepared following standard baking protocols. Response Surface Methodology (RSM) was employed to evaluate the interactive effects of bran quantity and particle size on dough properties.

Results: Increase in wheat bran content decreased dough elasticity and specific bread volume, while larger particle sizes resulted in coarser crumb structures. Fine bran particles at lower concentrations exhibited the least negative impact, preserving the bread's volume and structure. RSM indicated a significant interaction between bran level and particle size, identifying optimal bran levels and particle sizes to balance nutritional and sensory qualities.

Conclusion: The quantity and particle size of wheat bran significantly affects bread dough properties suggesting that small amounts of fine-particle bran can enhance the nutritional value of bread with minimal impact on quality.

Please cite this article as: Majlesi M, Pashangeh S, Rouhi S. Modeling the Effects of Wheat Bran Quantity and Particle Size on Certain Bread Dough Properties Using Response Surface Methodology. Int J Nutr Sci. 2025;10(1-Supplement):S44.

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Int J Nutr Sci 2025;10(1-Supplement):S45.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Challenges and Prospects of Bread Status in Iran: A Review

Hamed Pouraram*

Nutrition Sciences Unit, Community Nutrition Department, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Bread
Wheat
Challenges
Price
Iran

**Corresponding author:*
Hamed Pouraram, PhD;
Nutritional Sciences Unit,
Department of Community
Nutrition, School of Nutritional
Sciences and Dietetics,
Tehran University of Medical
Sciences,Tehran, Iran.
Email: h-pouraram@tums.ac.ir

ABSTRACT

Bread constitutes the primary dietary staple for the population, supplying approximately 40-60% of the energy and 40-45% of the protein intake. This review evaluated the challenges and prospects on bread status in Iran. Google Scholar, PubMed, Scopus and SID databases were searched using related and proper keywords. The annual per capita bread consumption in Iran stands at 160 kg, in stark contrast to the global average of merely 25 kg. Low-income demographics derive about 70-80% of their caloric intake from bread, underscoring the critical importance of producing healthy and high-quality bread. Expert assessments indicate that the quality of bread produced domestically is suboptimal. Key factors influencing bread production include the quality of raw materials, the adoption of appropriate technology, and the proficiency of bakers. This article endeavors to examine the global status of bread, identify significant domestic challenges, and propose viable solutions. Recommendations include: the elimination of bread subsidies, the formulation of a strategic plan, the reduction of government intervention to foster a competitive market, and the enhancement of government support policies. In conclusion, these policies should focus on improving wheat cultivation practices, directing academic research, ensuring continuous oversight, and reforming and liberalizing bread pricing.

Please cite this article as: Pouraram H. The Challenges and Prospects of Bread Status in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S45.

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Int J Nutr Sci 2025;10(1-Supplement):S46.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Functional Food Production and Management of Upcoming Industrial Challenges: A Review

Ehsan Sadeghi[1*], Maral Neyestani[2], Mahya Soltani[2], Leila Zare[2]

1. Department of Food Industries Faculty of Nutrition Sciences and Food Industries, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Student Research Committee of the Faculty of Nutrition Sciences and Food Industries, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Enrichment
Functional foods
Production
Nutrients
Bioactive compounds

**Corresponding author:*
Ehsan Sadeghi, PhD;
Department of Food Industries
Faculty of Nutrition Sciences and
Food Industries, Kermanshah
University of Medical Sciences,
Kermanshah, Iran.
Email: ehsan.sadeghi59@yahoo.com

ABSTRACT

On the one hand, there is a deficiency of nutrients, especially vitamins, unsaturated fatty acids, etc. On the other hand, the increased consumption of ready-to-eat food products with low nutritional value can be an important factor in the occurrence of various digestive diseases, cardiovascular diseases, immune system, nervous system, etc. This review assessed functional food production and management of upcoming industrial challenges. Google Scholar was searched using related keywords. In order to create a balance in the intake of bioactive compounds and micronutrients, to combat diseases and nutritional deficiencies, adding them to the food matrix can be the best solution available. Although the main goal of producing functional foods is to prevent various diseases, today one of the other important reasons for this purpose is to improve the quality of life of people in society by adding bioactive compounds. Despite all the advantages mentioned for fortification, this process faces challenges during product production. These challenges include incorrect regulatory strategies that create a barrier to the manufacturer for the production of functional foods, creating an undesirable taste in the food product, the loss of the added nutrient compound during food processing and its storage until consumption and its bioavailability in the body. In order to reduce these problems, adding the optimal amount of the nutrient compound prevents the creation of an undesirable taste and adding it at the appropriate stage of the process helps to maintain it during processing and storage. In conclusion, appropriate legislation to support the production of functional foods can increase its production and, as a result, improve the health of the people in the community.

Please cite this article as: Sadeghi E, Neyestani M, Soltani M, Zare L. Functional Food Production and Management of Upcoming Industrial Challenges: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S46.

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International Journal of Nutrition Sciences

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ORAL

Production of Functional Cake Containing Whole Wheat Flour Using Chemical and Enzymatic Modifications of the Formulation

Zahra Sheikholeslami[1], Bahareh Sahraiyan[2*], Mahdi Karimi[1]

1. Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran
2. Food Quality and Safety Research Department, ACECR, Khorasan Razavi Branch, Mashhad, Iran

ARTICLE INFO

Keywords:
Cup cake
Functional
Whole meal flour
Enzymatic modification
Emulsifier

**Corresponding author:*
Bahareh Sahraiyan, PhD;
Food Quality and Safety Research Department, ACECR, Khorasan Razavi Branch, Mashhad, Iran.
Email: Baharehsahraiyan@yahoo.com

ABSTRACT

Background: Cellulose texture and the size of coarse wheat bran particles can reduce the quality of baking products containing whole meal flour. Therefore, production of functional cake containing whole wheat flour using chemical and enzymatic modification was investigated.

Methods: The mixture of xylanase enzyme (0.04%), sodium stearoyl 2-lactylate emulsifiers (SSL), and tartaric acid mono and diglyceride esters (DATAM, 0.5%) and sugar alcohol sorbitol (3%) were used to produce cupcakes containing whole meal flour with different degrees of extraction (78, 88 and 96%). The physicochemical characteristics and overall acceptance of the cakes were evaluated.

Results: The results showed that with the increase in the degree of flour extraction and the presence of additives in the formulation, the moisture content of the samples increased. With increasing bran percentage (growing degree for extraction), a specific volume of cake decreased. The presence of improver (enzyme mixture, emulsifiers, and sugar alcohol) increased these two parameters. The cake sample containing flour with an extraction degree of 88%, enzymes, emulsifiers, and sugar alcohol had the lowest firmness during one month of storage.

Conclusion: The sample containing flour with an extraction degree of 88%, 0.04% xylanase enzyme, 0.5% DATUM, and SSL emulsifiers, and 3% sugar alcohol sorbitol obtained the highest overall acceptance score and it introduced as the best sample.

Please cite this article as: Sheikholeslami Z, Sahraiyan B, Karimi M. Production of Functional Cake Containing Whole Wheat Flour Using Chemical and Enzymatic Modifications of the Formulation. Int J Nutr Sci. 2025;10(1-Supplement):S47.

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Int J Nutr Sci 2025;10(1-Supplement):S48.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

The Role of Fortified Rice Kernels in Improvement of Nutritional Quality and Promotion of Community Health: A Review

Mehdi Yousefi, Negin Zarei*

Zist Khorak Elahieh, Shiraz, Iran

ARTICLE INFO

Keywords:
Rice
Fortification
Nutrition
Quality
Community health

ABSTRACT

Rice, more widely consumed than other cereals, is a crucial vehicle for fortifying foods to combat vitamin and mineral deficiencies. Hidden hunger affects 30% of the global population, particularly the low-income classes, leading to health issues such as anemia, osteoporosis, diabetes, short stature, and abortion. Fortifying rice and restoring separated nutrients, which loses many key nutrients during the milling, is effective in improving health, especially for vulnerable group such as children, pregnant, and lactating women. This review determined the role of fortified rice kernels in improving nutritional quality and health community. Google Scholar was searched using proper keywords. Rice is enriched using dusting, coating, or extrusion technologies. These methods include mixing fortified rice kernels with standard rice in ratios of 0.5-2%, which retain nutrients after cooking or even frying. The cost of the enrichment method is minimal compared to the treatment and healthcare costs resulting from nutritional diseases. The effectiveness of enriched rice consumption in Brazil, India, Mexico, the Philippines, and Thailand was studied and evaluated. For example, in the fortification of rice with iron, it was observed that the consumption of at least 13 mg of iron per day significantly improved serum ferritin levels and reduced iron deficiency. Rice enriched with vitamin A significantly improved the pupillary threshold in night-blind pregnant women. In Costa Rica, the Philippines, and Thailand, adding micronutrients, especially B vitamins, resulted in significant improvements in hemoglobin levels and anemia among children, as well as reductions in Beriberi disease and neural tube defects. It can be concluded that rice fortification is an effective, high-yield, and cost-effective strategy to combat micronutrient deficiencies and improve public health quality on a large scale.

*Corresponding author:
Negin Zarei, PhD;
Zist Khorak Elahieh, Shiraz, Iran.
Email: negin.zarei26@gmail.com

Please cite this article as: Yousefi M, Zarei N. The Role of Fortified Rice Kernels in Improvement of Nutritional Quality and Promotion of Community Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S48.

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International Journal of Nutrition Sciences

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ORAL

The Pilot Implementation of Subsidized Whole Wheat Bread Production and Distribution in Fars Province: A Review on Steps toward Public Health Promotion

Mehdi Jamali[1], Seyed Mohammad Mazloomi[2,3]*, Seyed Vahid Hosseini[4], Mohammad Hadi Imanieh[5], Morteza Sharifi[6]

1. Directory General, Grain and Government Trading Company, Fars Province, Shiraz, Iran
2. School of Nutrition and Food Sciences, and Director of Food and Beverage Evaluation and Monitoring, Shiraz University of Medical Sciences, Shiraz, Iran
3. Nutrition Research Center, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
4. Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
5. Department of Pediatric Gastroenterology, Gastroenterohepatology Research Center of Nemazee Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
6. Department of Civil Engineering, National University of Skill, Tehran, Iran

ARTICLE INFO

Keywords:
Pilot study
Whole wheat bread
Public health
Iran

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD;
School of Nutrition and Food Sciences, Shiraz University of Medical Sciences,
Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

In February 2023, a pilot program was launched for production and subsidized distribution of whole wheat bread in Fars Province, Shiraz, Iran and subsequently expanded across the province to promote public health by increasing access to whole wheat bread as a rich source of dietary fiber, micronutrients, and bioactive compounds. High quality whole wheat flour was provided to selected bakeries to enable the production and distribution of whole grain bread-retaining bran, germ, and nutritional value-at a government-subsidized price. First, 17 bakeries were enrolled based on their experience, excellent hygiene standards, and strong motivation to produce whole wheat bread, to serve as a model for future expansion. The program was developed and executed through effective collaboration among executive, regulatory, health, and professional sectors. It was a multidimensional approach to encompass the entire supply chain from wheat procurement and flour production to bread quality control, baker training, and public awareness campaigns to encourage whole wheat consumption. Other critical components were regular quality monitoring, strict adherence to hygiene guidelines, evaluation of consumer feedback, and continuous process improvement. In conclusion, the successful implementation of this pilot revealed the feasibility of scaling this model nationwide. Continued policy support, standard updates, and sustained public education are essential to institutionalize whole wheat bread as part of healthier national dietary patterns. The contributors to this project were the Governor of Fars Province, the Grain and Government Trading Company of Fars, Shiraz University of Medical Sciences, Fars Agricultural Jihad Organization, Sepidan Flour Factory, and the Bakers' Union of Shiraz.

Please cite this article as: Jamali M, Mazloomi SM, Hosseini SV, Imanieh MH, Sharifi M. The Pilot Implementation of Subsidized Whole Wheat Bread Production and Distribution in Fars Province: A Review on Steps toward Public Health Promotion. Int J Nutr Sci. 2025;10(1-Supplement):S49.

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Int J Nutr Sci 2025;10(1-Supplement):S50.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Nutritional Support for Celiac Patients in Fars Province, Southern Iran: A Review on Pioneering Steps to Improve Patients' Quality of Life

Seyed Mohammad Mazloomi[1*], Mehdi Jamali[2], Morteza Sharifi[3], Siavash Babajafari[4], Seyed Vahid Hosseini[5]

1. School of Nutrition and Food Sciences, Food and Beverage Monitoring and Evaluation, Shiraz University of Medical Sciences, Shiraz, Iran
2. Directory General of Grain and Commercial Services, Fars Province, Shiraz, Iran
3. Department of Civil Engineering, National University of Skill, Tehran, Iran
4. School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Iran
5. Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Nutrition
Quality of life
Iran

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD;
School of Nutrition and Food Sciences, Food and Beverage Evaluation and Monitoring, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

Since 2022 for the first time in the country, Fars Province, southern Iran has initiated pioneering actions to support celiac patients by establishing a celiac committee and clinic at Shiraz University of Medical Sciences and other universities in the fifth region of the country. The number of diagnosed celiac patients in the province in 2022 was 400 that increased to 1,500 in 2023. Also, the number of centers for gluten-free food products rose from two to thirteen during the same period for nutritional support plan of celiac patients and to improve dietary challenges for these patients in the province. This crucial step was conducted with collaboration of entities such as Fars Governor's Office, the Food and Beverage Monitoring and Evaluation Management of the Food and Drug Deputy and the Health Deputy of Shiraz University of Medical Sciences, the School of Nutrition and Food Science, the Fars Agricultural Jihad Organization, the General Directorate of Grain and Commercial Services of Fars Province, and a charitable organization. In this plan, the subsidized wheat flour allocation provided to Iranians was converted into gluten-free food products for celiac patients. This measure allowed celiac patients to benefit more from the advantages of gluten-free flour and products. In conclusion, these comprehensive and innovative actions are an example of successful synergy between executive, regulatory, and health institutions, which were able to improve the quality of life for celiac patients in Fars Province and pave the way for replicating this model in other provinces of the country.

Please cite this article as: Mazloomi SM, Jamali M, Sharifi M, Babajafari S, Hosseini SV. Nutritional Support for Celiac Patients in Fars Province, Southern Iran: A Review on Pioneering Steps to Improve Patients' Quality of Life. Int J Nutr Sci. 2025;10(1-Supplement):S50.

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Int J Nutr Sci 2025;10(1-Supplement):S51.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Important Steps Taken to Improve the Safety and Health of Agricultural Products in Fars Province, Southern Iran: A Review

Seyed Mohammad Mazloomi[1,2*], Mojtaba Dehghanpour[3], Mohammad Hadi Imanieh[4], Mohammad Javad Raei[5], Seyed Vahid Hosseini[6]

1. School of Nutrition and Food Sciences, Food and Beverage Monitoring and Evaluation, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Fars Agricultural Jihad Organization, Shiraz, Iran
4. Department of Pediatric Gastroenterology, Gastroenterohepatology Research Center of Nemazee Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
5. Pharmaceutical Biotechnology Unit, Department of Pharmaceutical Biotechnology, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran
6. Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Agricultural products
Pesticide
Public health
QR code
Iran

**Corresponding author:*
Seyed Mohammad Mazloomi, PhD;
School of Nutrition and Food Sciences, Food and Beverage Evaluation and Monitoring, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: smmazloomi@gmail.com

ABSTRACT

In Fars Province, Southern Iran; decisions were made to improve food safety and reduce pesticide and toxin residues in raw agricultural products by providing incentive packages for farmers with QR codes by the end of 2024, and encourage municipalities to allocate free stalls to suppliers of products with IDs. In 2023, Fars Province Supreme Council for Food and Nutrition monitored pesticide sale and smuggling in pharmacies and suppliers. First national risk analysis study on pesticide residues in agricultural products in Shiraz was undertaken by School of Nutrition and Food Sciences by modifying sampling collection of the National Pesticide Monitoring Plan. So direct sampling from farms increased from 30% to 80% and by implementation of resolutions of Supreme Council of Food and Nutrition, Fars province became the leading province utilizing electronic prescription and farm identification. Ministry of Agricultural Jihad emphasized the need for pesticides to be barcoded to prevent supply of unauthorized pesticides. Also, strengthening laboratory infrastructure of medical universities expanded the scope of identification and the number of samples is an inevitable necessity. So change in sampling approach of the Ministry of Health from field level to farms, along with legal action against violators is recommended. In conclusion, improving farmers' knowledge for safe use of pesticides, promoting good agricultural practice, managing use of chemical fertilizers, and expanding biological control are main priorities. Finally, conducting total diet studies of pesticides and food product toxins as main pillars of food safety policymaking should be placed under command of Food and Drug Organization.

Please cite this article as: Mazloomi SM, Dehghanpour M, Imanieh MH, Raei MJ, Hosseini SV. Important Steps Taken to Improve the Safety and Health of Agricultural Products in Fars Province, Southern Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S51.

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Int J Nutr Sci 2025;10(1-Supplement):S52.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Policy Requirements in Production of Whole Wheat Bread and Cereal-Based Products in Iran: A Review

Mehrzad Jamshidi[1,2*]

1. Employers' Trade Association of Flour Mill Managers, Fars Province, Tehran, Iran
2. International Association of Operative Millers, Middle East and Africa Branch, Tehran, Iran

ARTICLE INFO

Keywords:
Whole wheat
Bread
Cereal
Nutrition
Iran

***Corresponding author:*
Mehrzad Jamshidi, MSc;
Employers' Trade Association of Flour Mill Managers, Fars Province, Tehran, Iran.
Email: merzadj@gmail.com
mjamshidi@kffmills.com

ABSTRACT

The production of whole wheat bread requires comprehensive and multidimensional policy approaches. Evidences suggest that an exclusive focus on the "wholeness" of bread, without due consideration of its quality, safety, shelf-life, and consumer acceptance, is unlikely to lead to success. Therefore, the concept of "healthy bread" should serve as the foundation for policy development of a product that not only offers high nutritional value; but also aligns with consumer preferences and maintains desirable sensory, hygienic, and economic qualities. A fundamental prerequisite in this regard is the scientific classification of wheat based on functional and nutritional characteristics, to ensure the production of suitable flour for whole bread using both industrial and traditional methods. The refinement of milling techniques, particularly the promotion of roller milling systems, is essential for preserving the nutritional components of bran and preventing the degradation of phytochemicals. A principled and incentivizing pricing strategy is another crucial pillar for development of whole bread production. Such measures can encourage producers to enhance quality and comply with relevant standards. Concurrently, rigorous monitoring of whole flour quality throughout the bread production chain must be strengthened. Additionally, widespread public education and awareness campaigns are indispensable for promoting consumer acceptance of whole bread. In conclusion, these efforts should be grounded in scientific communication, media outreach, and formal education. Finally, it is recommended that the measurement of phytic acid be included as nutritional indicators in revised national standard for whole flour to provide scientific basis to improve nutritional quality of the products across the country.

Please cite this article as: Jamshidi M. Policy Requirements in Production of Whole Wheat Bread and Cereal-Based Products in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S52.

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Int J Nutr Sci 2025;10(1-Supplement):S53.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

National and International Standards for Grain Production and Its Products: A Review

Maryam Jalili*

Food, Halal and Agriculture Research Group, Food Industries and Agricultural Products Research Institute, Standards Research Institute, Karaj, Iran

ARTICLE INFO

Keywords:
Cereals
Grain
Standards
Safety
International

**Corresponding author:*
Maryam Jalili, PhD;
Food, Halal and Agriculture Research Group, Food Industries and Agricultural Products Research Institute, Standards Research Institute, Karaj, Iran.
Email: jalili@standard.ac.ir

ABSTRACT

In general, standards facilitate global trade and enable control of imports, exports and goods produced in each country in terms of safety, health and quality. Due to the role they play in the diet, cereals are among the goods whose trade is booming worldwide. At least 330 characteristics have been determined for cereals and their products in national and international standards, of which about 12 are applicable at the global level. Among the most important organizations that develop food standards, including cereals, the following can be mentioned: (i) International Organization for Standardization (ISO); while in this organization, Subcommittee 4 (SC4) is dedicated to develop standards for cereals and legumes. (ii) Codex Alimentarius Commission (Codex); while in which the Codex Committee on Cereals, Pulses and Legumes (CCCPL) develops standards related to cereals. (iii) European standards cover safety issues (including contaminants, pesticide residues, heavy metals) of flour additives and the use of enzymes. (iv) International Association for Cereal Science and Technology (ICC). In conclusion, in Iran, the Iranian National Standards Organization (INSO), as the custodian of national standards, has developed and published about 90 standards in the field of cereals, of which 50 are related to wheat and are mainly about its characteristics and testing methods.

Please cite this article as: Jalili M. National and International Standards for Grain Production and Its Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S53.

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Int J Nutr Sci 2025;10(1-Supplement):S54.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Standardization, a Solution to Increase the Quality and Reduce Bread Waste: A Review

Maryam Jalili*

Food, Halal and Agriculture Research Group, Food Industries and Agricultural Products Research Institute, Standards Research Institute, Karaj, Iran

ARTICLE INFO

Keywords:
Bread
Standardization
Quality
Waste
Iran

**Corresponding author:*
Maryam Jalili, PhD;
Food, Halal and Agriculture Research Group, Food Industries and Agricultural Products Research Institute, Standards Research Institute, Karaj, Iran.
Email: jalili@standard.ac.ir

ABSTRACT

Bread, with consumption of more than nine billion kilograms per year, is a major element in the global diet, which unfortunately has significant waste in production and consumption cycle. One of the most important solutions to increase the quality and reduce bread waste is its standardization. There are about 20 national standards for bread, including standards for raw materials (wheat, flour, yeast, water, etc.), work procedures for producing different types of bread in bakeries, technical and health requirements, and standards for different types of bread (flat and voluminous). The Iranian National Standard (INSO-104) specifies the characteristics of common wheat (*Triticum aestivum L.*), including bulk weight, useful and non-useful losses, mycotoxin levels (including aflatoxins, ochratoxin A, zearalenone, deoxynivalenol), heavy metals, and pesticide residues. This standard classifies wheat into 4 grades. The grades 1 and 2, have minimum protein content (albumins, globulins, prolamins, and glutenins) of 10 and 11 percent, respectively, based on dry matter, and are more suitable for bread production. The implementation of this standard is mandatory since 2027, because the wheat used to produce flour has a great impact on the quality of bread. The INSO-103 also specifies the characteristics of wheat flour, which classifies flour types into 9 different groups. The bread standard of INSO- 2628 also specifies the physical, chemical, microbial, and sensory characteristics of bread types. In conclusion, standard bread must score a minimum of 60 points for sensory characteristics.

Please cite this article as: Jalili M. Standardization, a Solution to Increase the Quality and Reduce Bread Waste: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S54.

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Int J Nutr Sci 2025;10(1-Supplement):S55.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Manual Style of Flour and Whole Bread: A Review on Its Monitoring

Majid Haji Faraji[1,2*]

1. Department of Nutrition, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Academy of Medical Sciences, Secretary of the Supreme Council for Health and Food Security, Tehran, Iran

ARTICLE INFO

Keywords:
Flour
Bread
Wholemeal
Standard
Ian

***Corresponding author:*
Majid Haji Faraji, PhD;
Department of Nutrition, Shahid Beheshti University of Medical Sciences,
Tehran, Iran.
Email: majid.hajifaraji@gmail.com

ABSTRACT

Bread plays an important role in providing the needed micronutrients, protein, and energy. Iranian households consume about 300 grams bread daily to provide around 50% of daily energy and protein, and approximately 30% of daily micronutrients. In Iran, Secretary of Supreme Council for Health and Food Security in December 2023 standardized the wholemeal flour and baking in 7 articles. Article 1 includes whole meal or whole grain flour physical, chemical, contaminant and microbial properties (INSO-103) and wholemeal bread using fermentation processes. Article 2 enrolls wheat delivered to factories to meet INSO-104 and INSO-103 by National Wheat, Flour and Bread Working Group upon Consumer and Producer Protection Organization on national basis. Article 3 encompasses wholemeal flour storage through INSO-3988 for 60-65% relative humidity, 20°C maximum temperature and adequate ventilation. Article 4 for wholemeal bread baking process uniforms distribution of ingredients to develop a protein network to expand resulting dough from sourdough and industrial yeast dough at 25-26°C and 1-3 hours baking time with indirect flame heat. Article 5 denotes to public education for wholemeal bread consumption to prevent diseases, prepare educational content for bakeries and consumers regarding benefits of wholemeal bread. Article 6 enrolls Provincial Wheat, Flour and Bread Working Group to monitor bread production. Article 7 includes activities for regular sampling of wholemeal flour in bakeries for ash and acidity levels, measuring bread additives (salt, baking soda and blanketite), baking of wholemeal bread, checking flour specifications, labeling date of production, and the appearance of the flour (smell).

Please cite this article as: Haji Faraji M. Manual Style of Flour and Whole Bread: A Review on Its Monitoring. Int J Nutr Sci. 2025;10(1-Supplement):S55.

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Int J Nutr Sci 2025;10(1-Supplement):S56.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Oral

Whole Bread Production in Fars Province, Southern Iran: A Review

Morteza Sharifi*

Department of Civil Engineering, National University of Skill, Tehran, Iran

ARTICLE INFO

Keywords:
Wholemeal
Whole bread
Nutrition
Celiac disease
Iran

**Corresponding author:*
Morteza Sharifi, PhD;
Department of Civil Engineering,
National University of Skill, Tehran, Iran.
Email: m_sharifi275@yahoo.com

ABSTRACT

The importance of healthy nutrition and its role in human health is not hidden from anyone, and a healthy mind can be in a healthy body. Bread, as the dominant food of the people, and its role in the daily table, has a great impact on human health. High-quality bread is extracted from high-quality flour, and high-quality wheat. Therefore, controlling the production of high-quality wheat rich in nutrients will produce high-quality flour under the condition of proper processing. The use of high-quality machinery, type of bread, and skilled labor play a fundamental role in producing high-quality bread. Wholemeal bread made from wholemeal flour is rich in nutrients. This project in Fars Province was undertaken in cooperation with Fars Governor, Shiraz University of Medical Sciences, General Administration of Grain and Commercial Services of Fars, and the Union of Flour Production Factories and Bakeries of the province. According to the announced instructions, it will be implemented in all bakeries of the province in the future. Another health-oriented measure in the field of flour and bread is the production of flour and bread for celiac patients which accounts for one percent of the country's population. In conclusion, so production of flour and bread for celiac patients can benefit from flour-based products.

Please cite this article as: Sharifi M. Whole Bread Production in Fars Province, Southern Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S56.

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Int J Nutr Sci 2025;10(1-Supplement):S57.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Healthy Whole Bread in Iran: A Review on Policymaking

Zohreh Pourahmad*

Department Food and Drug Administration's Special Foods, Tehran, Iran

ARTICLE INFO

Keywords:
Policymaking
Whole bread
Bran
Fermentation
Iran

**Corresponding author:*
Zohreh Pourahmad, PhD;
Department Food and Drug Administration's Special Foods,
Tehran, Iran.
Email: pourahmadiz@yahoo.com

ABSTRACT

There is a need to determine the problem in Iran's bread sector and to identify what percentage of the population is affected, what are the consequences of this problem, what measures were taken to resolve it, and what are the reasons for its failure and success? Is resolving the problem a priority based on the needs and context of the community? The solution should be approved by the government, implemented, and evaluated within a specific period of time to improve the process. Conventional breads have two important problems including the removal of a large part of the wheat bran and the second is the lack of fermentation of the bread dough. Most people consume about 310 grams of bread daily and among Iranian bread has spiritual value and is a blessing to the table. Therefore, resolving the problem can have a positive effect on health status of the entire community. Reducing the amount of bran in wheat and using flours with more bran to make bread is on the agenda of the Food and Drug Administration. Thirty percent of the country's flour mills have the conditions to produce whole wheat flour. It is also suggested that bakeries operate under the supervision of a food industry expert and have a license, and have a legal requirement to use yeast and sourdough in making bread. In conclusion, to produce healthy bread, the culture of society should be directed to using bread with whole wheat flour whose dough is fermented.

Please cite this article as: Pourahmad Z. Healthy Whole Bread in Iran: A Review on Policymaking. Int J Nutr Sci. 2025;10(1-Supplement):S57.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Wholemeal Flour and Bread, Quality Control: A Review on Does and Doesn't

Hamid Basati*

Institute of Cereal Research, Tehran, Iran

ARTICLE INFO

Keywords:
Wholemeal flour
Bread
Quality
Peroxide value
Iran

**Corresponding author:*
Hamid Basati; PhD;
Institute of Cereal Research,
Tehran, Iran.
Email: hbasati2003@yahoo.com

ABSTRACT

Whole flour is kind of flour that has a composition similar to wheat grain in the same proportions. According to Standard 103 for wheat flour, the ash content of whole flour must be at least 1.501%. Therefore, flours with lower content of ash are not considered whole flour. Since the wheat bran is a site for the accumulation of dust, microorganisms, and contaminants, the levels of fungal toxins such as deoxynivalenol, ochratoxin, and zearalenone are higher in whole flour compared to white flour quality. According to Standard 103, the quality of wheat for producing whole flour must be Grade 1 or 2. Thus, some characteristics such as ash content, damaged starch, gluten index, and peroxide value of the resulting flour are used to identify critical control points in whole flour milling. One key measurable factor in assessing mill performance is the level of damaged starch. If wheat grains are subjected to shear, friction, and abrasion forces in a single stage, the starch damage increases, and leads to sticky dough. Another critical property in evaluating mill performance is the gluten index. Excessive generated heat during milling can denature gluten and reduce its quality and gluten index. Additionally, whole flour contains wheat germ, which is rich in unsaturated fatty acids and prone to rancidity, oxidation, and free radical formation. In conclusion, measuring the peroxide value is a practical method to control milling and storage stages.

Please cite this article as: Basati H. Wholemeal Flour and Bread, Quality Control: A Review on Does and Doesn't. Int J Nutr Sci. 2025;10(1-Supplement):S58.

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Int J Nutr Sci 2025;10(1-Supplement):S59.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Impact of Different Wheat Milling Methods on Properties of Wheat Flour: A Review

Arash Taheri*

Institute of Cereal Research, Tehran, Iran

ARTICLE INFO

Keywords:
Wheat milling
Conditioning
Flour
Milling
Quality

**Corresponding author:*
Arash Taheri, PhD;
Institute of Cereal Research,
Tehran, Iran.
Email: arashtaheri81@gmail.com

ABSTRACT

Various wheat milling methods, including roller and non-roller techniques, and milling stages such as the controlling the input wheat, preparation and cleaning, conditioning, and flour production process can affect the properties of the resulting flour. One of the effective stages is wheat conditioning or tempering. At moisture levels below 10%, wheat becomes highly abrasive. During peeling process, optimal separation of the outer wheat bran during the peeling process is achieved by adding moisture to the wheat. The initiation of enzymatic activities and enhancement of the physicochemical properties of flour are facilitated by moisturizing, and achieving the appropriate flour fineness depends on suitable moisture levels in the milling process. According to research, the best method for milling was the roller milling method, which caused the least damage to the structure and components of wheat. In conclusion, the short-time contact of rollers with the material, minimal heat transfer or damage, suitability for various wheat varieties, the ability to adjust flour properties, the capability to separate wheat components, applying specific processes to each component without damage, minimal starch damage, minimal breakage of crude fiber, minimal protein and gluten degradation, and the high capacity to produce flour with the desired fineness and particle size based on diagram specifications and applied moisture levels can be the best method for milling.

Please cite this article as: Taheri A. The Impact of Different Wheat Milling Methods on Properties of Wheat Flour: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S59.

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Int J Nutr Sci 2025;10(1-Supplement):S60.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Effect of Wheat Flour Extraction Rate on Dough Rheological Properties and Nutritional Quality of Bread: A Review

Roya Aghagholizadeh*

Flour Production Technology Group, Institute of Cereal Research, Tehran, Iran

ARTICLE INFO

Keywords:
Whole flour
Rheological properties
Nutritional properties
Extraction rate

**Corresponding author:*
Roya Aghagholizadeh, PhD;
Flour Production Technology Group,
Institute of Cereal Research,
Tehran, Iran.
Email: gholizadeh3881@gmail.com

ABSTRACT

According to the Food and Drug Administration (FDA) definition, food products containing more than 51% whole grain are considered whole grain foods. Therefore, bread with a formulation containing more than 51% whole wheat grain is classified as whole bread. As the flour extraction rate increases, protein, phytic acid, and water absorption increase too, while starch content decreases. However, the ratio of high molecular weight glutenin to protein decreases and causes reduction of gluten index, Zeleny value, and rheological properties such as stability, farinograph quality number, dough elasticity, and ultimately lowering flour quality. The presence of fibers, especially insoluble fibers, prevents the formation of covalent cross-links between gliadin and glutenin subunits and competes with gluten for absorption of water, as fibers absorb more water and more quickly that leads to a weak gluten network not to be able to retain fermentation and gas bubbles and to producing bread with low specific volume and a dense, compact texture. On the other hand, increase in extraction rate and bran percentage of flour, reduces protein digestion and absorption in the body, and decreases peptide diversity and availability of essential amino acids due to the steric hindrance of fibers on protein-hydrolyzing enzymes. In conclusion, flours with extraction rate of 75-90% are more widely accepted globally because of their technological and nutritional properties.

Please cite this article as: Aghagholizadeh R. The Effect of Wheat Flour Extraction Rate on Dough Rheological Properties and Nutritional Quality of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S60.

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Int J Nutr Sci 2025;10(1-Supplement):S61.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Whole Bread and Bran: A Review on Challenges

Davood Maghsoudi*

Baking Industries Group, Institute of Cereal Research, Tehran, Iran

ARTICLE INFO

Keywords:
Phytic acid
Autolysis
Bran
Whole bread

ABSTRACT

The presence of bran in whole bread increases the nutritional value of the bread; however, deteriorates rheological properties of the dough. As bran particles compete with gluten for water absorption and have shearing effect on the gluten network, gluten is still one of the key factors affecting bread quality. On the other hand, phytic acid (hexa-inositol phosphate) of bran contains more than 85% aleurone layer. It can form insoluble complexes with divalent minerals such as calcium, iron, magnesium, and zinc. Therefore, absorption of these minerals reduces and causes excretion of minerals from the body and results in issues such as iron-deficiency anemia and osteoporosis. Feasible solutions to mitigate the adverse effects of bran in bread are prolonged fermentation time, use of sourdough, sufficient kneading, reduction in bran particle size, and treatment of bran with processes such as extrusion or enzymes, and the autolysis process. In the autolysis process, a portion of flour and water is mixed without adding other ingredients, and this suspension is left to rest for 10 minutes to 5 hours, depending on the flour quality. In conclusion, this process allows the gluten protein to absorb water and form a gluten network. Additionally, reducing bran particle size eliminates the sharp edges of bran, making the particles round like starch, thereby reducing their destructive effect on gluten network formation.

**Corresponding author:*
Davoud Maghsoudi, PhD;
Baking Industries Group, Institute of Cereal Research, Tehran, Iran.
Email: davoudmaghsoodi@yahoo.com

Please cite this article as: Maghsoudi D. Whole Bread and Bran: A Review on Challenges. Int J Nutr Sci. 2025;10(1-Supplement):S61.

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Int J Nutr Sci 2025;10(1-Supplement):S62.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

The Role of Home Food Fortifiers in Micronutrient Deficiency: A Review on Innovative Solutions

Mehdi Yousefi*, Negin Zarei

Zist Khorak Elahieh, Shiraz, Iran

ARTICLE INFO

Keywords:
Vito Zist
Home food fortifiers
Micronutrient deficiency
Rice
Iran

ABSTRACT

Vito Zist is a pioneering brand that produces home food fortifiers to combat micronutrient deficiencies. With the current economic challenges, these products have been meticulously formulated to address nutritional needs. They can be seamlessly added to various cooked dishes such as rice, stews, and fried foods without altering the flavor, aroma, or appearance of meals, and without necessitating changes to eating habits. Each serving delivers 30% of the recommended daily intake of vital micronutrients. Vitamin and mineral deficiencies, especially in B vitamins, significantly contribute to metabolic syndrome, a condition linked to diabetes, hypertension, fatty liver, and obesity. Alarmingly, approximately 25% of vulnerable groups in Iran including children, pregnant women, and women of reproductive age experience iron deficiency and anemia. In 2023, iron deficiency caused physical and cognitive damages in the country with a value of $3.2 billion, equating to a month's oil revenue. Additionally, around 90% of residents in major Iranian cities, such as Shiraz, are affected by Vitamin D deficiency. Vito ensures its products to remain free from preservatives and artificial colors, and to make them safe and accessible for all social classes. These items are affordably priced to cater to diverse demographics. In conclusion, fortifying staple foods can provide families with essential nutrients over the long term, fostering immunity and can aid resistance against infections. The brand aims to systematically bridge nutritional gaps and enhance well-being across society.

*Corresponding author:
Mehdi Yousefi, MSc;
Zist Khorak Elahieh, Shiraz, Iran.
Email: yousefi@yahoo.com

Please cite this article as: Yousefi M, Zarei N. The Role of Home Food Fortifiers in Micronutrient Deficiency: A Review on Innovative Solutions. Int J Nutr Sci. 2025;10(1-Supplement):S62.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Developing Wholemeal Flour Market Using Marketing Mix: A Review

Farshad Memarian[1,2*]

1. Board of Directors of the National Association of Iranian Flour Industries, Tehran, Iran
2. Tehran Bakhtar Flour Company, Tehran, Iran

ARTICLE INFO

Keywords:
Wholemeal flour
Marketing
Price
Process
Consumer

ABSTRACT

Whole wheat flour plays an important role to provide a healthy diet based on its high nutritional value and health benefits. However, development of its marketing faces challenges such as consumer behavior, production processes, pricing, distribution, and advertising. This review presents solutions to promote the position of whole wheat flour using the 7 P model of the marketing mix. Whole wheat flour contains all components of the wheat grain and has more fiber and nutrients compared to white flour. With changing lifestyles and increasing nutritional awareness, the demand for this product has increased, but challenges such as price, distribution, and consumption culture hindered its market growth. In marketing of mix elements in the development of whole wheat flour; first, the product is important by improving the quality of whole wheat flour and milling processes and by standardizing the ingredients. Second, the price has crucial role by determining a competitive price, modifying subsidies and supporting the producers. Third, the place is an essential factor by expanding distribution networks including grocery stores, bakeries, and online sales. Fourth, the promotion must be considered by digital advertising, collaboration with influencers, and communication about the benefits of whole wheat flour. Fifth, the people's role must be paid attention by educating bakers and retailers to improve baking quality and increase product acceptance. Sixth, the process is needed to be checked by using new technologies in milling to increase the shelf life and quality of flour. Seventh and finally, the physical evidence plays a vital role by improving packaging, strong branding, and creating the right space in stores to display the product. In conclusion, by implementing marketing strategies, it is possible to reduce barriers to the development of whole wheat flour and increase its consumption among different groups of society.

**Corresponding author:*
Farshad Memarian, MSc;
Board of Directors of the National Association of Iranian Flour Industries, Tehran, Iran.
Email: memarian1355@gmail.com

Please cite this article as: Memarian F. Developing Wholemeal Flour Market Using Marketing Mix: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S63.

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Int J Nutr Sci 2025;10(1-Supplement):S64.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

ORAL

Whole bread and Its Importance in Tourism: A Review

Mohammad Farrokhzadeh*

Deputy Coordination of Tourism Affairs of Fars Governorate, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole bread
Tourism
Global market
Policy

ABSTRACT

It is essential to correct the incomplete cycle of food production and sales in Iran. The power of a country depends on having a people with a high health status. In religious texts and the words of the elders, more than 250 verses and hadiths showed the importance of food and bread in growth, longevity, health, peace, mood, mental ability, production and reproduction of generations, especially in old age. From an economic perspective and supply chain and value chain, the $220 billion turnover of bread and its products in the world indicates the strategic role of this industry in the global market. Regarding a political perspective, food and bread have become one of the important axes in regional equations in the dimensions of health, resilience, and self-reliance, while a country can have bargaining power for investments and precise planning in this field. Unhealthy nutrition can affect a nation with a proud history. Neglecting this issue can have an impact on science and knowledge, modern technology, mental and physical health, productivity, and the economy. Countries with plans for food and health cycle security are well aware of the leading role of healthy bread in the chain of productive agricultural jobs, primary and downstream industries, planting, holding, preparation, production, and packaging. In conclusion based on tourists' idea, they have declared the food and bread industry of the destination country as one of their criteria, which indicates its importance in the international arena.

**Corresponding author:*
Mohammad Farrokhzadeh; PhD;
Deputy Coordination of Tourism Affairs of Fars Governorate, Shiraz, Iran.
Email: info@farrokhzadeh.com

Please cite this article as: Farrokhzadeh M. Whole bread and Its Importance in Tourism: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S64.

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Int J Nutr Sci 2025;10(1-Supplement):S65.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Physicochemical and Sensorial Properties of Biscuits Enriched by Whey Protein and Wheat Bran

Zahra Hassanzadeh-Rostami[1], Shiva Faghih[2], Azam Abbasi[3]*

1. Nutrition Department, Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Community Nutrition, Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whey protein
Wheat bran
Biscuit
Physicochemical properties

**Corresponding author:*
Azam Abbasi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: azam abbasi1387@gmail.com

ABSTRACT

Background: Food products high in protein and fiber can reduce calorie intake thorough suppressing the appetite in obese subjects. This study formulated a whey protein and wheat bran enriched biscuit that provide nutritional benefits and have well sensorial acceptability.

Methods: Four types of biscuits were enriched by (i) whey protein+wheat bran, (ii) whey protein, (iii) wheat bran, and (iv) control. Sugar was substituted with date extract as 40% w/w and same edible essential oil was used for all biscuits. Physicochemical properties (moisture and ash), nutritional value (sugar, protein, fat, and fiber), textural properties (using three-point bending test), sensorial analysis (using five-point hedonic test), and color (using lab mode technique) of biscuits were assessed.

Results: Adding whey protein and wheat bran to plain biscuit increased percentage of ash and moisture. Water activity was higher in biscuits enriched by whey protein. Protein content of biscuits enriched by whey protein and wheat bran was higher. The color of whey protein enriched biscuit had a higher rank among other biscuits. Enriched wheat bran and plain biscuits showed higher ranking of textural properties. Acceptability of the 3 enriched biscuits was not different compared to control.

Conclusion: It can be concluded that enriched biscuit with whey protein and wheat bran could enhance the nutritional value of the plain biscuit without adverse effect on its sensorial properties and acceptability.

Please cite this article as: Hassanzadeh-Rostami Z, Faghih S, Abbasi A. Physicochemical and Sensorial Properties of Biscuits Enriched by Whey Protein and Wheat Bran. Int J Nutr Sci. 2025;10(1-Supplement):S65.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Daily Intake of Molybdenum through Consumption of Bread and Cereal Products in Shiraz Population, Southern Iran

Maryam Safarirad[1], Enayat Berizi[2], Seyed Mohammad Mazloomi[2], Azam Abbasi[2*]

1. Food Safety and Hygiene, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Associate Prof, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Cereal
Molybdenum
Diet
Iran

**Corresponding author:*
Azam Abbasi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: azamabbasi1387@gmail.com

ABSTRACT

Background: One of chemical hazards in grains is presence of heavy metals, such as molybdenum. A high intake of this metal will have adverse effects, including development of gout. This study investigated daily intake of molybdenum among Shiraz population.

Methods: Food samples were randomly selected from 5 geographical regions of Shiraz and the extraction of the relevant metal was done using nitric acid digestion methods. Metal concentration was determined by ICP-OES and related analyzes. The average intake of different foods by the population of Shiraz was calculated by a study using the FFQ method.

Results: The average daily intake of molybdenum metal for each food was reported as follows: lavash bread: 0.0212, Berberi: 0.0128, Sangg: 0.00, Tufton 0.0020. From the group of rice grains: 0.143, canned corn: 0.0008, pasta: 0.003, vermicelli: 0.008 and noodles: 0.000 mg per day. For the bread group, this amount was announced as an average of 0.036 and for the cereal group, it was 0.293 mg per day. Also, during the risk assessment analyses, the amount of HQ was reported as 0.1 for the bread group and 0.83 for the cereal group.

Conclusion: The daily intake of molybdenum was less than the tolerable limit mentioned in the global indices (TDI) and the amount of HQ was less than 1. Therefore, it does not have a non-carcinogenic risk. As a result, it can be said that bread and cereal food groups are not at a warning level in the amount of molybdenum intake to the human body.

Please cite this article as: Safarirad M, Berizi E, Mazloomi SM, Abbasi A. Daily Intake of Molybdenum through Consumption of Bread and Cereal Products in Shiraz Population, Southern Iran. Int J Nutr Sci. 2025;10(1-Supplement):S66.

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Int J Nutr Sci 2025;10(1-Supplement):S67.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Assessment of Pesticide Residues in Wheat Flour and Whole Wheat Flour: A Review

Fatemeh Dezhgard, Hossein Bozorgpour Samakoush, Azam Abbasi*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Pesticide residues
Whole wheat flour
Food safety
Organophosphate pesticides
Organochlorine pesticides

ABSTRACT

Wheat flour is a fundamental and widely consumed staple food globally, serving as a significant source of carbohydrates, proteins, and B vitamins. However, the extensive use of pesticides in wheat cultivation poses serious health risks, including increased susceptibility to cancer, neurological disorders, and reproductive issues. This review assessed pesticide residues in wheat flour and whole wheat flour. Google Scholar, PubMed, and Scopus databases were searched using keywords of pesticide residue, wheat flour, and whole wheat flour. In Brazil in 2017, four samples of whole wheat flour from various cultivation areas and storage times were analyzed and reported only one sample to be free from pesticide residues, while the others contained bifenthrin, tebuconazole, cypermethrin, chlorpyrifos, and glyphosate residues. The glyphosate concentration in these samples was found to be 20.6 times above the permitted limit. In Australia in 2020, the impacts of *Triticum spelta* versus *T. aestivum* and the type of flour (organic vs. conventional) were evaluated. It was shown that pesticide residues in conventional flours (87%) were significantly higher than those in organic flours (25%), and the total concentration of pesticide residues in conventional flours was approximately four times greater than in organic flours. In India in 2022, paraquat residues in wheat flour samples were identified. In a 2014 study in Iran, 58 pesticides in 40 wheat flour samples from the Tehran market were evaluated and detected four samples to be contaminated with malathion and 2,4-DDE, albeit they were below Iran's permissible limits. Finally, a study in India suggested that contamination of wheat grains with endosulfan might be a potential cause of seizure attacks in certain families. So it can be concluded that there is a significant challenge to consumer health and food safety and this issue underscores the urgent need for appropriate measures to reduce pesticide residues in agricultural products.

*Corresponding author:
Azam Abbasi, PhD;
Department of Health and Food Quality Control,
Faculty of Nutrition and Food Sciences, Shiraz University of Medical Sciences,
Shiraz, Iran.
Email: azamabbasi1387@gmail.com

Please cite this article as: Fatemeh Dezhgard, Hossein Bozorgpour Samakoush, Azam Abbasi. The Assessment of Pesticide Residues in Wheat Flour and Whole Wheat Flour: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S67.

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Int J Nutr Sci 2025;10(1-Supplement):S68.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Use of Gel-Based Systems as a Substitute for Solid Fats in Cereal Products: A Review

Mahdieh Sharifi, Azam Abbasi*

Nutrition Research Center, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Saturated fat
Solid fat
Gel based system
Cereal products

**Corresponding author:*
Azam Abbasi, PhD;
Nutrition Research Center, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: azamabbasi1387@gmail.com

ABSTRACT

Bakery products such as cakes, cookies, and biscuits contain significant amounts of saturated fat that can lead to harmful health effects, including cardiovascular diseases, high cholesterol, etc. This review investigated the use of gel-based systems as a substitute for solid fats in cereal products. Google Scholar, PubMed and Scopus databases were searched using correlated keywords. Fernandes and Mellado used chia seed mucilage hydrogel as a fat replacer in cakes. The cake symmetry lost the specific volume in the formulation, decreased water activity and increased the hardness and the sensory evaluation revealing the acceptability by the panelists. A 100% cellulose-based emulgel was used as a fat substitute in muffins that resulted in a decrease in height and an increase in hardness. The gelatinization temperature of starch decreased and in sensory evaluation, it received lower scores than the control sample. Oleogel made with ethyl cellulose was utilized as a fat substitute in bread and led to an increase in the specific volume and obtaining a stable soft texture. Bigel was applied based on alginate and k-carrageenan and rice bran wax and soybean oil to replace solid fat in cookies. It was shown that the moisture, water activity and cell structure were similar to the control product and crispier than the control product. It can be concluded that gel-based structures such as hydrogel, emulgel, oleogel and bigel have a good ability to replace fat in bakery products. Still more studies are needed to improve sensory characteristics of the products.

Please cite this article as: . Sharifi M, Abbasi A. The Use of Gel-Based Systems as a Substitute for Solid Fats in Cereal Products: A Review Int J Nutr Sci. 2025;10(1-Supplement):S68.

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Int J Nutr Sci 2025;10(1-Supplement):S69.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Impact of Natural Compounds Obtained from Fruits and Plants on Enrichment and Improvement of Nutritional and Technological Characteristics of Bread: A Review

Arghavan Madani, Maryam Abbasvali*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Fruit
Plant
Natural ingredients
Enrichment

**Corresponding author:*
Maryam Abbasvali, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: abbasvali.m@gmail.com

ABSTRACT

Bread and grain products are considered as one of the main products in the daily food basket of Iranian people and the world. So this review was undertaken to determine the impact of natural compounds obtained from fruits and plants on enrichment and improvement of nutritional and technological characteristics of bread. Web of Science, PubMed, and Scopus databases were searched in relation to key words of nutritional properties, enrichment, bread, bakery products, natural compounds, plants and fruits. Various compounds such as flour obtained from the skin of some fruits including pears, oranges, *Moringa oleifera*, etc. were shown to have an increasing effect on beta-carotene content, antioxidant activity, total phenol content, and amounts of micronutrient and macronutrient compounds. It can lead to prevention of cardiovascular diseases and cancers and is worth mentioning that some of these compounds can have a positive effect on the volume of bread and its sensory properties. It can be concluded that the use of natural compounds with useful substances such as phenolic compounds can be an effective step to improve the nutritional characteristics of bread. Also, it can lead to recycling of waste of some fruits and to have a positive effect from an environmental and economic point of view.

Please cite this article as: Madani A. The Impact of Natural Compounds Obtained from Fruits and Plants on Enrichment and Improvement of Nutritional and Technological Characteristics of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S69.

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Int J Nutr Sci 2025;10(1-Supplement):S70.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Relationship between White Bread Consumption and Risk of Colon Cancer: A Review

Mahdi Honardoust[1], Afsane Ahmadi[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Colorectal cancer
White bread
Refined carbohydrates

**Corresponding author:*
Afsane Ahmadi, PhD;
Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: ahmadi.afsane@gmail.com

ABSTRACT

Colorectal cancer (CRC) is one of the leading causes of cancer-related deaths worldwide. Diet plays a crucial role in the development and progression of CRC, with high consumption of refined carbohydrates, particularly white bread, often implicated as a risk factor. This review evaluated the association between white bread consumption and the risk of CRC. Databases of PubMed, Scopus, Web of Science and SID were searched between 2015 and 2024 using related keywords in cohort studies, case-control studies, and meta-analyses to examine the link between white bread intake and CRC incidence. The findings indicate a positive association between high white bread consumption and increased risk of CRC. Several large-scale cohort studies have reported that individuals with the highest intake of white bread had a significantly higher risk of developing CRC compared to those with the lowest intake. This association is believed to be driven by the high glycemic index (GI) of white bread, leading to elevated postprandial glucose levels, insulin resistance, and chronic inflammation. The current body of evidence supports the notion that high white bread consumption may increase the risk of CRC, likely through mechanisms related to glycemic control, insulin resistance, and inflammation. It can be concluded that further researches are needed to clarify the precise role of white bread in colorectal carcinogenesis and to explore potential interactions with other dietary and lifestyle factors.

Please cite this article as: Honardoust M, Ahmadi A. The Relationship between White Bread Consumption and Risk of Colon Cancer: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S70.

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POSTER

The Effect of Sumac Fruit Powder Addition and Salt Reduction on Appearance and Rheological Properties of Bread

Zohreh Abdi-Moghadam[1*], Ali NaserHojjati Rudsari[1], Shahram Beiraghi-Toosi[2]

1. Food Quality Control, Food Safety and Hygiene, Nutrition and Food Science Department, Medical School, Gonabad Medical University of Sciences, Gonabad, Iran
2. Food Processing Research Department, Food Science and Technology Research Institute, ACECR-Khorasan Razavi Branch, Mashhad, Iran

ARTICLE INFO

Keywords:
Sumac
Bread
Salt
Rheology
Sensory evaluation

**Corresponding author:*
Zohreh Abdi-Moghadam, PhD;
Nutrition and Food Science Department, Medical School, Gonabad Medical University of Sciences, Gonabad, Iran.
Email: z.abdimoghadam1@gmail.com

ABSTRACT

Background: Salt is a crucial component of bread and dough consistency and has an impact in development of non-communicable diseases This study investigated the effect of adding sumac powder and reducing salt on appearance and rheological properties of bread.

Methods: Treatments were divided into two groups of standard salt and reduced salt. In both groups, 0, 0.5, 1, 2, and 3% of sumac powder were added to flatbread formula, and rheological characteristics were assessed. After baking treatments at 180°C for 20 minutes, samples were analyzed for textural characteristics immediately, 24 and 72 hours after cooking, and for moisture content, and sensory characteristics.

Results: Adding sumac powder increased water absorption. In both groups, the stability time decreased and the dough expansion time increased with the addition of sumac powder. The texture of the bread became harder with the increase in the amount of sumac powder and with time. Sensory evaluation of treatments showed that the breads containing 0.5% and 1% sumac, respectively, in both groups of salt, received the highest ratings.

Conclusion: Reducing salt affected hardness of bread texture and accelerated staleness over time. Sensory analysis of the treatments containing 0.5% and 1% sumac showed higher and similar scores to the control treatments.

Please cite this article as: Abdi-Moghadam Z, NaserHojjati Rudsari A, Beiraghi-Toosi S. The Effect of Sumac Fruit Powder Addition and Salt Reduction on Appearance and Rheological Properties of Bread. Int J Nutr Sci. 2025;10(1-Supplement):S71.

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Int J Nutr Sci 2025;10(1-Supplement):S72.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of White Bread and Whole Grain Bread on Inflammatory Markers, Lipid Profile and Anthropometric Indices: A Review

Mahdi Honardoust[1], Afsane Ahmadi[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
White bread
Whole grain
Lipid profile
Inflammatory markers

**Corresponding author:*
Afsane Ahmadi, PhD;
Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: ahmadi.afsane@gmail.com

ABSTRACT

Dietary choices, particularly consumption of refined vs. whole grains, significantly influence inflammatory markers, lipid profiles, and anthropometric indices, all of which are critical in management of chronic diseases. This review evaluated the effect of white bread and whole grain bread on inflammatory markers, lipid profile and anthropometric indices. Google Scholar, PubMed, Web of Science, and Scopus databases were searched between 2019 and 2024 using the related keywords. Whole grain bread consumption was associated with a more favorable inflammatory profile, including reduced C-reactive protein levels and other pro-inflammatory cytokines. Whole grain bread had beneficial effects on lipid profiles, such as lowering LDL cholesterol and triglycerides, while improving HDL cholesterol levels. White bread was linked to higher inflammatory markers and less favorable lipid profiles, contributing to increased BMI and waist circumference. The fiber and bioactive compounds in whole grain bread were primarily responsible for these positive outcomes, whereas high glycemic index and low fiber content of white bread contribute to the adverse effects. Whole grain bread offers significant advantages over white bread to reduce inflammation, improve lipid profiles, and maintain healthier anthropometric indices. In conclusion, these findings underscore the importance of replacing white bread with whole grain alternatives in diets to support overall health.

Please cite this article as: Honardoust M, Ahmadi A. The Effect of White Bread and Whole Grain Bread on Inflammatory Markers, Lipid Profile and Anthropometric Indices: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S72.

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Int J Nutr Sci 2025;10(1-Supplement):S73.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Silver Nanoparticles as a Novel Approach to Combat Fungal Pathogens in Wheat: A Review

Zohreh Ahmadi*, Farzaneh Vaseghi, Seyed Ali Askarpour

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Nanoparticles
Silver nanoparticles
Antifungal activity
Wheat

**Corresponding author:*
Zohreh Ahmadi, PhD Candidate; Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Zohreh4hmd@gmail.com
zohreh_ahmadi@sums.ac.ir

ABSTRACT

Nanotechnology in wheat farming is rapidly advancing and offers innovative solutions. Application of nanotechnology in wheat cultivation is crucial to enhance resistance against various pathogens and environmental stresses, particularly against fungi. Use of silver nanoparticles (AgNPs) to control fungi in crops, especially wheat has been studied. This review assessed silver nanoparticles, antifungal activity, and Wheat were used by searching databases of PubMed, Scopus, Web of science and Sematic scholar. AgNPs are increasingly recognized as a noteworthy alternative to traditional fungicides due to their strong antimicrobial properties and low toxicity. These nanoparticles exert their antifungal effects by damaging fungal cell membranes, inhibiting DNA replication, and generating reactive oxygen species (ROS), which lead to oxidative stress and cellular damage in pathogens. The effectiveness of these nanoparticles is influenced by their shape, size, and concentration. Research has demonstrated that biosynthesized AgNPs can effectively control specific wheat pathogens, such as *Fusarium graminearum* and Aspergillus, which are known to cause significant damage to crops. In conclusion, as global food security becomes an increasingly pressing concern, the need for effective and environmentally friendly solutions to combat plant diseases should be paramount. AgNPs offer a promising solution for combating wheat diseases, particularly against fungal infections. This advancement not only enhances food security but also promotes sustainable agriculture by offering a more effective alternative to traditional fungicides while minimizing their negative impacts on organisms and ecosystems.

Please cite this article as: Ahmadi Z, Vaseghi F, Askarpour SA. Silver Nanoparticles as a Novel Approach to Combat Fungal Pathogens in Wheat: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S73.

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POSTER

The Effect of Seed Priming, Zinc Sulfate Application and Cycocel Spraying on Concentration of Some Nutrients in Wheat Grain

Mostafa Ahmadi[1*], Mohammad Javad Zarea[2], Yahya Emam[3]

1. Department of Crop Physiology, Agricultural Organization of Bushehr, Bushehr, Iran
2. Department of Agronomy and Plant Breeding, Ilam University, Ilam, Iran
3. Department of Agronomy and Plant Breeding, Shiraz University, Shiraz, Iran

ARTICLE INFO

Keywords:
Seed priming
Zinc sulfate
Cycocel spraying
Nutrients
Wheat grain

ABSTRACT

Background: The importance of wheat for Iranians is high because wheat bread is the main part of the community's nutrition pattern. This study investigated the response of biochemical characteristics of wheat grain to application of cyclocel, zinc sulfate and nitroxin.

Methods: This investigation was conducted as two factorial experiments using a randomized complete block design with three replications at two sites in Ilam and Bushehr provinces, Iran during 2013-2014 cropping seasons. The experimental factors were two levels of cycocel (0, 2.5 gram per liter), application of zinc sulfate at the three rates of 0, 25 and 50 kilogram per hectare), and niroxin, (seed inoculated and non-inoculated). After harvesting of production, concentration of Fe, Zn, P, K and N elements were measured.

Results: The application of 50 kg/ha of zinc sulfate increased the concentration of zinc and potassium elements in the seeds compared to the control by 47.9% and 34.5%, respectively. The highest concentration of zinc element (53.1 mg/kg), potassium (4943 mg/kg) and grain nitrogen content (2.43%) was obtained from the foliar treatment of 2.5 g/L cycocel, application of 50 kg/ha zinc sulfate and seed inoculation with niroxin. The highest concentration of iron element (58.6 mg/kg) and phosphorus (4438 mg/kg) was obtained from the interaction of 2.5 g/L of cyclocel, 25 kg/ha of zinc sulfate and seed priming with niroxin.

Conclusion: It was shown that the environmental and climatic conditions of the region were effective on the concentration of nutrients in wheat grains. Pre-treatment of wheat seeds with nitroxin at the rate of 1.5 liters per hectare and application of 50 kg/ha of zinc sulfate and foliar spraying of cycocel had a significant effect on the concentration of nutrients in seeds.

**Corresponding author:*
Mostafa Ahmadi, PhD;
Agricultural Organization of Bushehr, Bushehr, Iran.
Email: ma_ahmadi@yahoo.com

Please cite this article as: Ahmadi M, Zarea MJ, Emam Y. The Effect of Seed Priming, Zinc Sulfate Application and Cycocel Spraying on Concentration of Some Nutrients in Wheat Grain. Int J Nutr Sci. 2025;10(1-Supplement):S74.

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Int J Nutr Sci 2025;10(1-Supplement):S75.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Response of Some of Biochemical Characteristics of Wheat Grain to Cycocel, Biofertilizer and Zinc Sulfate under Dry Land Farming

Mostafa Ahmadi[1*], Mohammad Javad Zarea[2], Yahya Emam[3]

1. Department of Crop Physiology, Agricultural Organization of Bushehr, Bushehr, Iran
2. Department of Agronomy and Plant Breeding, Ilam University, Ilam, Iran
3. Department of Agronomy and Plant Breeding, Shiraz University, Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat Grain
Cycocel
Biofertilizer
Zinc sulfate
Dry land farming

ABSTRACT

Background: Regarding bread preparation and bakery value, the quality of flour from plants and cereal family is not comparable to wheat. This study evaluated the response of biochemical characteristics of wheat grain to application of cycocel, zinc sulfate and nitroxin.

Methods: This investigation was conducted as two factorial experiments using a randomized complete block design with three replications at two sites in Ilam and Bushehr provinces, Iran during 2013-2014 cropping seasons. The experimental factors were two levels of cycocel (0, 2.5 gram per liter), application of zinc sulfate at the three rates of 0, 25 and 50 kilogram per hectare), and niroxin, as bio-fertilizer, (seed inoculated and non- inoculated). After harvesting of production, amount of protein, gluten, gliadin, glutenin and amino acids such as lysine, methionine, threonine were measured.

Results: The highest grain protein content (13.8%), wet gluten (36.1%), gliadin (53.6%) and glutenin (31.8%) were obtained from plants treated with cycocel spraying, at 50 kilograms per hectare of zinc sulfate and niroxin inoculated seeds treatment. Cycocel spraying at the concentration 2.5 g/liter, application of 50 Kg of zinc sulfate per hectare and inoculation of seeds with niroxin resulted in the highest grain yield (1710 kilograms per hectare) and the highest amounts of lysine, threonine and methionine were obtained by about 510, 545 and 772 milligrams per 100 gram of protein sample, respectively.

Conclusion: It can be concluded that cycocel, zinc sulfate and niroxin might be effective in improvement and increasing quantitative and biochemical traits of grain yield in wheat under dry land farming.

**Corresponding author:*
Mostafa Ahmadi, PhD;
Agricultural Organization of Bushehr, Bushehr, Iran.
Email: ma_ahmadi@yahoo.com

Please cite this article as: Ahmadi M, Zarea MJ, Emam Y. Response of Some of Biochemical Characteristics of Wheat Grain to Cycocel, Biofertilizer and Zinc Sulfate under Dry Land Farming. Int J Nutr Sci. 2025;10(1-Supplement):S75.

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Int J Nutr Sci 2025;10(1-Supplement):S76.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Carcinogenic Polycyclic Aromatic Hydrocarbons in Bread; Amount, Analytical Method and Mitigation Strategy: A Review

Nader Akbari[1,2*], Parisa Sadighara[1], Parisa Shavali-Gilani[1], Yeganeh Mazaheri[1], Elaheh Jafari[3]

1. Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran
3. Department of Food Science and Engineering, Faculty of Sciences, Agriculture, and Modern Technologies, Islamic Azad University, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Polycyclic aromatic hydrocarbons
Carcinogen
Analytical method
Risk

**Corresponding author:*
Nader Akbari, MSc;
Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: naderakbari72@yahoo.com

ABSTRACT

Bread is safety is considered crucial for public health. Among various contaminants found in bread, polycyclic aromatic hydrocarbons (PAHs) are of particular concern due to their carcinogenic potential. This systematic review assessed concentration of four carcinogenic PAHs (PAH4) in different types of bread and factors influencing their levels. Literature search was conducted through Pubmed, Scopus and Google Scholar databases using keywords of polycyclic aromatic hydrocarbons, PAHs, PAH4, and bread. Seventeen relevant studies were enrolled for analysis. Sample preparation techniques, primarily utilizing ultrasonic baths, and analytical methods, particularly gas chromatography-mass spectrometry (GC-MS) were reviewed. The concentration of PAH4 in bread samples ranged from non-detectable up to 20.66 µg/kg. Factors affecting PAH levels were type of bread, fuel used in baking, cooking temperature, and baking time. Industrial breads generally exhibited lower PAH concentrations, while traditional breads contained higher levels of PAHs. It can be concluded that industrial bread is generally safe concerning PAH contamination, but traditional bread may pose health risks due to higher PAH content. Incorporating antioxidants during the bread-making process and controlling baking conditions, such as fuel type, temperature, and time, are recommended strategies to reduce PAH levels in bread.

Please cite this article as: Nader Akbari, Parisa Sadighara, Parisa Shavali-Gilani, Yeganeh Mazaheri, Elaheh Jafari. The Carcinogenic Polycyclic Aromatic Hydrocarbons in Bread; Amount, Analytical Method and Mitigation Strategy: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S76.

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Int J Nutr Sci 2025;10(1-Supplement):S77.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Enzymes and Emulsifiers on Dough Properties and Bread Quality Prepared from Whole Wheat Flour: A Review

Soghra Mohseni[1], Omran Karimi[2], Mehdi Akbari[3*]

1. Faculty of Agriculture and Food Industry, Ayatollah Amoli University, Amol, Iran
2. Grain Industry Unit, Food and Drug Deputy, Mazandaran University of Medical Sciences, Sari, Iran
3. Food Science and Technology Unit, Department of Food Science and Technology, College of Agriculture and Natural Resource, University of Tehran, Karaj, Iran

ARTICLE INFO

Keywords:
Whole wheat
Dough
Bread
Enzyme
Emulsifier

**Corresponding author:*
Mehdi Akbari, PhD;
Department of Food Science and Technology, College of Agriculture and Natural Resource, University of Tehran, Tehran, Iran.
Email: akbari.mehdi@ut.ac.ir

ABSTRACT

Despite health benefits associated with whole grains, consumption of whole grain products is lower than the recommended levels. Whole wheat bread has characteristics of low volume, hard texture, dark and coarse crust, bitter taste, and reduced shelf life. This review examines the effect of various enzymes and emulsifiers on properties of whole wheat bread and dough, particularly their impact on bread volume and hardness searching Google Scholar, PubMed, Web of Science and SID databases using related keywords. It was shown that xylanase enzyme reduces water absorption of whole wheat flour and, through hydrolysis of arabinoxylans and increasing the volume and softness of bread. Amyloglucosidase can decrease or increase the resistance to stretching of whole wheat dough depending on the amount used. Emulsifiers such as diacetyl tartaric acid esters of mono- and diglycerides (DATEM) and sodium stearoyl-2-lactylate can increase the volume of whole wheat bread and delay its staling. It can be concluded that enzymes and emulsifiers are among the most important functional ingredients that can improve properties of whole wheat dough and bread when used in their formulation. To achieve the best quality of whole wheat dough and bread, its combination is recommended.

Please cite this article as: Mohseni S, Karimi O, Akbari M. The Effect of Enzymes and Emulsifiers on Dough Properties and Bread Quality Prepared from Whole Wheat Flour: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S77.

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Int J Nutr Sci 2025;10(1-Supplement):S78.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

How Can Whole Grains Affect Alzheimer's disease? A Review

Sareh-Sadat Heydari[1], Marzieh Akbarzadeh[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Alzheimer's disease
Cognitive decline

**Corresponding author:*
Marzieh Akbarzadeh, PhD;
Nutrition Research Center, Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: marzieh_akbarzadeh@yahoo.com

ABSTRACT

In recent years, Alzheimer's disease (AD) has risen in prevalence around the world and is now one of the leading causes of dementia. It has been suggested that dietary patterns, particularly the consumption of whole grains (WG), may affect cognitive health and reduce the risk of Alzheimer's disease. This study aimed to summarize the association between whole grain intake and Alzheimer's disease, highlighting the potential protective roles of whole grains against cognitive decline. The association between WG consumption and dementia outcomes was investigated, which focused on both longitudinal and cross-sectional research using PubMed, Google Scholar, and Scopus databases. Evidence indicates that higher WG consumption is significantly associated with a reduced risk of all-cause dementia and AD. Moreover, some studies focusing on older African Americans revealed that increased WG intake is correlated with slower cognitive decline, equating to approximately 8.5 times less memory decline over six years compared to lower WG consumers. The findings support the hypothesis that whole grain consumption is inversely related to the risk of developing Alzheimer's disease and cognitive decline. In conclusion, these results underscore the importance of dietary interventions emphasizing whole grains as a potential strategy for reducing dementia risk, warranting further research to elucidate underlying mechanisms and optimize public health recommendations.

Please cite this article as: Heydari SS, Akbarzadeh M. How Can Whole Grains Affect Alzheimer's disease? A Review. Int J Nutr Sci. 2025;10(1-Supplement):S78.

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Int J Nutr Sci 2025;10(1-Supplement):S79.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Association between Whole Grain Antioxidants and Chronic Diseases: A Review

Sareh-Sadat Heydari[1], Amirhossein Asadi[1], Marzieh Akbarzadeh[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grains
Antioxidants
Chronic diseases
Oxidative stress
Phytochemicals

**Corresponding author:*
Marzieh Akbarzadeh, PhD;
Nutrition Research Center, Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: marzieh_akbarzadeh@yahoo.com

ABSTRACT

In today's world, chronic diseases pose significant challenges to public health. It was shown that diets high in whole grains are associated with a reduced risk of these conditions. In this regard, the antioxidant properties of whole grains play a crucial role. This review aimed to determine the role of antioxidants found in whole grains and their potential in prevention of chronic diseases. Google Scholar was searched using related keywords. The antioxidant content of whole grains, including their phytochemical profiles and their associations with chronic diseases was assessed. Phenolic acids, dietary fiber, and trace minerals were evaluated as antioxidants in whole grains. Various antioxidants can be found in whole grains, including phenolic compounds (e.g., ferulic acid, lignans) and vitamins (e.g., vitamin E, selenium). These compounds have significant antioxidant properties, in that they scavenge reactive oxygen species (ROS) and reduce oxidative stress, which has been implicated in the pathogenesis of chronic diseases. It has been shown that regular consumption of whole grains can reduce inflammatory markers and improve metabolic health indicators. Incorporating whole grains into daily diets is a promising strategy for preventing chronic diseases. Their antioxidant content contributes not only to the reduction of oxidative stress but also to the support of a healthy metabolic process. In conclusion, developing strategies for enhancing their bioavailability in human diets, as well as elucidating the specific mechanisms by which these antioxidants exert their protective effects, is an important focus of future research.

Please cite this article as: Heydari SS, Asadi AH, Akbarzadeh M. Association between Whole Grain Antioxidants and Chronic Diseases: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S79.

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Int J Nutr Sci 2025;10(1-Supplement):S80.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Protective Effect of Whole Grains on Cognitive Decline and Neuroplasticity: A Review

Sareh-Sadat Heydari[1], Marzieh Akbarzadeh[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Neuroplasticity
Cognitive functions

**Corresponding author:*
Marzieh Akbarzadeh, PhD;
Nutrition Research Center,Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: marzieh_akbarzadeh@yahoo.com

ABSTRACT

It has been suggested by recent studies that diet has a significant impact on modulating neuroplasticity, with whole grains emerging as a potential contributor because of their nutritional composition. In this review, the protective benefits of whole grains on cognitive decline and neuroplasticity were investigated. PubMed, Web of Science, Google Scholar, SID, and Scopus databases were searched using proper keywords. An association was shown between whole grains and cognitive outcomes in some studies. Some studies revealed a higher intake of whole grains to be associated with improved mood and reduced anxiety symptoms. Improved biomarkers of inflammation and glucose metabolism have been identified as potential pathways through which whole grains may influence neuroplasticity. Despite a promising link between whole grain consumption and improved mood outcomes, evidence regarding cognitive benefits is less clear. In conclusion, there is a need for further research to establish causal relationships and understand how they are mediated. In conclusion, dietary choices, particularly whole grains, play an important role in promoting brain health and resilience.

Please cite this article as: Heydari SS, Akbarzadeh M. Exploring the Protective Benefits of Whole Grains on Cognitive Decline and Neuroplasticity: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S80.

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Int J Nutr Sci 2025;10(1-Supplement):S81.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Improving the Structure of Gluten-Free Breads and Enriching Them with Dietary Fibers According to Nutritional Needs of Celiac Patients: A Review

Elham Aleebrahim[1*], Elahe Aleebrahim[2]

1. Food Science and Industry, Faculty of Biological Sciences, North Tehran Branch, Islamic Azad University, Tehran, Iran
2. Medical Plants Research Center, Basic Health Sciences Institute, Shahrekord University of Medical Sciences, Shahrekord, Iran

ARTICLE INFO

Keywords:
Grains
Bread
Gluten
Dietary fiber
Celiac disease

**Corresponding author:*
Elham Aleebrahim, PhD;
Food Science and Industry, Faculty of Biological Sciences, North Tehran Branch, Islamic Azad University, Tehran, Iran.
Email: elham.elb2017@gmail.com

ABSTRACT

Due to significant increase in celiac disease, there is a high demand for gluten-free products. This review focused on currently used methods of replacing grains, according to the nutritional needs of celiac patients. Databases of PubMed, Google Scholar, Magiran, Irandoc, and IranMedex were searched using keywords of grains, bread, gluten, dietary fiber, nutrition, celiac disease patients, viscoelastic properties, diet, nutritional properties, formulation of gluten-free breads and technological properties). Patients with celiac disease on a gluten-free diet showed multiple nutrient deficiencies, especially for vitamins and minerals. It is not still possible to offer celiac patients an alternative treatment diet based on high-nutrition and tasty grains that are naturally gluten-free. Until now, in the preparation of gluten-free bread, various methods were researched to improve the nutritional value, by using inulin-type fructans, rice and millet flour, *Cucurbita moschata*, soybean, hydrocolloids, and citrus fibers. It can be concluded that these data can be used for further researches, development of new methods, as well as making formulations using other compounds, especially medicinal plants, to increase the quality of bread in terms of nutrition, textural structure and proper appearance. The widespread release of such products could, in a completely innovative way, aim to reduce immune sensitivity to gluten and possibly reduce the incidence of celiac disease.

Please cite this article as: Aleebrahim E, Aleebrahim E. Improving the Structure of Gluten-Free Breads and Enriching Them with Dietary Fibers According to Nutritional Needs of Celiac Patients: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S81.

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Int J Nutr Sci 2025;10(1-Supplement):S82.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Investigating Sensory, Microbial, Physical and Chemical Properties of Baguette Bread Mixed with *Aloe vera* Preservative Powder

Arezoo Alimohammadi*

Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Health
Medicinal plant
Staleness
Baguette bread
Shelf life

ABSTRACT

Background: Bread is the main source of energy, protein, minerals and vitamins needed by humans. *Aloe vera* is one of the oldest medicinal plants and contains fiber, minerals, vitamins, amino acids, natural sugars, antibacterial, anti-inflammatory and antioxidant agents, and due to these properties, it prevents the spoilage in food and therefore, it is used in prevention and treatment of Alzheimer's disease, and is useful for digestive problems and heart diseases. The purpose of this study was to investigate the effect of adding *Aloe vera* on the microbial, sensory characteristics, texture, color and water absorption of baguette bread.

Methods: In order to produce baguette bread, 1, 3, 6 and 9 weight percent of *Aloe vera* powder was added to the flour and the microbial, sensory characteristics, texture, color and water absorption of the baguette bread were tested during 3 days.

Results: The results showed that the addition of *Aloe vera* powder was beneficial. At all levels, the activity of microorganisms, molds and yeasts has been controlled and spoilage has been controlled and delayed, the force of expansion has increased, the scores of sensory attributes, especially taste and smell have decreased, and the color indices, especially the light value and transparency of bread have decreased.

Conclusion: In general, this study showed that the addition of 1% *Aloe vera* powder reduced the staleness of bread and increased the shelf life and health value of bread.

**Corresponding author:*
Arezoo Alimohammadi,
Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: arezo.alimhmdi@gmail.com

Please cite this article as: Alimohammadi A. Investigating Sensory, Microbial, Physical and Chemical Properties of Baguette Bread Mixed with *Aloe vera* Preservative Powder. Int J Nutr Sci. 2025;10(1-Supplement):S82.

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Int J Nutr Sci 2025;10(1-Supplement):S83.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Investigating Factors Affecting Texture and Rheological Changes of Bread Dough to Increase Shelf Life of the Product: A Review

Arezoo Alimohammadi*

Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread
Flour
Rheology
Dough
Hydrocolloid

**Corresponding author:*
Arezoo Alimohammadi, MSc;
Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: arezo.alimhmdi@gmail.com

ABSTRACT

Food security is the basis of human social, economic, political and social development. Wheat is a strategic commodity, and therefore attention and precision in the quality and processing of this product is very important, especially in the field of flour and bread production. One of the most important ways to improve food safety is to maintain the quality of bread. One of the important factors in the quality of bread production is the rheological properties of the dough. Conventional methods are used to investigate the rheological properties of wheat flour dough. Among the important factors for evaluation are the type of flour and the amount of flour extraction, hydrocolloids, enzymes, salt, addition of whey protein, etc. In order to achieve the mentioned goal, various databases, including Scopus and PubMed, were examined and various published articles in this field were downloaded and the desired information was extracted. The obtained results showed the looseness of the dough increasing the resistance and strength of the gluten, and the color of the crust improved, but it had a negative effect on the texture and volume of the bread grain. With the addition of compressed yeast, the extensometer showed a decrease in dough elasticity and tensile strength, and in general, the dough loosened, but in the case of active dry yeast, satisfactory results were not obtained. Some of the most important factors of bread dough rheology are: type of flour, amount of flour extraction, added gums, enzymes, etc. which we examined in this study. Some of the most important factors of bread dough rheology were factors such as the type of flour, the amount of flour extraction, added gums and enzymes. In conclusion, guar hydrocolloid had the greatest effect on the rheological properties and the quality and shelf life of bread.

Please cite this article as: Alimohammadi A. Investigating Factors Affecting Texture and Rheological Changes of Bread Dough to Increase Shelf Life of the Product: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S83.

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Int J Nutr Sci 2025;10(1-Supplement):S84.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Assessment of Different Percentages of Permeate Powder in Bread and Bulk Bread Dough

Arezoo Alimohammadi[1*], Mohammad Sadegh Arab[2]

1. Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran
2. Food Science and Industry, Department of Food Science and Industry, Sarvestan Islamic Azad University, Sarvestan, Iran

ARTICLE INFO

Keywords:
Whey
Reversibility
Compressibility
Consistency
Bread

**Corresponding author:*
Arezoo Alimohammadi, MSc;
Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: arezo.alimhmdi@gmail.com

ABSTRACT

Background: Due to the presence of lactose and protein, whey powder is an important factor in strengthening flour and reducing the effect of wheat starch and helps reduce the staleness of bread. Some vitamins and minerals of wheat are lost due to peeling in flour mills, and whey as a permeate powder has high nutritional value, especially lactose and calcium phosphate. Whey can partially compensate for this deficiency. In addition, whey can effectively delay the staleness of bread and improve the physical and chemical properties of the resulting bread. In this research, the effect of whey on Berberi bread and baguette samples as bulk bread samples was investigated.

Methods: The effect of adding four levels of whey as 20, 30, 40 and 50% to replace part of the water were used in dough of bread prepared with the original sample without permit powder (without whey). The treated materials were tested for three consecutive days to evaluate the three factors of compressibility, consistency and viscoelastic reversibility.

Results: In terms of compressibility and consistency, the optimal whey concentration treatment of 20% as specific volume had the best specific volume after the control sample. After adding whey, secondary fermentation time decreased by 27%, final fermentation time by 25%, and Berber bread baking time by 26% compared to the control sample. Regarding sensory, appearance and judges' tests, the samples added with whey were superior to the control samples in terms of shell-to-core adhesion, taste, and especially smell.

Conclusion: Adding whey to replace part of the water used in the dough can improve the physical and chemical properties of bread.

Please cite this article as: Alimohammadi A, Arab MS. Assessment of Different Percentages of Permeate Powder in Bread and Bulk Bread Dough: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S84.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Evaluating the Effect of Buttermilk on Physical and Chemical Properties of Bulk Bread

Arezoo Alimohammadi[1*], Mohammad Sadegh Arab[2]

1. Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran
2. Food Science and Industry, Department of Food Science and Industry, Sarvestan Islamic Azad University, Sarvestan, Iran

ARTICLE INFO

Keywords:
Butter milk
Bulky bread
Shelf life
Physical properties
Chemical properties

**Corresponding author:*
Arezoo Alimohammadi, MSc;
Food Safety Department, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: arezo.alimhmdi@gmail.com

ABSTRACT

Background: Today, researchers are interested in nutritional and sensory quality of bulky bread. The aim of this study was to evaluate the influence of buttermilk on physicochemical and sensory attributes of pan and pita breads.

Methods: Different amounts of buttermilk (30, 60, and 100% of added water) were mixed with other ingredients of pan and pita bread formulations. The doughs and bread were analyzed for rheological, physicochemical, and sensory qualities.

Results: Incorporation of different concentrations of buttermilk in bread formulations could progressively enhance water absorption capacity, dough development time, gelatinization temperature, and peak viscosity, whereas it reduced the dough stability and temperature at peak viscosity. Supplementation of wheat flour with 30% buttermilk significantly enhanced the physical properties of pan bread compared to nonsupplemented control. Incorporation of different percentages of buttermilk in bread formulation concomitantly increased protein, oil, and ash contents and it reduced the carbohydrate contents of both types of bread. Incorporation of 60 and 100% of buttermilk in bread formula showed low scores of all sensory attributes compared to control and 30% buttermilk containing pan and pita bread.

Conclusion: In conclusion, supplementation of bread formulas with 30% buttermilk is recommended for improving the nutritional and sensorial qualities of pan and pita bread.

Please cite this article as: Alimohammadi A, Arab MS. Evaluating the Effect of Buttermilk on Physical and Chemical Properties of Bulk Bread. Int J Nutr Sci. 2025;10(1-Supplement):S85.

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Int J Nutr Sci 2025;10(1-Supplement):S86.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Fungal Contamination of Bread and the Control Methods: A Review

Arezou Khezerlou[1], Hajar Zolfaghari[1], Mahmood Alizadeh Sani[2*]

1. Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Assistant professor, Department of Food Science and Technology, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Fungal contamination
Bread quality
Mycotoxin
Mold spoilage control

**Corresponding author:*
Mahmood Alizadeh Sani, PhD;
Department of Food Science and Technology, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran.
Email: saniam7670@gmail.com

ABSTRACT

Bread is a perishable food, while the reduction of quality and/or freshness of this product is closely related to storage time. The shelf life of bakery products is mainly affected by filamentous fungi or molds of Aspergillus and Penicillium that can be associated with a significant economic problem. Another aspect associated with fungal growth in food is the potential production of mycotoxins. This is a cause for concern as mold mycelia may have penetrated the bread and release secondary metabolites such as mycotoxins and molecules with biological activities. The present review was conducted by searching the sources in SID, Scopus, and Google Scholar search databases utilizing keywords of fungal contamination, bread quality, mycotoxin, and mold spoilage control. To prevent premature spoilage of bread and public health concerns, strategies such as use of antifungal compounds produced by lactic acid bacteria, monoglycerides, or based fermentation, encapsulated essences and their free form, modified packaging, and physical methods such as the use of ozone treatment and the application of novel technologies such as cold plasma, ultraviolet radiation, and nanoparticles (silver, copper) were recommended. In addition, due to the importance of environmental health in the contamination of ready-to-use products, the use of sanitizers with appropriate antifungal properties is necessary. It can be concluded that considering that spoilage of bread can bring many health and economic risks; use of various methods to prevent fungal growth and extend the shelf life of bread may contribute to improve the quality and safety of bakery products.

Please cite this article as: Arezou Khezerlou1, Hajar Zolfaghari1, Mahmood Alizadeh Sani. Fungal Contamination of Bread and the Control Methods: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S86.

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Int J Nutr Sci 2025;10(1-Supplement):S87.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Impact of Active Packaging on Shelf Life of Bread: A Review

Hajar Zolfaghari[1], Arezou Khezerlou[1], Mahmood Alizadeh Sani[2*]

1. Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Department of Food Science and Technology, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Bread
Active packaging
Shelf life
Bakery products
Food safety

**Corresponding author:*
Mahmood Alizadeh Sani, PhD;
Department of Food Science and Technology, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran.
Email: saniam7670@gmail.com

ABSTRACT

Unfortunately, bread remains fresh for only a few hours after baking. This is a major problem for those who deal with the packaging of bakery products. Bread is a dynamic system that undergoes physical, chemical, and microbiological changes that limit its shelf life. The main factors that cause the loss of bread properties are microbial spoilage, chemical or physical changes in the bread which in addition to health and safety problems cause significant economic losses. The present review was conducted by searching the sources in SID, Scopus, and Google Scholar search databases utilizing keywords of active packaging, shelf life, and bread. Today, various physical methods (ultraviolet (UV), infrared (IR), microwave (MW), ultra-high pressure (UHP)) and chemical methods (preservatives such as acetic acid, potassium acetate, sodium acetate) are used to increase the shelf life of bread and reduce the growth of microorganisms. One of the novel methods is the use of active packaging based on biopolymers in the bakery industry. Active packaging, by absorbing or releasing effective compounds such as various organic/inorganic nanoparticles, essential oils, plant extracts, and other bioactive compounds, prevents staling of bread and the growth of microorganisms; and does not have the environmental problems of conventional packaging. In conclusion, active packaging with controlled internal atmospheric conditions, as well as antimicrobial and antioxidant properties, can increase the shelf life of various types of bread.

Please cite this article as: Zolfaghari H, Khezerlou A, Alizadeh Sani M. Impact of Active Packaging on Shelf Life of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S87.

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Int J Nutr Sci 2025;10(1-Supplement):S88.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Key Factors in Formation and Control of Maillard Reaction Products in Bread: A Review

Mir Mojtaba Didehvar[1], Hadi Almasi[1*], Babak Ghanbarzadeh[2]

1. Department of Food Science and Technology, Faculty of Agriculture, University of Urmia, Urmia, Iran
2. Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Maillard reaction
Acrylamide
Hydroxymethyl furfural

**Corresponding author:*
Hadi Almasi, PhD;
Department of Food Science and Technology, Faculty of Agriculture, University of Urmia, Urmia, Iran.
Email: h.almasi@urmia.ac.ir

ABSTRACT

Bread baking involves a complex thermal process that causes changes in its taste, color and texture and formation of Maillard reaction products that can have negative effects on human health. In this study, the factors that affect the production of these products in different types of bread have been investigated and different methods have been suggested to reduce their level. Google Scholar, PubMed, Web of Science, SID and Scopus databases were searched using related keywords. Exposure to temperatures above 220 °C leads to increased formation of Maillard reaction products, especially acrylamide and furfural, the former being exacerbated by longer curing times. Hydroxymethylfurfural is independent of time and only dependent on temperature. The use of whole or less refined grain flours can help to reduce these products due to the reduced availability of Maillard reaction product precursors.In conclusion, reducing the cooking time and temperature can help reduce the formation of toxic compounds such as acrylamide and hydroxymethylfurfural. In addition, choosing mixed flours or whole grains due to their lower levels of amino acid precursors and reducing sugars can be a good strategy to reduce Maillard products in bread.

Please cite this article as: Didehvar MM, Almasi H, Ghanbarzadeh B. Key Factors in Formation and Control of Maillard Reaction Products in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S88.

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Int J Nutr Sci 2025;10(1-Supplement):S89.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Importance of Bread and Cereal Products in Celiac Patients: A Review

Narges Almasian*, Faezeh Rastgou, Maryam Begami

Department of Food Science and Technology, Zahedan University of Medical Sciences. Zahedan, Iran

ARTICLE INFO

Keywords:
Bread
Cereals
Patients
Celiac disease

ABSTRACT

Celiac disease is an autoimmune disorder caused by the consumption of gluten, a protein found in wheat, barley and rye in people who are sensitive to this protein that stimulates their immune system and damages the villi of the small intestine and can lead to serious problems such as malnutrition, anemia and increased risk of other diseases. One of the most important challenges in this diet is to find and consume gluten-free bread and grain products that are nutritionally balanced and favorable for taste and texture. Pubmed, Scopus and Google Scholar databases were searched using keywords of bread, cereals, and celiac disease. This review introduced bread and grain products for celiac patients and investigated raw materials used in production of gluten-free bread and grain products, baking techniques and problems in manufacturing these products. The nutritional value of gluten-free bread and grain products was compared with gluten-containing products to clarify important nutritional points for celiac patients. Gluten-free breads are usually made from alternative flours such as rice flour, corn flour, potato flour and quinoa flour that can help create a similar texture to gluten-containing breads. However, there are challenges such as improving the texture, taste and shelf life of these products that manufacturers should pay attention to. Gluten-free cereal products also include pasta, crackers, biscuits and breakfast products. These products should not only be gluten-free, but also nutritionally balanced and rich to meet the nutritional needs of celiac patients. Some of the problems associated with the production of these products include maintaining quality and durability, high cost of production and limited access to suitable raw materials. This study concluded successful experiences in the production of gluten-free bread and products and studies scientific research related to these products. Also, it offers suggestions to improve the production and consumption of these products so that celiac patients can better manage their diet and have a better quality of life.

*Corresponding author:
Narges Almasian, BSc;
Department of Food Science and Technology, Zahedan University of Medical Sciences, Zahedan, Iran.
Email: nargesalmaseian@gmail.com

Please cite this article as: Almasian N, Rastgou F, Begami M. Importance of Bread and Cereal Products in Celiac Patients: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S89.

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Int J Nutr Sci 2025;10(1-Supplement):S90.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Methods to Reduce Sodium Intake in Bakery Products: A Review

Golara Asadi Kalhori*, Babak Ghanbarzadeh, Akram Pezesky

Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Salt reduction
Rheological properties
Bread
Quality
Salt replacement

**Corresponding author:*
Golara Asadi Kalhori, MSc;
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Golaraasadi1999@gmail.com

ABSTRACT

The intake of sodium chloride in the diet is higher than the daily intake due to its prominent presence in food products. Food experts define bread as a main food at the top of the food pyramid because it is rich in carbohydrates, fiber, nutrients, B vitamins and mineral salts. Excessive consumption of iron increases blood pressure, which prevents cardiovascular diseases. Salt is vital in making bread and reducing it can affect the quality of bread. This review is about the physiological role of sodium chloride, its effect on the human body and legal recommendations for its use. The amount of sodium in the body of people may be different, but its distribution is the same in all people. Sodium chloride on bread offers a technological and sensory point of view and offers options for reducing salt in food with food on bakery products. Methods to reduce sodium intake in bakery products were evaluated in this review. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords of salt substitutes, rheological properties, sensory and textural characteristics of bakery products. It is somewhat possible to replace sodium chloride with other types of salts, different spices, dry sour dough and flavor enhancers in bakery products. In conclusion, the research carried out so far offers different strategies to reduce sodium from the content of bakery products (gradual reduction of the level of salt in foods, use of different types of mineral salts, flavor enhancers, different ingredients with flavor compounds, etc.). Salt reduction in bakery products can be done gradually over time and will not affect consumer acceptability. KCl is the most common salt used to replace NaCl. The use of sea salt with low sodium content is increasing nowadays for its use in bakery products, because it may lead to good quality of bakery products.

Please cite this article as: Asadi Kalhori G, Ghanbarzadeh B, Pezesky A. Methods to Reduce Sodium Intake in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S90.

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Int J Nutr Sci 2025;10(1-Supplement):S91.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Economic Burden of a Gluten-Free Diet in Iran and the Trend of Price Changes in the Last Five Years

Sara Asadi*, Fatemeh Salimi, Khadijeh Karimi, Mohammad Mehdi Naghizadeh

Noncommunicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran

ARTICLE INFO

Keywords:
Gluten free diet
Economic burden
Cost
Celiac disease

**Corresponding author:*
Sara Asadi, MSc;
Noncommunicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran.
Email: asadis_744@yahoo.com

ABSTRACT

Background: Celiac disease is an autoimmune disorder, the only cure for which is lifelong gluten-free diet that has important issues regarding the food access and prices for patients. This study evaluated economic burden of a gluten-free diet in Iran and the trend of price changes in the last 5 years.

Methods: The prices of gluten-free products available in the market, including all licensed domestic products and foreign samples that do not have domestic equivalents were examined and the price of 100 grams of them was compared with the price of similar gluten-containing products in the last 5 years.

Results: The price of gluten-free bread in 2018 was 3.7 times that of regular bread, but in 2024, it is 23 times that of regular bread. Regarding non-subsidized breads such as baguettes, this difference reaches 1.9 times. The average price of gluten-free flours in 2018 was 1.3 times the price of regular flours, and this difference has now reached 7 times. Regarding biscuits and wafers, the price difference increased from 1.3 times and 5.1 times in 2018 to 3.8 and 9 times in 2024, respectively. The price difference of cakes-cookies and pasta increased from 1.7 times to 2.6 times and from 1.7 times to 4.25 times, respectively. The price of gluten-free vanilla ice cream and sauces decreased in comparison to 2018. In 2024, the prices of sweets, dairy products, tomato paste, cake powder and spices did not differ between gluten-free products and regular products. The average price difference in 1998 was equal to 2939 with a standard deviation of 3157 and in 2024 it was equal to 26129±35856 (p<0.001).

Conclusion: The high price of gluten-free products shows the need to support these patients.

Please cite this article as: Asadi S, Salimi F, Karimi K, Naghizadeh M. Economic Burden of a Gluten-Free Diet in Iran and the Trend of Price Changes in the Last Five Years. Int J Nutr Sci. 2025;10(1-Supplement):S91.

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Int J Nutr Sci 2025;10(1-Supplement):S92.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Nutritional Value of Iranian Gluten-Free Bread

Sara Asadi*, Fatemeh Salimi, Khadijeh Karimi, Mohammad Mehdi Naghizadeh

Noncommunicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran

ARTICLE INFO

Keywords:
Gluten free
Bread
Nutritional value

ABSTRACT

Background: In celiac disease as an autoimmune condition, the only way to control it is lifelong adherence to a gluten-free diet and bread. This study has evaluated nutritional value of Iranian gluten-free bread.

Methods: The ingredients and nutritional information reported on the labels of Iranians gluten-free breads were investigated and their micronutrients and nutritional value were compared with gluten-containing breads.

Results: Of 12 gluten-free breads available in the market, rice flour was used in 82%, corn starch in 64%, potato flour in 54%, corn flour and potato starch in 36%, and soybean flour in 9% of the samples. Totally, 27% of the samples contained whey powder and 18% contained egg white. A total of 64% of the breads contained oil additions and 54% were added with sugar. Average energy was 240 Kcal, average fat was 3.8 grams, and average protein was 4 grams per 100 grams of gluten-free bread. Compounds such as buckwheat, quinoa, inulin and other compounds were used in some non-Iranian gluten-free bread that was not observed in any of Iranians gluten-free breads.

Conclusion: As the use of refined starches and flours with low fiber content in the composition of gluten-free flours increases the glycemic index of these breads; the inflammatory biomarkers increases too when compared to foods with a low glycemic index. As some gluten-free bread is higher in calories compared to gluten-containing breads, weight management is essential. Starches and low-protein flours such as corn, rice, which are commonly used as main ingredients in gluten-free breads, they are considered as poor sources of folate. People using a gluten-free diet should be aware about potential nutrient deficiencies of this diet and use the required alternatives and supplements.

*Corresponding author:
Sara Asadi, MSc;
Noncommunicable Diseases Research Center, Fasa University of Medical Sciences, Fasa, Iran.
Email: asadis_744@yahoo.com

Please cite this article as: Asadi S, Salimi F, Karimi K, Naghizadeh M. Nutritional Value of Iranian Gluten-Free Bread. Int J Nutr Sci. 2025;10(1-Supplement):S92.

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Int J Nutr Sci 2025;10(1-Supplement):S93.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Transgenic Rice on Quality and Nutritional Value of Cereal Products: A Review

Mohsen Shahdadi[1], Seyed Mohammad Mazloomi[2], Elham Ashrafi Dehkordi[2]*

1. Food Safety and Hygiene, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Transgenic rice
Bakery products
Genetic engineering
Nutritional value

**Corresponding author:*
Elham Ashrafi Dehkordi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: elhamashrafi@gmail.com

ABSTRACT

The protein value of rice is higher than wheat and lacks gluten making it suitable for Celiac patients. Rice is colorless, with a pleasant taste, low sodium, protein, fat, and fiber, and high carbohydrate with good digestibility. Transgenic rice flour quality improves via genetic engineering. This review explored impact of transgenic rice on quality and nutritional value of cereal products. Google Scholar was searched using related keywords. Key genes in transgenic rice were for pest and disease resistance, herbicide tolerance, nutritional enhancement, and antioxidant properties. Cry genes provide transgenic rice with greater resistance to pests, reduce the need for chemical pesticides and improve the stability and quality of the final product. ZmPPSY1 and Eucrt1 genes lead to production of beta-carotene (a precursor to Vitamin A), while Atgtpchi and Atadcs genes contribute to production of folic acid. Osnas2, Gmferritin, Afphytase, Osnas1, and Osnas3 genes increase the production of iron and zinc in rice, and enhanceing nutritional value of transgenic rice. Antioxidant genes of P5CS and ADC increase the final product's resistance to oxidative environmental conditions and improve shelf-life of baked goods. These genetic modifications induce changes in structure of proteins and starches, alter texture of products made from rice flour. Changes in flavor and aroma compounds might arise due to modifications in protein structures and chemical compounds. It can be concluded that use of nutrient-enhancing genes to improve nutritional quality and overall value of the products.

Please cite this article as: Shahdadi M, Mazloomi SM, Ashrafi Dehkordi E. The Effect of Transgenic Rice on Quality and Nutritional Value of Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S93.

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Int J Nutr Sci 2025;10(1-Supplement):S94.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Association of Whole Grain Dietary Intake with Non-Communicable Diseases: A Review

Leila Azadbakht*, Nazanin Asghari Hanjani

Nutritional Sciences Unit, Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Whole grain
Non-communicable diseases
Dietary fiber
Inflammation

ABSTRACT

The increasing prevalence of non-communicable diseases (NCDs) is a global health challenge. Dietary factors play a crucial role in this condition, and evidence suggests that whole grain (WG) with nutrient-dense bran and germ influence NCD primarily through metabolic regulation. The study aimed to summarize the effects of WG consumption on NCD. PubMed, Web of Science and Scopus were searched using related keywords. A randomized control trial showed that WG and high fiber diet can lower inflammatory biomarkers [c-reactive protein (CRP), Tumor necrotizing factor-alpha (TNF-α), Interleukin-6 (IL-6), D-dimer, and serum fibrinogen] after 10 weeks. Weight, and waist circumference significant reduction were also observed after WG consumption. Systolic blood pressure, fasting blood sugar and triglycerides decreased significantly when compared with the fruits and vegetables group. A meta-analysis revealed a significant improvement in risk factors of cardiovascular diseases including HbA1C and CRP followed by WG consumption. A 14 observational studies review also indicated that WG was inversely associated with metabolic syndrome incidence. A meta-analysis of 34 articles reported a declined risk of digestive cancer tract in the higher quartile of WG compared to a lower intake of WG. In conclusion, there is convincing evidence that consuming WG can reduce NCD burden. Incorporating WG into dietary guidelines is a practical strategy that can foster healthier eating habits.

*Corresponding author:
Leila Azadbakht, PhD;
Faculty Member, Department of Community Nutrition, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran.
Email: l-azadbakht@tums.ac.ir

Please cite this article as: Azadbakht L, Asghari Hanjani N. The Association of Whole Grain Dietary Intake with Non-Communicable Diseases: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S94.

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Int J Nutr Sci 2025;10(1-Supplement):S95.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Challenges and Obstacles in Improvement of the Quality of Bread in Kermanshah, Iran

Mahnaz Fatahi, Samira Azimi*, Hosein Biglari, Taranom Hoseini Kia, Shahryar Mostoofi

Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran

ARTICLE INFO

Keywords:
Bread
Wheat
Flour
Quality
Iran

**Corresponding author:*
Samira Azimi, MSc;
Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran.
Email: samira.azimi215@gmail.com

ABSTRACT

Background: In Iran, bread plays a special role in the nutritional pattern as the primary source of nutrition for people, providing the majority of daily energy, protein, and some essential minerals and vitamins. Given that the quality parameters of bread play an important role in the health and satisfaction of consumers, this study aims to identify the challenges and obstacles to improving bread quality from the perspectives of experts, key stakeholders, bakers, and consumers In Kermanshah.

Methods: This qualitative study collected data through focused group discussions with experts and key stakeholders involved in the production process of flour and bread. The data was gathered continuously over one year through the sessions of a specialized working group.

Results: The major challenges and obstacles to improving bread quality, in order of importance, included: low-quality raw materials, the use of unauthorized additives, insufficient training and experience among bakery workers, lack of personal and environmental hygiene in bakeries, pricing without considering bakers' costs, the issuance of bakery licenses without expert consultation, multi-tiered flour pricing, and lack of precision in wheat procurement due to the government-run purchasing system.

Conclusion: The findings of this study contribute to a better understanding of the challenges and barriers to improving the wheat, flour, and bread supply chain in the province. This information can be useful for policymaking and planning to enhance the quality of bread production and distribution.

Please cite this article as: Fatahi M, Azimi S, Biglari H, Hoseini Kia T, Mostoofi S. Challenges and Obstacles in Improvement of the Quality of Bread in Kermanshah, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S95.

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Int J Nutr Sci 2025;10(1-Supplement):S96.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Challenges and Obstacles in Improvement of the Quality of Bread in Kermanshah Province, Iran

Mahnaz Fatahi, Samira Azimi*, Hosein Biglari, Taranom Hoseini Kia, Shahryar Mostoofi

Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran

ARTICLE INFO

Keywords:
Challenge
Obstacle
Bread
Quality
Wheat-flour-bread

**Corresponding author:*
Samira Azimi , MSc;
Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran.
Email: samira.azimi215@gmail.com

ABSTRACT

Background: In Iran, bread is the primary source of nutrition for people, providing the majority of daily energy, protein, and some essential minerals and vitamins. So quality parameters of bread play an important role in the health and satisfaction of consumers. This study aims to identify the challenges and obstacles to improve bread quality from the perspectives of experts, key stakeholders, bakers, and consumers In Kermanshah, Iran.

Methods: This qualitative study collected data through focused group discussions with experts and key stakeholders involved in the production process of flour and bread. The data was gathered continuously over one year through the sessions of a specialized working group.

Results: The major challenges and obstacles to improve bread quality, in order of importance were low-quality raw materials, the use of unauthorized additives, insufficient training and experience among bakery workers, lack of personal and environmental hygiene in bakeries, pricing without considering bakers' costs, the issuance of bakery licenses without expert consultation, multi-tiered flour pricing, and lack of precision in wheat procurement due to the government-run purchasing system.

Conclusion: The findings of this study contribute to a better understanding of the challenges and barriers to improve the wheat, flour, and bread supply chain in the region. This information can be useful for policymaking and planning to enhance the quality of bread production and distribution.

Please cite this article as: Fatahi M, Azimi S, Biglari H, Hoseini Kia T, Mostoofi S. Challenges and Obstacles in Improvement of the Quality of Bread in Kermanshah Province, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S96.

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Int J Nutr Sci 2025;10(1-Supplement):S97.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Challenges and Limitations in Vitamin D Fortification of Bread: A Review

Shima Nikkhah[1], Mina Babashahi[2*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Vitamin D fortification
Bread
Stability
Consumer acceptance

**Corresponding author:*
Mina Babashahi, PhD;
Department of Community Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: m.babashahi21@gmail.com

ABSTRACT

The fortification of bread with vitamin D is being explored as a strategy to combat widespread vitamin D deficiency. Despite its potential benefits, the development and implementation of bread fortification policy faces several technical and regulatory challenges. This review aims to identify and analyze these limitations and weaknesses. A systematic search was conducted across PubMed, Google Scholar, Scopus, and Web of Science databases using keywords such as vitamin D fortification, bread, stability, consumer acceptance, and regulatory challenges. The initial search yielded 100 articles. After applying inclusion criteria and excluding irrelevant studies, 15 articles were selected for detailed analysis. The main challenges identified include the stability of vitamin D during baking, consumer acceptance, and regulatory issues. High baking temperatures can degrade vitamin D, leading to inconsistent levels in the final product. Additionally, consumers may resist fortified bread due to potential changes in taste and texture. Furthermore, inconsistent regulations across regions complicate the widespread implementation of bread fortification. While fortifying bread with vitamin D is a promising public health intervention, the identified challenges must be addressed to ensure its effectiveness. It can be concluded that future researches should focus on optimizing vitamin D stability during baking, improving consumer awareness, and harmonizing regulations to facilitate broader adoption.

Please cite this article as: Nikkhah S, Babashahi M. Challenges and Limitations in Vitamin D Fortification of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S97.

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Int J Nutr Sci 2025;10(1-Supplement):S98.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Association of Subsidies of Wheat and Flour with per Capita Consumption of Bread among Iranian Households

Mina Babashahi*

Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat
Flour
Households
Subsidy

ABSTRACT

Background: Fiscal policies can play an important role in the behavior and health of consumers. This study aimed to analyze the trend of bread consumption in Iran and changes in the amount of subsidy paid to it.

Methods: The amount of bread consumed in Iranian households was extracted from the balance sheet of food products of the Islamic Republic of Iran during 2002-2011 and the amount of subsidy paid to it was obtained from the documents and statistics available at the Ministry of Economic Affairs and Finance.

Results: Linear regression results showed statistically significant difference between subsidies for bread, bread consumption (p=0.019 and r=0.720) and energy level produced in the body (p=0.003 and r=0.824). For each one billion Rials increase in subsidies paid for bread, 63.712 tons of bread consumption and 0.014 kilo-calories of daily energy consumption decreased.

Conclusion: To hold bread price constant, huge money is spent as subsidies for this product every year. Not paying attention to flour quality, and the low-quality bread produced in bakeries, can cause a part of subsidies spent for bread is wasted and therefore, per capita consumption of bread decreased.

*Corresponding author:
Mina Babashahi, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: m.babashahi21@gmail.com

Please cite this article as: Babashahi M. Association of Subsidies of Wheat and Flour with per Capita Consumption of Bread among Iranian Households. Int J Nutr Sci. 2025;10(1-Supplement):S98.

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Int J Nutr Sci 2025;10(1-Supplement):S99.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Investigating the Effect of Fermented Rice Bran on Chemical Composition and Sensory Properties of Cookies

Elham Zamani, Haniyeh Bagheri Kia*

Food Technology, Department of Food Science and Technology, Tarbiat Modares University, Tehran, Iran

ARTICLE INFO

Keywords:
Lactobacillus plantarum
Saccharomyces cerevisiae
Rice bran
Physicochemical composition
Cookie

**Corresponding author:*
Haniyeh Bagheri Kia, PhD;
Department of Food Science and Technology, Tarbiat Modares University, Tehran, Iran.
Email: Haniyeh.bagherikia1992@gmail.com

ABSTRACT

Background: Cookies are widely popular among all age groups, however, due to the use of refined flour in their production, they may be harmful to health based on their high sugar and calorie content.

Methods: To increase the nutritional value and solve these problems, rice bran fermented by lactic acid bacteria and bread yeast was used in the formulation of cookies. To prepare cookies, first the moisture content of rice bran reached 70% by adding water, and in the next step, it was sterilized by autoclave. Then under sterile conditions, *Lactobacillus plantarum* bacteria and *Saccharomyces cerevisiae* yeast were added to rice bran, and after three days of fermentation, rice bran was fermented, dried, ground and used in the production of cookies. In next step, the cookies were compared with four types of commercially available cookies in terms of nutrient composition, physical properties, and sensory evaluation.

Results: The use of fermented rice bran in production of cookies, due to the production of various enzymes, increased soluble fiber, antioxidant capacity, and phenolic compounds, and reduced the calories of cookies. Also, the use of fermented rice bran could improve the sensory and textural properties of cookies.

Conclusion: The results of this research can be a promising prospect for the use of whole grains and their bran in cake and pastry products, including cookies.

Please cite this article as: Zamani E, Bagheri Kia H. Investigating the Effect of Fermented Rice Bran on Chemical Composition and Sensory Properties of Cookies. Int J Nutr Sci. 2025;10(1-Supplement):S99.

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Int J Nutr Sci 2025;10(1-Supplement):S100.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Assessment of Quinoa Pseudo-Cereal in Bread Enrichment and Its Replacement Roles in Bread for Celiac Patients

Sepideh Bahrami*

Department of Food Science and Technology, Safadasht Branch, Islamic Azad University, Tehran, Iran

ARTICLE INFO

Keywords:
Quinoa
Bread
Hydroxypropyl methylcellulose
Katira gum
Celiac disease

ABSTRACT

Background: Quinoa seed is gluten-free and contains high amounts of essential amino acids, essential fatty acids and is rich in dietary fiber and with high quantities of potassium, calcium, phosphorus, magnesium, and iron. So quinoa pseudo-cereal role in bread enrichment and its replacement in bread for celiac patients were investigated.

Methods: To produce gluten-free bread, corn flour, rice flour, and quinoa flour were used and equal proportions of hydroxypropyl methylcellulose and Katira gum were added. To enrich the bread, 5-20% of quinoa flour was added to the common formulation of flatbread.

Results: Use of 25% quinoa flour in presence of 65% corn flour and 10% rice flour showed favorable results in terms of texture, specific volume, and moisture content, and there was no significant difference in terms of sensory characteristics. Sensory evaluation of bread samples enriched with quinoa up to 20% showed no significant difference in taste, smell, texture, and general acceptance. From a technological point of view, quinoa flour decreased the staleness percentage and increased the dough's water-holding capacity.

Conclusion: The favorable nutritional characteristics of quinoa flour can be used in manufacturing neutroceutical products by improving the amount of essential amino acids, essential fatty acids, and fiber, without causing unfavorable changes in sensory characteristics, which can be shown from quinoa flour. When an appropriate hydrocolloid is used in production of gluten-free food, the organoleptic qualities do not change considerably. Samples enriched with quinoa did not reveal a significant difference, but the increase in firmness during storage occurs if more percentages of quinoa (20%) are added. which is also suggested to improve the texture of the use of hydrocolloids in enriched products.

**Corresponding author:*
Sepideh Bahrami, PhD;
Department of Food Science and Technology, Safadasht Branch, Islamic Azad University, Tehran, Iran.
Email: Sepideh.bahrami@iau.ac.ir

Please cite this article as: Bahrami S. Assessment of Quinoa Pseudo-Cereal in Bread Enrichment and Its Replacement Roles in Bread for Celiac Patients. Int J Nutr Sci. 2025;10(1-Supplement):S100.

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Int J Nutr Sci 2025;10(1-Supplement):S101.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Use of Sourdough in Gluten-Free Bakery Products: A Review

Farzaneh Balighi*, Mehran Aalami

Department of Food Industry Science and Engineering, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran

ARTICLE INFO

Keywords:
Gluten- free bakery products
Sourdough
Cake
Bread
Celiac disease

*Corresponding author:
Farzaneh Balighi, MSc;
Department of Food Industry Science and Engineering, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran.
Email: Balighi.farzaneh@gmail.com

ABSTRACT

In recent years, with the increase in celiac disease, the demand for gluten-free bakery products has increased too. Considering that the quality of gluten-free bakery products in terms of nutritional value, structure, durability, acceptability and mouthfeel is lower than gluten-containing bakery products, the production and improvement of the quality of these products is one of the important challenges of the grain industry. This review assessed the effect of using sourdough in gluten-free bakery products and its improvement in these products in terms of texture, shelf life, nutritional properties, aroma and taste. PubMed, Scopus and Google Scholar databases were searched utilizing related keywords. The development of gluten-free baking industries has led to the use of gluten-free flours (such as soy, corn, rice, peas and chestnuts) and supplements such as sourdough. Sourdough is one of the oldest examples of natural culture starter, which is mostly used in the preparation of bakery products and as a substitute for bakery yeasts and chemical agents (such as baking soda and baking powder). Meanwhile, the bacteria and yeasts in the sourdough can be grown spontaneously or inoculated as a selective starter culture. It has been proven that sourdough is ideal in increasing the overall quality of bakery products and its positive effects are due to the complex metabolic activities of sourdough microorganisms such as acidification, proteolysis, and production of exopolysaccharides and antibacterial substances. It can be concluded that the researchers and producers of the grain industry are encouraged to expand the use of sourdough in gluten-free bakery products, increase the variety and quality of gluten-free products, and develop the technological and nutritional potential of sourdough.

Please cite this article as: Balighi F, Aalami M. Use of Sourdough in Gluten-Free Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S101.

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Int J Nutr Sci 2025;10(1-Supplement):S102.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Production Methods of Gluten-Free Products: A Review

Nafise Baradaran*

Ferdowsi University, Mashhad, Iran

ARTICLE INFO

Keywords:
Gluten-free
Food
Quality
Hydrocolloids
Enzymes

ABSTRACT

Due to the increase in the population of celiac patients worldwide, the production of high quality gluten-free products is one of the most important challenges in food industry. Due to the lack of gluten protein, which plays an important role in creating a cohesive structure and quality of bakery products, the texture of these products is weak. There are several ways to improve the quality of gluten-free products. The aim of this review was to assess production methods of gluten-free products. PubMed, Scopus and Google Scholar were searched using the proper keywords. Hydrocolloids can be used as a substitute for gluten due to their tissue stabilization properties and proteins due to their emulsifying characteristics. Biotechnological methods, such as the use of enzymes and sour dough, improve the quality of gluten-free products. Enzymes improve the rheology and sourdough properties through cross-linking, and increase the elasticity of the dough due to the breakdown of non-gluten proteins and starch compounds. New methods include microwave, infrared, extrusion, cold plasma, and high pressure. The extrusion process has advantages such as gelatinization of starch and increases in water absorption capacity and as a result increases in digestion. Microwave radiation increases the volume and nutritional value and the use of infrared increases the amount of digestible starch and inactivates enzymes. Cold plasma promotes the hydration properties and raises the gelatinization temperature due to the effect on the structure of starch granules. It can be concluded that high pressure treatment can make it possible to produce food with a new texture by changing the structure of protein and starch. It is hoped that researchers will provide quality products to patients with these methods.

*Corresponding author:
Nafise baradaran, MSc;
Graduated from Ferdowsi University of Mashhad, Mashhad, Iran.
Email: nfsbaradaran@gmail.com

Please cite this article as: Baradaran N. Production Methods of Gluten-Free Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S102.

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Int J Nutr Sci 2025;10(1-Supplement):S103.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Role of Whole-Meal Bread and Cereal Products in Improvement of Digestive Health and Prevention of Chronic Diseases: A Review

Mohammad Vesal Bideshki[1], Hannaneh Jozi[1], Donya Arjmandfard[2], Ehsan Behzadi[2], Mehrdad Behzadi[2*]

1. Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
2. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Grain
Cereal
Whole meal bread
Chronic diseases
Digestive diseases

**Corresponding author:*
Mehrdad Behzadi, MSc;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Mehrdad.behzadi.39@gmail.com

ABSTRACT

Whole-grain products have a special place in human nutrition as rich sources of fiber, vitamins, minerals and phytochemical compounds. This review investigated the role of whole grains in improving digestive health and reducing the risk of chronic diseases. PubMed, Scopus, Web of Science and Google Scholar databases were searched up to July 2024 using keywords of whole-grains, digestive health, chronic diseases and dietary fiber. A total of 50 articles were identified, and after checking the inclusion and exclusion criteria, 30 articles were selected for the final review. Studies have shown that regular consumption of whole-grains improves intestinal function, reduction of constipation and prevention of diverticulitis. Also, due to the presence of fiber and antioxidants, these products reduce the risk of type 2 diabetes and cardiovascular diseases by reducing inflammation and controlling blood sugar. Several studies have shown that consuming whole grains can help reduce the risk of gastrointestinal cancers. It can be concluded that whole-grains can play an important role in preventing chronic diseases and improving digestive health as part of a healthy diet. Encouraging the consumption of these products in national nutrition policies seems necessary.

Please cite this article as: Bideshki MV, Jozi H, Arjmandfard D, Behzadi E, Behzadi M. The Role of Whole-Meal Bread and Cereal Products in Improvement of Digestive Health and Prevention of Chronic Diseases: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S103.

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Int J Nutr Sci 2025;10(1-Supplement):S104.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Quality of Synbiotic Bread: A Review

Samira Beikzadeh*, Akbar Bagheri, Nasrin Hoseinzadeh

Department of Food Science and Nutrition, Maragheh University of Medical Sciences, Maragheh, Iran

ARTICLE INFO

Keywords:
Bread
Synbiotic
Stale
Probiotic
Prebiotic

ABSTRACT

Bread is one of the main foods all over the world, which is cooked in different ways. Synbiotic microorganisms are living organisms that can affect health status if enough are introduced into the body. Synbiotic bread contains probiotics (beneficial living microorganisms) and prebiotics (indigestible fibers that help the growth of probiotics). This review is an overview of the quality characteristics of synbiotic bread. Articles were selected from Science Direct, Google Scholar and PubMed from 2000 to 2024 using the related keywords. It was shown that synbiotic bread can be produced by adding microorganisms such as Lactobacillus and Bifidobacterium, which have probiotic properties, together with prebiotics such as inulin and oligosaccharides. Also, encapsulation is one of the ways to increase the resistance of probiotics against the heat caused by baking synbiotic bread. Synbiotic bread has the ability to help intestinal health, strengthen the immune system and reduce the risk of certain diseases. The addition of synbiotics has no significant effect on the quality of bread. In general, the addition of different types of synbiotics to bread production does not cause significant changes in the physical, chemical, textural, and sensory characteristics of bread. But the production of synbiotic bread faces challenges and limitations, such as maintaining the viability of bacteria during the production and storage process, mass production, consumers' awareness and willingness to consume synbiotic bread.

*Corresponding author:
Samira Beikzadeh, PhD;
Department of Food Science and Nutrition, Maragheh University of Medical Sciences, Maragheh, Iran.
Email: samira.beikzadeh89@gmail.com

Please cite this article as: Beikzadeh S, Bagheri A, Hoseinzadeh N. The Quality of Synbiotic Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S104.

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Int J Nutr Sci 2025;10(1-Supplement):S105.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Different Types of Gums on Physical, Chemical, Staling and Sensory Characteristics of Bulky Breads: A Review

Samira Beikzadeh*, Nasrin Hoseinzadeh, Akbar Bagheri, Mehran Vosoughi

Department of Food Science and Nutrition, Maragheh University of Medical Sciences, Maragheh, Iran

ARTICLE INFO

Keywords:
Bread
Bulk bread
Gum
Hydrocolloid
Staling

**Corresponding author:*
Samira Beikzadeh, PhD;
Department of Food science and Nutrition, Maragheh University of Medical Sciences, Maragheh, Iran.
Email: samira.beikzadeh89@gmail.com

ABSTRACT

Bulky bread refers to bread that has a thickness of more than 5 cm, and the fermentation process has been completed in them, and after baking, it has a spongy and uniform texture. It has a longer shelf life, and has the ability to be easily digested and absorbed. Hydrocolloids or gums include polysaccharides obtained from plant, grain, and microbial and synthetic sources. Food gums have various functions such as water retention properties, dispersion and distribution of food components, creating gels, films, foams, and are used as texture modifiers in food products. Gums used in bread industry include xanthan gum, Persian gum, sodium alginate, katira, etc. This review assessed the effect of different types of gums on physical, chemical, staling and sensory characteristics of bulky bread. Articles were selected from Science Direct, Google Scholar and PubMed from 2000 to 2024 using related keywords. It was shown that the addition of gums increased the amount of moisture and the volume of bread. Also, the addition of gums did not have a significant effect on the amount of brightness, color index, and the evaluation of sensory characteristics. Since bread has a short shelf life and undergoes some physical and chemical changes within a short period of time after baking, and these changes do not create a favorable organoliptic, and one of these changes is the staleness of bread; the use of gums in baking products leads to a delay in staleness due to improvement of storage time by maintaining moisture in the core of bread, and preventing the recrystallization of the starch chain. In general, the addition of different types of gums improves the physical, chemical, textural, and sensory characteristics of bulky breads.

Please cite this article as: Beikzadeh S, Hoseinzadeh N, Bagheri A, Vosoughi M. The Effect of Different Types of Gums on Physical, Chemical, Staling and Sensory Characteristics of Bulky Breads: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S105.

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Int J Nutr Sci 2025;10(1-Supplement):S106.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Advantages and Disadvantages of Wheat Bran Removal to Reduce Heavy Metals from Bread: A Review

Delara Moradi Mirhesari[1], Nastaran Nikjo[2], Maral Neyestani[1], Enayat Berizi[2*]

1. Department of Nutrition and Food Sciences, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Health and Food Quality Control, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat bran
Bread quality
Heavy metals
Pollutant
Milling process

**Corresponding author:*
Enayat Berizi, PhD;
Department of Health and Food Quality Control, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: enayat.berizi@gmail.com

ABSTRACT

Wheat bran has nutritional benefits containing rich sources of dietary fiber, vitamins and minerals; but it may have dangerous pollutants such as heavy metals. This review evaluated the role of removing wheat bran in reduction of heavy metals in bread. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. The advantages were reducing the level of heavy metals, improving the quality of bread, increasing the useful life of storage, providing uniform texture and taste. The disadvantages were loss of nutrients, the reduction in fiber content, more processing costs and environmental impacts. However, wheat bran, through its absorption property, has a significant effect in reduction of the level of heavy metals such as lead, mercury, cadmium and arsenic in bread, which can accumulate in the human body and cause serious health problems. So, wheat bran removal process can reduce heavy metals in bread through mechanisms of selective grinding, purification process, reduction in the level of contact with the pollutant and reduction of contaminated layers. This study concluded that wheat husk removal can be an effective strategy to reduce heavy metal contamination in bread. In addition, alternative strategies such as the use of organic wheat or the implementation of agricultural practices that reduce the absorption of heavy metals should also be investigated to ensure a healthier and more sustainable bread production.

Please cite this article as: Moradi Mirhesari D, Nikjo N, Neyestani M, Berizi E. The Advantages and Disadvantages of Wheat Bran Removal to Reduce Heavy Metals from Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S106.

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Int J Nutr Sci 2025;10(1-Supplement):S107.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Assessment of Dietary Intake of Strontium through Bread Consumption in Shiraz, Iran

Mohsen Shahdadi[1], Maryam Safarirad[1], Seyed Mohammad Mazloomi[2], Azam Abbasi[2], Fatemeh Hemmati[2], Enayat Berizi[2*]

1. Food Safety and Hygiene, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Diet
Heavy metals
Strontium
Total diet study
Tolerable daily intake

**Corresponding author:*
Enayat Berizi, PhD;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: enayat.berizi@gmail.com

ABSTRACT

Background: Some trace elements are essential for the body to function properly. However, these products can be harmful to health if consumed in excess. This study evaluated dietary strontium intake in the Shiraz population using the Total Diet Study (TDS) method.

Methods: Totally, 121 samples were collected to estimate strontium uptake by the TDS method using an FFQ answer sheet dividing into 20 groups. The samples were purchased from 5 districts of Shiraz, and were homogenized and digested, and the strontium concentration was measured by inductively coupled plasma optical emission spectrometry (ICP-OES). Dietary intake was estimated based on metal concentration and food consumption data. The daily intake was calculated.

Results: Potatoes had the highest concentration of strontium and fruit contributed the most to dietary strontium intake. The average daily strontium intake was 0.267 mg/day. The amount of strontium in diet based on tolerable daily intake (TDI) was 2.844%, below the standard TDI.

Conclusion: Receiving strontium through food does not pose any risk to the health of the Shiraz population.

Please cite this article as: Shahdadi M, Safarirad M, Mazloomi SM, Abbasi A, Hemmati F, Berizi E. Assessment of Dietary Intake of Strontium through Bread Consumption in Shiraz, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S107.

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Int J Nutr Sci 2025;10(1-Supplement):S108.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Arabic Gum and Quinoa on Lavash Bread Produced with Wheat Flour

Maryam Boostani*

Department of Food Science and Technology, Islamic Azad University, Sarvestan Branch, Sarvestan, Iran

ARTICLE INFO

Keywords:
Arabic gum
Quinoa
Bread
Grain

**Corresponding author:*
Maryam Boostani, MSc;
Department of Food Science and Technology, Islamic Azad University, Sarvestan Branch, Sarvestan, Iran.
Email: maryam.boostani71@gmail.com

ABSTRACT

Background: In all countries, bread has been a basic and important commodity and one of the cheapest sources of energy and protein used by humans. The purpose of conducting this research was to investigate the effects of gum Arabic and quinoa flour on the production of Lavash bread with wheat flour.

Methods: For this purpose, Lavash bread was prepared with 30% replacement of wheat flour with quinoa flour, and since bread with 30% quinoa did not have the capability of being produced, Arabic gum was added in the amounts of zero, 1, 2 and 3 percent. The breads were compared with the control containing 100% wheat flour. In this study, chemical properties of flour, dough rheology characteristics including pharynographic and extensography and physicochemical properties of bread including measurement of moisture, volume, color, texture and sensory evaluations were performed. The sensorial characteristics including taste, smell, color and total acceptance were also conducted.

Results: It was shown that the elasticity and rheological properties of the dough will be improved by increasing the amount of Arabic gum. Adding quinoa flour and Arabic gum, in addition to improving the elasticity, caused an increase in the shelf life and moisture of the breads. The best formulation for producing Lavash bread with quinoa flour is 30% quinoa flour, 70% wheat flour and 3% Arabic gum.

Conclusion: The best formulation for producing Lavash bread with quinoa flour is 30% quinoa flour, 70% wheat flour and 3% Arabic gum.

Please cite this article as: Boostani M. The Effect of Arabic Gum and Quinoa on Lavash Bread Produced with Wheat Flour. Int J Nutr Sci. 2025;10(1-Supplement):S108.

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Int J Nutr Sci 2025;10(1-Supplement):S109.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Islamic Values and Recommendations That Can Affect Whole Bread Consumption: A Review

Lotfollah Dezhkam[1], Mansour Darvishi Tafvizi[2]*

1. Islamic Education, Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Iran

ARTICLE INFO

Keywords:
Islamic values
Tradition
Culture
Whole bread
Consumption

**Corresponding author:*
Mansour Darvishi Tafvizi, PhD;
Department of Medical Ethics and Philosophy of Health, Faculty of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Tafvizi.m@gmail.com

ABSTRACT

Bread is an important part of the main and basic food of the people of the world and plays an important role in meeting the nutritional needs of society. So it is directly related to the health of society. The sanctity of bread can be seen in the history of many civilizations, religions and cultures. In the religion of Islam, since it pays attention to the health of human nutrition from various dimensions, special recommendations have been made in the field of this food item, which can be used in the process of promoting and modeling the consumption of whole bread. This review determined Islamic values and recommendations that affect whole bread consumption. Google Scholar was searched using related keywords. Islamic traditions in the field of bread emphasize its importance as the best food, the capital of human life, harmony with the structure and needs of the body, honor and respect for bread, the presence of blessings in every bite of it, Having the role of heavenly and earthly factors and many of God's creations in it; It is mentioned. Also, from consideration in the collection of these narrations, it is possible to extract the need to pay attention to improving the quality of bread and using the best raw materials and the best preparation methods. In conclusion, the rich and valuable concepts of Islam, regarding bread can be benefited by considering religious teachings along with customs and social values to culture and promote the consumption of whole bread.

Please cite this article as: Dezhkam L, Darvishi Tafvizi M. Islamic Values and Recommendations That Can Affect Whole Bread Consumption: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S109.

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Int J Nutr Sci 2025;10(1-Supplement):S110.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Phytic Acid in Whole Flour Bread: A Review

Nina Deliri*, Akbar Zamani, Naser Ghazanfarirad

Food and Drug Administration, Urmiah University of Medical Sciences, Urmiah, Iran

ARTICLE INFO

Keywords:
Phytic acid
Whole flour
Acrylamide

ABSTRACT

Type of bread flour and method of baking can affect the nutritional quality and production costs. In this study, the quality of whole wheat flour and the amount of phytic acid in whole flour bread were reviewed. Google Scholar, PubMed, Scopus, Web of Science and SID were searched utilizing the related keywords. The concentration of phytic acid in whole flour is higher than white flour and it produces more acrylamide which is potentially carcinogenic. To improve the bread quality, sour dough biotechnology is used. It was shown that dough fermentation decreased phytic acid in whole-wheat dough and corresponding breads about 24%. High total titratable acidity and lactic acid production favored the degradation of phytic acid in breads. Lacto-fermentation also led to 80% reduction in acrylamide, compared to yeast fermentation alone. Higher concentration of phytic acid correlated with higher content of acrylamide. Mirshahidi in 2010 examined the amount of used yeast and the fermentation time in the stage of first proof in both traditional and controlled baking methods, they recommend that, Standardization of the first proof conditions of Barbari bread in the 2.5 hour first proof and the yeast use of 0.25% increasing the nutritional quality and marketability in controlled method. In conclusion, sourdough fermentation recipe for preparation of Iranian breads is a forgotten traditional method that if applied, can replace yeast fermentation or various chemical-leavening processes by useful and suitable microbial strains. It can be concluded that high fermentation time the type of fermentation can be useful in decreasing phytic acid and acrylamide in whole flour bread.

*Corresponding author:
Nina Daliri, MSc;
Food and Drug Administration,
Urmiah University of Medical
Sciences, Urmiah, Iran.
Email: deliri_n@yahoo.com

Please cite this article as: Deliri N, Zamani A, Ghazanfarirad N. Phytic Acid in Whole Flour Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S110.

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Int J Nutr Sci 2025;10(1-Supplement):S111.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Health Benefits of Bread Fortification: A Review

Fatemeh Emami Khah*, Aida Mehrvand

Food Science and Engineering, Food Technology Department, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Fortification
Bread
Development
Health

**Corresponding author:*
Fatemeh Emami Khah, PhD;
Food Science and Engineering, Food Technology Department, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: fatemehemamikhah78@yahoo.com

ABSTRACT

Bread is one of the most common foods for the world population. Therefore, it can be fortified to eliminate nutrient deficiencies or carry other substances with nutritional or physiological effects, bringing health benefits to consumers and influencing sustainable health. This systematic review aimed to analyze clinical studies about the effect of enriching bread with different nutrients, including minerals (iron, chromium, etc.), vitamins (vitamin C and D), soy flour, protein, fiber, etc. regarding human health. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. Fortification is the process of intentionally adding nutritious or non-nutritive bioactive components to food products. It is commonly used around the world to balance nutrition or prevent nutrient deficiencies. Fortified foods belong to a group of functional foods that have health-promoting properties that easily improve health. Clinical trials have shown the health benefits of consuming enriched bread. It can be concluded that the requirement of enrichment and strengthening is aligned with the goals of sustainable development. Enriching bread increases its nutritional content, making it a more important source of essential nutrients, contributing to food security and fighting malnutrition. In conclusion, the enrichment of such high consumption products can be a tool that leads to sustainable health.

Please cite this article as: Emami Khah F, Mehrvand A. Health Benefits of Bread Fortification: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S111.

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Int J Nutr Sci 2025;10(1-Supplement):S112.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Shelf Life and Safety of Bakery Products: A Review

Aida Mehrvand, Babak Ghanbarzadeh, Fatemeh Emamikhah*

Department of Food Science and Engineering, School of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Shelf life
Safety
Bakery products
Foodborne illness
Microbiological spoilage

ABSTRACT

Bakery products are an important part of a balanced diet and a wide variety of these products are readily available. Bakery products include sweet products (pancakes, waffles, donuts and cookies) and unsweetened products (bread, baguettes, toast). This review evaluates shelf life and safety of bakery products searching databases of PubMed, Scopus, and Google Scholar using the related keywords. It is divided into two parts. The first part focuses on spoilage concerns in low, medium and high moisture bakery products, while the second part focuses only on safety concerns in high moisture bakery products. Traditional and new food preservation methods that can be used by the bakery industry to increase shelf life and increase product safety are discussed. Bakery products, like many processed foods, are subject to physicochemical and microbiological spoilage, while physical and chemical spoilage limits the shelf life of bakery products with low and medium moisture. Microbiological spoilage by bacteria, yeasts and molds in products with high moisture content, i.e. products with water activity above 0.85, is a concern. It can be concluded that several bakery products have been implicated in foodborne illness, including *Salmonella spp.*, *Listeria monocytogenes*, and *Bacillus cereus*, while *Clostridium botulinum* is a concern in high-moisture bakery products packaged in modified atmospheres.

**Corresponding author:*
Fatemeh Emamikhah, PhD;
School of Agriculture, Tabriz University, Tabriz, Iran.
Email: fatemehemamikhah78@yahoo.com

Please cite this article as: Mehrvand A, Ghanbarzadeh B, Emamikhah F. Shelf Life and Safety of Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S112.

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Int J Nutr Sci 2025;10(1-Supplement):S113.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Assessment of Cadmium and Lead Levels in Oats in Tehran, Iran

Nader Akbari[1,2], Parisa Sadighara[1], Soheil Eskandari[3*], Elaheh Jafari[4]

1. Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran
3. Food Industry, School of Nutrition, Tehran University of Medical Sciences, Iran
4. Department of Food Science and Engineering, Faculty of Sciences, Agriculture, and Modern Technologies, Islamic Azad University, Shiraz, Iran

ARTICLE INFO

Keywords:
Oats
Cadmium
Lead
Heavy metals
Food safety

**Corresponding author:*
Soheyl Eskandari, MSc;
Food Industry, School of Nutrition, Tehran University of Medical Sciences, Tehran, Iran.
Email: s_e50@yahoo.com

ABSTRACT

Background: Cereals, particularly oats, are a major source of nutrition for humans worldwide. Given the important role of cereals in global consumption patterns, governments have made efforts to enhance their production. However, the potential presence of toxic and carcinogenic elements, especially lead and cadmium, in oats raises health concerns. This study aimed to investigate the concentration of heavy metals, specifically cadmium and lead, in oats from Tehran province.

Methods: A total of 30 oat samples were collected from production factories in Tehran province, Iran. The concentrations of cadmium and lead were measured using an atomic absorption spectrometer.

Results: The average concentration of cadmium was 1.6±0 µg/kg, while the average concentration of lead was 30±0.03 µg/kg. These values were either below or in compliance with the standards set by the US-EPA, FAO/WHO, and Iranian national standards, suggesting that oat consumption is likely safe in terms of heavy metal contamination in the area.

Conclusion: This research highlights the importance of safeguarding public health in relation to oat consumption and underscores the need for further studies to ensure food safety regarding heavy metal contamination in cereals in Tehran province, Iran.

Please cite this article as: Nader Akbari, Parisa Sadighara, Soheil Eskandari, Elaheh Jafari. Assessment of Cadmium and Lead Levels in Oats in Tehran, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S113.

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Int J Nutr Sci 2025;10(1-Supplement):S114.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Ethics in Production of Wheat and Whole Grains: A Review

Seyyedeh Sousan Khodadad Hosseini[1], Mahtab Maftahi[2,3], Soheyl Eskandari[4,5*]

1. Nutrition Department, School of Nutrition Sciences and Food Technology, Students' Scientific Society, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Health Care Department, Ministry of Education, Tehran, Iran
3. Food Hygiene Department, Islamic Azad University, North Tehran Branch, Tehran, Iran
4. Food and Drug Laboratory Research Center, Food and Drug Administration, Ministry of Health and Medical Education, Tehran, Iran
5. Food Sciences Department, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Food safety
Environment
Biodiversity
Productivity
Public health

ABSTRACT

Due to the increase in global population and the limitation of natural resources and the need to ensure food security and quality of products, it is necessary to pay attention to the ethical dimensions of wheat and whole grain production. This review assessed ethics in production of wheat and whole grains. PubMed, Scopus, Web of Science, SID and Google Scholar databases were searched using the related keywords. Environmental ethics in production can be excessive use of pesticides, chemical fertilizers and agricultural practices incompatible with the environment that can lead to soil degradation, groundwater pollution and biodiversity reduction. Social justice and farmers' rights can be appropriate wages, fair working conditions and access to resources and advanced technologies that are among the rights that should be provided to farmers. Fair access to resources and products can be in relation to many farmers that are not able to optimize the productivity of their land due to financial constraints and insufficient access to modern technologies. Unequal access to markets and technologies leads to a deep gap between developed and developing countries, so it is important to try to improve agricultural infrastructure in deprived areas and promote equal access to knowledge and new technologies. Product quality and public health can be the use of genetically modified species and chemical pesticides that may raise concerns about the health of consumers. Ethics in the production of agricultural products requires that the final products are marketed without the use of harmful substances and in compliance with appropriate health standards, which can prevent the occurrence of diseases related to unhealthy nutrition and help improve the general health of society. It can be concluded that ethics in the production of wheat and whole grains should be considered from environmental, social and public health points of view, including the use of sustainable agricultural methods, respect for farmers' rights, fair distribution of resources and guaranteeing the quality of products. Despite the many challenges in this direction, by promoting awareness and modifying production methods, we can step towards a more sustainable and fairer future for wheat and grain production.

**Corresponding author:*
Soheyl Eskandari, PhD;
Food and Drug Laboratory Research Center, Food and Drug Administration, Ministry of Health and Medical Education,
Tehran, Iran.
Email: so.eskandari@sbmu.ac.ir

Please cite this article as: Khodadad Hosseini SS, Maftahi M, Eskandari S. Ethics in Production of Wheat and Whole Grains: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S114.

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Int J Nutr Sci 2025;10(1-Supplement):S115.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Effects of Replacing Sugar with Sugar Alcohols and Other Sugar Substitutes in Bakery Products, with a Focus on Nutrition for Diabetic Individuals: A Review

Parvaneh Farsadbakhsh*

Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Sugar substitutes
Sugar alcohols
Diabetic nutrition
Bakery products

ABSTRACT

The increasing prevalence of diabetes and obesity has become a significant public health challenge, with excessive sugar consumption in processed foods, including bakery products, playing a major role. Sugar alcohols (polyols) such as xylitol, erythritol, sorbitol, and maltitol, due to their lower calorie content and reduced glycemic index, are considered suitable alternatives to sucrose. Additionally, high-intensity sweeteners like stevia and sucralose are widely used as non-caloric sugar replacements. This review comprehensively examines the effects of substituting sugar with these alternatives in bakery products and assesses their nutritional profile, sensory attributes, texture, and shelf life. The research employed Google Scholar database using keywords of sugar substitutes, sugar alcohols, diabetic nutrition, bakery products, calorie reduction, and glycemic index. The results indicate that sugar alcohols and other substitutes not only reduce sugar content but also enhance organoleptic properties, increase water absorption capacity and moisture retention, improve the quality and texture of bread, and prolong the freshness of bakery products. These substitutes have a positive impact on reducing hardness and improving the structure of the products. It can be concluded that using sugar alcohols and sugar substitutes in bakery products, especially for diabetic individuals can improve the nutritional value, texture, and quality of the products. These approaches help mitigate the issues associated with sugar consumption and can contribute to healthier bakery products with extended shelf life.

**Corresponding author:*
Parvaneh Farsadbakhsh, MSc student; Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: parvafarsad@gmail.com

Please cite this article as: Farsadbakhsh P. Effects of Replacing Sugar with Sugar Alcohols and Other Sugar Substitutes in Bakery Products, with a Focus on Nutrition for Diabetic Individuals: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S115.

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Int J Nutr Sci 2025;10(1-Supplement):S116.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Utilizing Participatory Council Structures and Health Messengers in Promoting Whole Wheat Bread Consumption in Kermanshah, Iran

Taranom Hoseinikia, Mahnaz Fatahi*, Samira Azimi, Ali Rezaei, Hosein Biglari, Saeed Samiei, Shahryar Mostofi, Saba Falah

Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran

ARTICLE INFO

Keywords:
Participatory council structures
Health messengers
Whole wheat bread
Iran

**Corresponding author:*
Mahnaz Fatahi, MSc;
Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran.
Email: fatahi2mahnaz@gmail.com

ABSTRACT

Background: Public and organizational participation in health-oriented development programs through structures such as participatory councils and health messengers leads to better identification of community needs, program sustainability, service recipient satisfaction, and more. In this study, these structures were utilized to promote the culture of whole wheat bread consumption in Kermanshah province, Iran.

Methods: Workshops and meeting minutes from the Health Messengers Council and the Provincial People's Participation in Health Council, with a focus on promoting whole wheat bread culture in the province, were held. The study areas included conveying public demands and health messages to people and officials, strengthening interdepartmental cooperation to enhance the performance of provincial executive bodies, and preparing a provincial version of the Supreme Health Council resolutions.

Results: Based on the reports received and the analysis of documents from relevant meetings and discussions with council members, the findings showed that an acceptable level of communication was established with both the public and organizations in promoting whole wheat bread consumption in the province.

Conclusion: The evaluations indicate that support for the participatory council structures in this area is weak, and gaining comprehensive support for these organizations is essential to ensure optimal efficiency and effectiveness.

Please cite this article as: Hoseinikia T, Fatahi M, Azimi S, Rezaei A, Biglari H, Samiei S, Mostofi S, Falah S. Utilizing Participatory Council Structures and Health Messengers in Promoting Whole Wheat Bread Consumption in Kermanshah, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S116.

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Int J Nutr Sci 2025;10(1-Supplement):S117.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Methods to Reduce Glycemic Index of Bakery Products: A Review

Zahra Vosooghi poor, Mahboubeh Fazaeli*

Department of Food Science and Industry, Faculty of Agriculture, Shiraz University, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole flour
Bran
Bread
Glycemic index

ABSTRACT

White bread prepared with wheat flour is the most consumed grain product and the main cause of diabetes and obesity that can increase glycemic index of human diet. The starch of white bread is quickly digested and absorbed and results in an increase in the amount of glucose and insulin in the blood. This study investigated methods of reducing the glycemic index, such as using flour rich in fiber in bakeries. Since bread is the most relevant source of carbohydrates in the diet, many studies have been conducted to reduce the glycemic index of bread and subsequently reduce cardiovascular diseases associated with obesity. Articles and books in Science Direct were searched using related keywords. In people with type 2 diabetes, consuming high-fiber bread and cereal breakfast with wheat bran for three months (19 grams per day) improved blood sugar level. Likewise, they included whole grain products (mainly bread made from ground whole wheat) in the daily diet of overweight subjects for two 6-week periods and observed a positive effect for fiber to reduce glycemic response based on its physiological activity. It is involved in the viscosity of Kim in the upper digestive tract. The presence of intact structures inaccessible to human amylases, as well as the decrease in pH that delays gastric emptying could create an obstacle for starch digestion and was effective in improving glucose metabolism. It can be concluded that substituting whole grains for refined grains can lead to a better efficacy to reduce the glycemic index of bread. However, when fiber or whole grains are included in the preparation of bakery products to influence the glycemic response, several technological parameters must be considered in order to obtain products with high quality and acceptability for the consumer.

*Corresponding author:
Mahboubeh Fazaeli, PhD;
Department of Food Science and Industry, Faculty of Agriculture, Shiraz University, Shiraz, Iran.
Email: fazaeli@shirazu.ac.ir

Please cite this article as: Vosooghi poor Z, Fazaeli M. Methods to Reduce Glycemic Index of Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S117.

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Int J Nutr Sci 2025;10(1-Supplement):S118.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Grain Sourdough Bread and Its Role in Management of Irritable Bowel Syndrome: A Review

Donya Firoozi*, Seyed Jalil Masoumi

Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Science, Shiraz, Iran

ARTICLE INFO

Keywords:
Irritable bowel syndrome
Bread
Whole grain
Sourdough

ABSTRACT

Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder characterized by symptoms such as bloating, abdominal pain, and altered bowel habits. Whole grain sourdough bread (WGSB) is one option that may offer benefits for individuals with IBS. WGSB differs from white sourdough in that it retains more fiber and nutrients. While the higher fiber content in WGS can support gut health in some IBS patients, it may lead to increased fermentation in the gut, resulting in excess gas production and bloating, which are common IBS triggers. The aims of this review were investigating the impact of WGSB's high fiber content on IBS symptoms. Following PRISMA guidelines, we searched MEDLINE via PubMed, Embase, Cochrane, and additional registries from 2015 to 2024 using the keywords of IBS, bread, whole grain, and sourdough fermentation. This review presented that for those with constipation-predominant IBS, WGSB could be a beneficial option due to its fiber content and digestibility. The sourdough fermentation process reduced fermentable oligo-di-monosaccharides and polyols (FODMAPs), making it potentially more tolerable than modern whole grain bread; also it enhanced prebiotic content. However, in the individual with diarrhea-predominant IBS whole grain sourdough caused bloating, gas, or discomfort due to its high fiber content. In the mixed IBS individuals (experience both constipation and diarrhea), whole grain sourdough had mixed results due to specific situation of patients. It can be concluded that using WGSB for IBS patients required a personalized approach. Although sourdough fermented bread can be more suitable for these patients than other fermentations.

*Corresponding author:
Donya Firoozi, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Science, Shiraz, Iran.
Email: donyafiroozi@gmail.com

Please cite this article as: Firoozi D, Masoumi SJ. Whole Grain Sourdough Bread and Its Role in Management of Irritable Bowel Syndrome: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S118.

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Int J Nutr Sci 2025;10(1-Supplement):S119.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Whole Grain Consumption on Composition of Gut Microbiota: A Review

Sahar Foshati*

Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grains
Whole cereals
Gut microbiota
Gut microbiome
Gut microflora

ABSTRACT

Whole grains, including whole wheat bread and brown rice, are essential components of a healthy diet and should make up at least half of the total grain intake. They are rich in dietary fiber, polyphenols, and bioactive compounds. A balanced gut microbiota is vital for health, whereas dysbiosis is linked to issues like obesity, diabetes, and inflammatory bowel disease. This review of randomized controlled trials (RCTs) aimed to examine the effect of whole grain consumption on the composition of gut microbiota. PubMed, Scopus, Web of Science and Google Scholar up to 2023 were searched using related keywords up to the middle of 2024. The keywords used were "whole grains" or "whole cereals" and "gut microbiota" or "gut microbiome" or "gut microflora". In RCTs, participants consuming whole grains showed an increase in microbial diversity and a higher abundance of health-promoting bacteria compared to those on refined grains or low-fiber diets. Most studies indicated that the intake of whole grains promoted the growth of Bifidobacteria and Lactobacilli while potentially suppressing harmful strains, such as *Escherichia coli* and Clostridia, in the human gut. The prebiotic soluble and insoluble fibers present in whole grains contribute to these effects. Moreover, the undigested fibers undergo fermentation by gut bacteria and produce short-chain fatty acids (SCFAs), which have many health benefits, including anti-inflammatory effects. It can be concluded that whole grains boost microbial diversity, increasing the growth of Bifidobacteria and Lactobacilli while inhibiting *E. coli* and Clostridia.

*Corresponding author:
Sahar Foshati, PhD;
Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: s.foshati@gmail.com

Please cite this article as: Foshati S. The Effect of Whole Grain Consumption on Composition of Gut Microbiota: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S119.

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Int J Nutr Sci 2025;10(1-Supplement):S120.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Association between *Helicobacter Pylori* Infection and Anthropometric, Clinical, and Paraclinical Parameters in Children and Adults with Celiac Disease

Sahar Foshati[1*], Siavash Babajafari[1], Ramin Niknam[2], Mitra Soltani[1], Naser Honar[2], Ebrahim Fallahzadeh Abarghooei[2], Seyed Mohammad Mazloomi[3], Mohammad Reza Fattahi[2], Laleh Mahmoudi[4]

1. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
3. Nutrition Research Center, Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
4. Department of Clinical Pharmacy, School of Pharmacy, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Gluten-sensitive enteropathy
Nontropical Sprue
Helicobacter pylori

**Corresponding author:*
Sahar Foshati, PhD;
Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: s.foshati@gmail.com

ABSTRACT

Background: This study investigated the prevalence of *Helicobacter pylori* infection and its relationship with various anthropometric, clinical, and paraclinical factors in patients with Celiac disease (CD) in Fars, Iran.

Methods: In a cross-sectional study, 345 adults and 649 children with CD were enrolled. Demographic data and the presence of gastrointestinal symptoms were collected through interviews. An enzyme-linked immunosorbent assay kit was used to measure serum levels of IgA anti-transglutaminase antibodies (anti-tTG). Endoscopic assessment categorized CD histological damages based on Marsh classification and differentiated people with or without *H. pylori* infection. Body mass index (BMI) was determined.

Results: The prevalence of *H. pylori* was 5.1% in children and 18.3% in adults with CD. Significant positive relationships were identified between the occurrence of *H. pylori* and gastrointestinal symptoms, BMI, and anti-tTG serum levels in children with CD, but not in adults. No significant association was found between *H. pylori* infection and histological damages in both pediatric and adult CD patients.

Conclusion: The prevalence of *H. pylori* infection among CD patients seems to be low. Children with CD who were positive for *H. pylori* infection appear to exhibit more gastrointestinal symptoms, higher BMI, and elevated anti-tTG serum levels compared to those without the infection.

Please cite this article as: Foshati S, Babajafari S, Niknam R, Soltani M, Honar N, Fallahzadeh Abarghooei E, Mazloomi SM, Fattahi MR, Mahmoudi L. The Association between *Helicobacter Pylori* Infection and Anthropometric, Clinical, and Paraclinical Parameters in Children and Adults with Celiac Disease. Int J Nutr Sci. 2025;10(1-Supplement):S120.

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Int J Nutr Sci 2025;10(1-Supplement):S121.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Role of Fibers and Polyphenols in Whole Grains vs. Refined Ones: A Review

Matina Ghahremany[1]*, Shima Mozaffari[2]

1. Nutrition and Diet Therapy, Shahid Babaei Faculty, Qazvin University of Medical Sciences, Qazvin, Iran
2. Nutrition Sciences Department, Faculty of Medical Sciences and Technologies, Islamic Azad University, Science and Research Unit, Tehran, Iran

ARTICLE INFO

Keywords:
Whole grains
Polyphenols
Dietary fiber
Antioxidants
Carotenoids

**Corresponding author:*
Matina Ghahremany, BSc;
Nutrition and Diet Therapy, Shahid Babaei Faculty, Qazvin University of Medical Sciences, Qazvin, Iran.
Email: matin.ghrmni4311@gmail.com

ABSTRACT

Wheat, rye, rice and barley have outer bran rich in fiber, sprout rich in micronutrients and the main starch component (endosperm). Whole grains have the same ratio of bran, germ and endosperm after food processing. Whole grains are consisted of bioactive components such as phytochemicals and antioxidants. This review evaluated whole grains vs. refined ones regarding their fiber and polyphenols content. PubMed database was searched using the related keywords. Flavones such as apigenin, a compound found in barley, have antioxidant, anti-cancer, anti-allergic, anti-inflammatory, anti-carcinogenic and stomach protective properties. The role of polyphenols is in cell signaling and gene expression regulation and liver protection. The phytic acid present in whole grains also acts as an antioxidant and leads to a decrease in the production of highly oxidative and harmful free radicals that are caused by the peroxidation of lipids. Lutein is the carotenoid that has the highest concentration in wheat, followed by zeaxanthin and then beta-cryptoxanthin. Rice bran contains lutein and zeaxanthin, which improve eyesight. In the fermentation process of wheat flour, an increased concentration of amino acids, total phenol capacity, dietary fiber, antioxidant activity of the dough and improved sensory properties were observed. Whole grains can improve performance with a preventive approach using beneficial compounds in their structure. Compounds such as flavonoids, carotenoids and phenolic acid have antioxidant, anti-cancer, anti-allergenic and anti-inflammatory properties. It was concluded that whole grains increase the feeling of satiety by using the husk and bran in their structure and then reduce BMI.

Please cite this article as: Ghahremany M, Mozaffari S. The Role of Fibers and Polyphenols in Whole Grains vs. Refined Ones: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S121.

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Int J Nutr Sci 2025;10(1-Supplement):S122.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Challenges and Solutions in Whole Wheat Milling and Storing the Resulting Flour: A Review

Masoud Ghanbari[1,2*], Narges Mazloomi[2,3], Mohammadhosein Esfahanizadeh[1,2], Gholamreza Mehdipour[1], Negar Mohseni[4]

1. Food and Drug Deputy, Mazandaran University of Medical Sciences, Sari, Iran
2. Health of Plant and Livestock Products Research Center, Mazandaran University of Medical Sciences, Sari, Iran
3. Department of Nutritional Sciences, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
4. Department of Food Science and Technology, Islamic Azad University, Ayatollah Amoly branch, Amol, Iran

ARTICLE INFO

Keywords:
Bread
Whole wheat flour
Bran
Enzyme
Shelf life

**Corresponding author:*
Masoud Ghanbari, PhD;
Health of Plant and Livestock Products Research Center,
Mazandaran University of Medical Sciences, Sari, Iran.
Email: Ma.gh54@yahoo.com

ABSTRACT

There is no standard method for milling whole wheat flour (WWF), so bran particle sizes vary widely. The shelf life of WWF is less compared to white flour due to the presence of lipids and fat-degradative enzymes. This review determined challenges and solutions regarding whole wheat milling and storing the resulting flour. Google Scholar, PubMed, Scopus and Web of Science databases were searched using related keywords. It was shown that medium bran particle sizes are best for bread production, while small particle sizes are better for non-gluten applications. WWF contains more enzyme activity, lipids and antioxidants than wheat flour, which can affect the final consumption and storage properties. WWF stabilization strategies focused on controlling lipolytic enzyme activity and have been somewhat successful. Wheat selection and milling method may be different when producing WWF and compared to general wheat flour. During storage of WWF, lipase products and lipoxygenase activity are the main cause of loss of sensory acceptability, nutritional value and functional quality. It can be concluded that the strategy to control the rancidity of WWF has been to inhibit lipase activity. Further research is necessary to identify the most influential components that can be manipulated to create WWF with optimal functionality.

Please cite this article as: Ghanbari M, Mazloomi N, Esfahanizadeh MH, Mehdipour GR, Mohseni N. Challenges and Solutions in Whole Wheat Milling and Storing the Resulting Flour: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S122.

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Int J Nutr Sci 2025;10(1-Supplement):S123.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Investigating Ingredients in Whole Wheat Bread and Their Effects on Dough Properties and Bread Quality: A Review

Masoud Ghanbari[1,2*], Narges Mazloomi[2,3], Mohammadhosein Esfahanizadeh[1,2], Gholamreza Mehdipour[1], Negar Mohseni[4]

1. Food and Drug Deputy, Mazandaran University of Medical Sciences, Sari, Iran
2. Health of Plant and Livestock Products Research Center, Mazandaran University of Medical Sciences, Sari, Iran
3. Department of Nutritional Sciences, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
4. Department of Food Science and Technology, Islamic Azad University, Ayatollah Amoly branch, Amol, Iran

ARTICLE INFO

Keywords:
Whole wheat flour
Dough
Enzyme
Emulsifier
Hydrocolloid

**Corresponding author:*
Masoud Ghanbari, PhD;
Health of Plant and Livestock Products Research Center,
Mazandaran University of Medical Sciences, Sari, Iran.
Email: Ma.gh54@yahoo.com

ABSTRACT

Whole wheat bread (WWB) is associated with low bread volume, firm texture, dark and rough crust and appearance, bitter taste and reduced shelf life. This review assessed ingredients in whole wheat bread and investigated their effects on dough properties and bread quality. Google Scholar, PubMed, Scopus and Web of Science databases were searched using related keywords. Xylanase reduces the water absorption of WWF and increases the volume of bread and the softness of bread crumb by hydrolyzing arabinoxylans. Alpha-amylase can be useful under certain conditions. Phytase may activate endogenous alpha-amylase. G4 amylase is promising, but needs to be validated with further research on its effect on bread volume, bread crumb firmness and staling. Wheat gluten overcomes many of the challenges of WWB production and is found in most commercial WWBs. DATEM and SSL emulsifiers can improve the volume, texture and staleness characteristics of WWB. In general, several types of improvers are needed in combination to provide the greatest improvement in wheat dough and WWB. It can be concluded that in the WWB system, there is a need to improve the quality and sensory aspects to increase consumer appeal and thus increase the consumption of WWB.

Please cite this article as: Ghanbari M, Mazloomi N, Esfahanizadeh MH, Mehdipour GR, Mohseni N. Investigating Ingredients in Whole Wheat Bread and Their Effects on Dough Properties and Bread Quality: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S123.

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Int J Nutr Sci 2025;10(1-Supplement):S124.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Barriers to Whole Grain Consumption: A Review

Mohadeseh Ghanbari-Jahromi[1*], Faride Sadat Jalali[2], Zahra Zare[3]

1. Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran
2. Health Human Resources Research Center, School of Health Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Department of Healthcare Management, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Barriers
Nutrition
Whole grains
Knowledge
Packaging

**Corresponding author:*
Mohadeseh Ghanbari-Jahromi, PhD; Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran.
Email: mohadese.ghanbari2020@gmail.com

ABSTRACT

National data showed that despite the known health benefits, few people consume whole grains in the amount recommended to reduce chronic diseases and maintain body mass index (BMI). Therefore, the present study was conducted with the aim of determining the barriers to the consumption of whole grains. Published articles on barriers to whole grain consumption were reviewed through a systematic search using relevant keywords in PubMed, Scopus, Web of Science, Magiran, and SID databases without time limits according to PRISMA guidelines. Finally, 14 articles were selected and analyzed using thematic analysis method. The data on barriers to consuming whole grains were categorized into four main topics and nine sub-topics. The main themes of individual perceptions (differences in texture, taste, appearance and smell), individual attitude (lack of easy access and non-use of grains by parents and friends), awareness (inability to identify good sources of whole grains, little familiarity with the health benefits of whole grains, limited knowledge of the amount of whole grains required for the body and lack of knowledge of the relationship between whole grain consumption and chronic diseases) and marketing (high cost and inappropriate labeling of products containing whole grains). It can be concluded that nutritional interventions should lead to increasing the availability and diversity of whole grain food products, distribution of whole grain products in school, increasing advertisements and educational campaigns to increase awareness, packaging whole grain products in attractive and fun designs, and encouraging manufacturers to develop products with whole grain content.

Please cite this article as: Ghanbari-Jahromi M, Jalali FS, Zare Z. Barriers to Whole Grain Consumption: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S124.

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Int J Nutr Sci 2025;10(1-Supplement):S125.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Fat Substitutes in Bakery Products and Their Impact on Rheological Properties: A Review

Seyed Mohammad Najibi Hosseini[1], Babak Ghanbarzadeh[2*]

Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Fat replacer
Oleogel
Sensory properties
Saturated fatty acid
Trans fatty acid

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: ghanbarzadeh@tabrizu.ac.ir

ABSTRACT

Many bakery products are formulated with high levels of fat. Various fats, such as shortenings and margarines, play a significant role in the quality attributes of these products. These fats are high in trans and saturated fatty acids, and their consumption has been linked to increased levels of LDL cholesterol. Additionally, excessive fat intake is associated with an increased risk of chronic diseases such as obesity, diabetes, and cardiovascular diseases. Various systems, including carbohydrate-, protein-, and lipid-based fat replacers, have been developed to mimic the functional properties of fats in foods. However, replacing fats in bakery products remains challenging due to their critical role in flavor, texture, and shelf life. Moreover, understanding the impact of fats on the rheological properties of these products is crucial. The aim of this study is to review types of fat replacement systems and their effects on the rheological properties of bakery products. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. Although various fat replacement systems have been developed, none can completely mimic the diverse functions of fats in bakery products. However, lipid-based systems appear to be more suitable options. In conclusion, future research should focus on lipid-based systems, as these systems have the potential to completely replace fats without the need to adjust water content and provide a healthier fat replacement system without significantly affecting technological properties. Furthermore, understanding the rheological behavior of fat replacers is important to producing bakery products with modified or reduced fat content.

Please cite this article as: Najibi Hosseini SM, Ghanbarzadeh B. Fat Substitutes in Bakery Products and Their Impact on Rheological Properties: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S125.

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Int J Nutr Sci 2025;10(1-Supplement):S126.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Production of Functional Bakery Products Using Microencapsulation of Probiotics, Prebiotics and Sourdough Technology: A Review

Soudabeh Farid Aghaee, Babak Ghanbarzadeh Houjgan*

Food Engineering Department, Faculty of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Bakery products
Functional food
Probiotics
Prebiotics
Microencapsulation

**Corresponding author:*
Babak Ghanbarzadeh Houjgan, PhD;
Faculty of Agriculture, Tabriz University, Tabriz, Iran.
Email: babakg1359@yahoo.com

ABSTRACT

Public awareness on impact of nutrition on physical and mental health led to an increasing attention to production of fortified, enriched, altered, enhanced and thoroughly functional foods. In this review, researches on production of functional bakery products produced with microencapsulation of probiotics and probiotics by different methods such as freeze drying, spray drying, extrusion, emulsion and also sourdough technology for better functional properties of final product were studies. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. The studies were conducted on gut microbial flora to maintain physical health. Due to changes in the diet, about half of the gut microbial population may be lost, as a result, the use of prebiotic and probiotic functional food products has attracted a lot of attention. The production of functional bakery products using probiotics and prebiotics in recent years, along with the health benefits of prebiotics and probiotics, has been seen to improve several technological parameters such as volume, specific volume, texture along with sensorial parameters such as flavor and aroma in these products. Due to severe thermal stress that can cause the destruction of probiotics and prebiotics in the baking process, methods such as microencapsulation and sourdough technology have been used to maintain their effectiveness. In conclusion, numerous researches have shown that functional bakery products produced with probiotic and prebiotic microencapsulation not only have acceptable sensory and physical properties, but in some cases have also led to improved nutritional value in the final product.

Please cite this article as: Farid Aghaee S, Ghanbarzadeh Houjgan B. Production of Functional Bakery Products Using Microencapsulation of Probiotics, Prebiotics and Sourdough Technology: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S126.

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Int J Nutr Sci 2025;10(1-Supplement):S127.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Effect of Inulin and Fructo-Oligosaccharide Supplementation on Textural, Rheological and Sensory Properties of Bread and their Role in Weight Management: A Review

Erfan Mohammadian, Babak Ghanbarzadeh*, Fatemeh Bazavar

Department of Food Industry Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Fructo-oligosaccharides
Inulin
Bread
Satiety
Texture

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Industry Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Ghanbarzadeh@tabrizu.ac.ir

ABSTRACT

There is evidence that fructo-oligosaccharides (FOS) and inulin can impart a range of health benefits if consumed on a regular basis. The health benefits include increased mineral absorption and improved immune response and while there is mounting evidence that prebiotics play a role in colorectal cancer prevention, their role of satiety and weight management still needs to be investigated. In this review, the evidences published so far on FOS or inulin supplementation and weight management were searched. It was also established whether prebiotic enriched breads are feasible in terms of dough machinability, bread characteristics and consumers acceptance. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. Addition of inulin to bread resulted in smaller loaves with a harder crumb and darker color. The limited sensory studies on these products reflect those findings and acceptability that decreased with inulin content. However, a fortification of 5% seems achievable. Despite evidences that yeast can invertase and dry heat can degrade inulin, the question whether the prebiotics maintain their activity is not known. It can be concluded that there is still a great deal of work to be done to establish whether a bread prepared with enough inulin to retain a significant activity can be manufactured without compromising consumer acceptance.

Please cite this article as: Mohammadian E, Ghanbarzadeh B, Bazavar F. Effect of Inulin and Fructo-Oligosaccharide Supplementation on Textural, Rheological and Sensory Properties of Bread and their Role in Weight Management: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S127.

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Int J Nutr Sci 2025;10(1-Supplement):S128.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Natural Hydrocolloids in Improvement of Gluten-Free Bread and Cakes: A Review

Fatemeh Bazavar, Babak Ghanbarzadeh*, Erfan Mohammadian

Department of Food Industry Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Basil seed
Celiac disease
Gluten-free
Gums
Xanthan

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Industry Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Ghanbarzadeh@tabrizu.ac.ir

ABSTRACT

The main component of wheat, which is responsible for the quality of bread and cake, is gluten. Gluten plays the main role in development of bread and cake by creating cohesion and maintaining the carbon dioxide produced during fermentation. Celiac disease is an autoimmune digestive disease caused by the digestion of gluten, and the only treatment for this disease is a gluten-free diet. Various gluten-free formulations (composite and wheat-free flours) have used gums (as a substitute for gluten) to mimic the viscoelastic properties of gluten. This review evaluated improvement of the properties of gluten-free bread and cakes using natural hydrocolloids. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. Gums have been used in bakery products to improve dough performance, bread and cake characteristics, textural and sensory quality, as well as to increase product shelf life. This article examined the effect of the most common and newest hydrocolloids (egg syrup, wild sage seed, basil seed, cress seed, xanthan, guar, carrageenan, starch, methyl cellulose, carboxymethyl cellulose, hydroxypropyl methyl cellulose and carob gum) on properties of rheological, physicochemical, textural and qualitative aspects of gluten-free breads and cakes. Gums affect the gelatinization and retrogradation of starch through the strong connection between amylose and gum, and as a result, reduce the retrogradation of starch. It can be concluded that addition of gum increases the volume and porosity of breads and cakes and causes the production of softer products.

Please cite this article as: Bazavar F, Ghanbarzadeh B, Mohammadian E. The Effect of Natural Hydrocolloids in Improvement of Gluten-Free Bread and Cakes: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S128.

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Int J Nutr Sci 2025;10(1-Supplement):S129.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Acrylamide in Bakery Products: A Review

Mahtab Bagheri, Babak Ghanbarzadeh*

Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Acrylamide
Toxicity
Public health
Bakery

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Ghanbarzadeh@tabrizu.ac.ir

ABSTRACT

Acrylamide or 2-propanamide is a chemical compound with the chemical formula CH2=CH-CO-NH2 that can be produced at high levels in high carbohydrate foods and is defined as a pollutant in Council Regulation (EEC) No. 315/93. The health risks of acrylamide and its toxic properties, including neurotoxicity, genotoxicity, carcinogenicity, and reproductive toxicity, were demonstrated by the Scientific Committee on the Environment in 2001. This review determined the role of acrylamide in bakery products and its public health importance. Google Scholar, Scopus, PubMed, Web of Science and SID were searched utilizing therelated keywords. Potatoes and bakery products (including bread, crisps, cakes, dough, breakfast cereals, biscuits, pies, etc.) are some of the main sources of dietary acrylamide. This review focused on the levels of acrylamide in food products, especially bakery products, and the risk that acrylamide in the diet has on human health. Google Scholar database was searched using related keywords. It can be concluded that various approaches to reduce the level of acrylamide in bakery products, such as the use of asparaginase, calcium salts, antioxidants, acids and their salts, etc. are available in detail.

Please cite this article as: Bagheri M, Ghanbarzadeh B. Acrylamide in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S129.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Functional Enzymes in Whole Wheat Bread and Their Effects on Dough Properties and Bread Quality: A Review

Sabiheh Jamali[1], Babak Ghanbarzadeh[1*], Akram Pezeshki[2]

1. Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran
2. Department of Food Industry Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Whole wheat flour
Enzyme
Dough
Quality

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: ghanbarzadeh@tabrizu.ac.ir

ABSTRACT

Compared to refined wheat flour, whole wheat flour contains higher levels of vitamins, minerals, and fibers. This review assessed functional enzymes in whole wheat bread and their effects on dough properties and bread quality searching Google Scholar, PubMed and Scopus with related keywords. Consumption of whole grains can reduce risk of chronic diseases including cardiovascular diseases, diabetes, cancer, obesity, and mortality. Dough and bread produced from whole wheat flour compared to refined wheat flour have lower loaf volume, increased firmness, coarser texture, darker color, and distinct flavor and aroma. Various enzymes such as α-amylase, G4-amylase, amyloglucosidase, cellulase, glucose oxidase, lipase, lactase, xylanase, and other hemicellulases, transglutaminase, phytase, and hydrolase, can be used as substitutes for chemical improvers to increase dough hydration, improve loaf volume or texture, reduce staling, or improve nutritional quality. Enzyme activity is influenced by factors such as temperature, pH, water activity, and enzyme concentration. The reduction in firmness and staling achieved by α-amylase is due to an increase in low molecular weight saccharides and specific volume. Low molecular weight products produced from starch hydrolysis make starch unavailable for retrogradation, and these smaller saccharides delay the retrogradation of gelatinized starch. Glucose oxidase catalyzes the oxidation of glucose to gluconic acid and hydrogen peroxide. In conclusion, glucose oxidase does not significantly affect the farinographic properties of whole wheat or white flour dough. Dough made from whole wheat flour has greater tensile strength compared to white flour dough due to interactions between gluten and non-starch polysaccharides in the bran.

Please cite this article as: Jamali S, Ghanbarzadeh B, Pezeshki A. Functional Enzymes in Whole Wheat Bread and Their Effects on Dough Properties and Bread Quality: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S130.

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Int J Nutr Sci 2025;10(1-Supplement):S131.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Edible Fibers on Bakery Products: A Review

Afsaneh Ahansaz, Babak Ghanbarzadeh*

Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Bread
Bakery products
Dietary fiber
Functional Food
Synergistic effects

**Corresponding author:*
Babak Ghanbarzadeh, PhD;
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: babakg1359@yahoo.com

ABSTRACT

Bakery products are one of the most widely consumed foods among the Iranians, whose fiber content is reduced due to industrial processing. By adding different types of edible fibers in bakery products, it is possible to provide the daily amount of fiber needed by the body in the diet, prevent non-communicable diseases and achieve functional products with a longer shelf life. Main keywords including Bakery Products, Bread, Dietary Fiber, Synergistic effect and Functional Food in PubMed, Web of Science, Scopus, Wiley and Google Scholar and Science Direct search engines in the title, abstract and keywords of search articles. The most prominent and relevant articles were selected and their full texts was reviewed to write this review article. The prominent effects of adding edible fibers in bakery products include improving the sensory properties, the role of nutrition in weight management, the stability of emulsions, and replacing fat. Enriching bakery products with edible fiber, in addition to affecting their quality, also has gelling, thickening and water-binding properties. In this article, the effect of adding dietary fibers and new or alternative sources of dietary fibers in bakery products was investigated. In conclusion, many studies have investigated the effect of adding a dietary fiber, but few studies have addressed the synergistic effects of dietary fibers on bakery products, which recent studies are mentioned in this article.

Please cite this article as: Ahansaz A, Ghanbarzadeh B. The Effect of Edible Fibers on Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S131.

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Int J Nutr Sci 2025;10(1-Supplement):S132.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Impact of Electrolyzed Water on the Increase of the Shelf Life and Improvement of the Bread Quality

Parsa Ghasemi*, Sara Faisali

Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Iran

ARTICLE INFO

Keywords:
Bread dough
Electrolyzed water
Quality improvement
Rheology
Disinfection

ABSTRACT

Bread is consumed as a staple food especially around the world and provides consumers with essential nutrients including carbohydrates, fats, vitamins and minerals. In the preparation of bread, water is considered as an important raw material. Water is one of the important elements in bread dough too and a lot of water is used in its production. This review aimed to determine the impact of electrolyzed water on the increase of the shelf life and improvement of the bread quality. Scholar Google, Scopus and Pubmed were searched for key words of bread dough, electrolyzed water,; quality improvement, rheology, and disinfection to reach our objective. Since the physical properties of water are related to its chemical composition, purification, and especially its complexity energy, the quality characteristics of bread are easily affected by the characteristics of water too. In the food industry, water is also considered as an important raw material. So various methods with special capacity for water use were developed and used for water electrolysis by using electrolysis of drinking water, including tap water and salt solution. Minerals do not have oxidation-reduction potential (ORP, minerals, etc.) and properties of water used in bread production, such as pH, hardness, and minerals can significantly affect dough properties. It can be concluded that the final product is very important for bread production in agriculture and food industry due to having a strong and an environmentally friendly disinfection potential. It can lead to production of soft bread that glutenizes and gelatinizes the matrix, and also the wheat starch is precipitated by an electrolyzed alkaline water.

**Corresponding author:*
Parsa Ghasemi, MSc,
Department of Food Science and Technology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Parsa.ghasemi1401@ms.tabrizu.ac.ir

Please cite this article as: Parsa Ghasemi, Sara Faisali. The Impact of Electrolyzed Water on the Increase of the Shelf Life and Improvement of the Bread Quality. Int J Nutr Sci. 2025;10(1-Supplement):S132.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Enrichment of Cereal Products with Enzyme Extracted from Mushrooms: A Review

Newsha Gheibi[1]*, Nabi Shariatifar[2], Razzagh Mahmoudi[3,4]

1. Student Scientific Research Center, Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Environmental Health Engineering, Division of Food Safety and Hygiene, Tehran University of Medical Sciences, Tehran, Iran
3. Department of Food Hygiene and Aquatics, Faculty of Veterinary Medicine, University of Tabriz, Tabriz, Iran
4. Health Products Safety Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

ARTICLE INFO

Keywords:
Cereal
Food
Mushroom
Enzyme
Processing

**Corresponding author:*
Newsha Gheibi, MSc;
Student Scientific Research Center, Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: newsha.gheibi@yahoo.com

ABSTRACT

The increasing demand for cereal-based foods has prompted the grain food industry to enhance their nutritional profiles, particularly by increasing bioactive phytochemicals. Mushrooms are rich in essential amino acids like lysine, and complement cereals; but lack sufficient sulfur amino acids such as methionine and cysteine. Combining mushrooms with cereal products can yield a more balanced amino acid profile, promoting better growth than consuming either food group alone. This synergy supports nutritional advancements in convenience foods, addressing consumer health interests effectively. This review evaluated enrichment of cereal products with enzyme extracted from mushrooms. Google Scholar, PubMed and Web of Science were searched using proper keywords. It was shown that enzyme-assisted extraction methods, utilizing enzymes such as β-glucanase and flavourzyme, can significantly increase the extraction efficiency of free amino acids and umami flavors from various mushroom species, including shiitake and oyster mushrooms. These enzymes facilitate the breakdown of cell walls and proteins, thereby improve the bioavailability of nutrients when incorporated into cereal products. Spent mushroom compost is a valuable source of lignocellulolytic enzymes, including amylase, cellulase, and xylanase that can enhance the nutritional profile of cereals by facilitating the digestion of complex carbohydrates. The synergistic effect of these mushroom-derived enzymes when combined with cereal grains not only boosts nutrient absorption but also improves the balance of essential amino acids, making cereals more comparable to animal protein sources in nutritional value. In conclusion, the integration of mushroom enzymes into cereal processing presents a promising avenue for developing healthier food products that meet consumer demands for improved nutrition.

Please cite this article as: Gheibi Ne, Shariatifar N, Mahmoudi R. Enrichment of Cereal Products with Enzyme Extracted from Mushrooms: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S133.

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Int J Nutr Sci 2025;10(1-Supplement):S134.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Applying Organic Farming Techniques in Optimizing Soil Health and Fertility in Wheat and Grain Industry: A Review

Somayeh Gheysari[1*], Mehdi Hasanshahi[1], Narges Karimi Oryad[2]

1. Department of Operating Room, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran
2. Operating Room, Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Organic agriculture
Soil fertility
Wheat
Cereals

**Corresponding author:*
Somayeh Gheysari, MSc;
Department of Operating Room,
School of Nursing and Midwifery,
Shiraz University of Medical
Sciences, Shiraz, Iran.
Email: somayeh.gh65@yahoo.com

ABSTRACT

World population is paying attention to the quality of products along with minimizing the environmental problems caused by the use of chemical products as one of the main concerns of societies. Therefore, this review investigated the effect of applying organic farming techniques in optimizing soil health and fertility in the wheat and grain industry. Articles in Persian and English were searched in Google scholar, SID and PubMed by combining the keywords "Organic agriculture", "Soil fertility", "Soil health" and "Cereals and wheat". Totally, 38 full-text articles were finally reviewed. The results showed that the use of various organic farming techniques such as soil organic carbon amendments by improving the soil structure and increasing the water holding capacity, and the combined use of chemical fertilizers with biological fertilizers can increase soil fertility and ultimately improve its productivity. However, organic wheat cultivation results in lower yield, lower protein content and more damaged starch. In fact, the use of organic flour gives bread with a lower volume and quality. From the findings, it can be concluded that the expansion of organic agriculture has many positive effects in preventing soil erosion and destruction. In this regard, it seems necessary to create an international classification of agricultural ecosystem management to strengthen reform activities in the organic sector based on known agro-climatic indicators.

Please cite this article as: Gheysari S, Hasanshahi M, Karimi Oryad N. The Effect of Applying Organic Farming Techniques in Optimizing Soil Health and Fertility in Wheat and Grain Industry: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S134.

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Int J Nutr Sci 2025;10(1-Supplement):S135.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Application of Date Fruit (*Phoenix Dactylifera* L.) and Its By-Products in Bakery Products: A Review

Parisa Houshmandi[1], Golsa Karambakhsh[2], Mohammad Taghi Golmakani[3*]

Department of Food Science and Technology, School of Agriculture, Shiraz University, Shiraz, Iran

ARTICLE INFO

Keywords:
Bakery products
Date fruit by-products
Functional foods
Value-added products

**Corresponding author:*
Mohammad Taghi Golmakani, PhD;
Department of Food Science and Technology, School of Agriculture, Shiraz University, Shiraz, Iran.
Email: golmakani@shirazu.ac.ir

ABSTRACT

The date palm, scientifically known as *Phoenix dactylifera* L., *Arecaceae*, is cultivated in the arid and semi-arid regions of the Middle East and North Africa. The date fruit and its by-products, including low-quality dates, date seed, and date press cake, contain valuable nutrients such as dietary fibers, phenolics, flavonoids, tocopherols, and carotenoids and have health benefits. This review evaluated the application of date fruit (*phoenix dactylifera l.*) and its by-products in bakery products. The main purpose of this study was to comprehensively investigate the use of date fruit and its by-products in bakery products and identify both the positive and negative aspects of this approach based on current knowledge. Google Scholar, PubMed, and Web of Science were searched using the related keywords. In the date processing industry, more than 10% (weight/weight) of the production has become waste or by-products. Recently, food engineers and nutrition specialists have been exploring the incorporation of these by-products into different food products due to the high demand of consumers for functional foods. Today, the use of date fruit by-products in value-added bakery products is a growing field of study that has received wide attention. It can be concluded that this approach adds value to date fruit by-products, generates income for date processing industries, and reduces environmental impact. Moreover, research has shown that using date fruit by-products in bakery products can improve their quality characteristics.

Please cite this article as: . Houshmandi P, Karambakhsh G, Golmakani MT. Application of Date Fruit (*Phoenix Dactylifera* L.) and Its By-Products in Bakery Products: A Review Int J Nutr Sci. 2025;10(1-Supplement):S135.

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Int J Nutr Sci 2025;10(1-Supplement):S136.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Gluten-Free Diet Developments in Treatment of Celiac Disease: A Review

Farzaneh Hadi[1*], Saba Eyshi[2], Zahra Foroutani[2]

1. Department of Food Science and Technology, University of Tabriz, Tabriz, Iran
2. Department of Food Science and Food Quality Control and Hygiene, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Treatment
Diet
Gluten

**Corresponding author:*
Farzaneh Hadi, MSc;
Department of Food Science and Technology, University of Tabriz, Tabriz, Iran.
Email:
farzaneh.hadi1402@ms.tabrizu.ac.ir

ABSTRACT

Celiac disease is a common autoimmune disorder that occurs in genetically predisposed individuals with a systemic response to gluten found in wheat, rye, clinical manifestations of small intestinal enteropathy with gastrointestinal and non-gastrointestinal symptoms. In this review, an attempt has been made to address the challenges and solutions presented by the gluten-free diet for the treatment of celiac disease. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. Gluten-free diet is known as a healthy diet for people with celiac disease, despite its proven effectiveness, following such a diet is not always easy and can involve various risks. Among the main challenges that celiac patients face on a daily basis, exposure to gluten, high costs and low quality gluten-free food are unintentional. Researchers have recently focused on these issues and are trying to develop alternative approaches. Currently, a gluten-free diet is the only effective treatment for celiac disease. Despite the main role of this diet, the lack of vitamins and minerals, nutritional imbalance, cardiovascular diseases and the risk of obesity have increased in such patients. When there is an established non-pharmacological treatment for a disease, the development of pharmacological therapy faces many challenges. For a new drug to replace gluten-free diet in patients with celiac disease, it must be cheap, easy to administer, and free of side effects. Pharmacological treatments for celiac disease may be more beneficial for patients who do not respond to a gluten-free diet. It can be concluded that a comprehensive understanding of gluten-related disorders, challenges and risks of a gluten-free diet, as well as adequate monitoring, can help improve treatment management and increase the quality of life of affected individuals.

Please cite this article as: Hadi F, Eyshi S, Foroutani Z. Gluten-Free Diet Developments in Treatment of Celiac Disease: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S136.

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Int J Nutr Sci 2025;10(1-Supplement):S137.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Formation, Toxicity and Reduction Strategies of Acrylamide in Cereal Products: A Review

Farzaneh Hadi[1*], Saba Eyshi[2], Zahra Foroutani[2]

1. Department of Food Science and Technology, University of Tabriz, Tabriz, Iran
2. Department of Food Science and Food Quality Control and Hygiene, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Acrylamide
Cereal product
Maillard reaction
Toxicity

**Corresponding author:*
Farzaneh Hadi, MSc;
Department of Food Science and Technology,
University of Tabriz, Tabriz, Iran.
Email: farzaneh.hadi1402@ms.tabrizu.ac.ir

ABSTRACT

Acrylamide is formed as a result of the Maillard reaction, in which reducing sugars react with asparagine at temperatures above 120°C. Its toxic effects on humans including neurotoxicity, genotoxicity, reproductive toxicity, and carcinogenicity were described. This review focused on acrylamide level in cereal products, the reduction strategies, and the risk to human health resulting from dietary acrylamide intake. Google Scholar was searched using related keywords. Considering that cereal products and especially bakery products are widely consumed, they can contribute significantly to the daily intake of acrylamide. The content of acrylamide in cereal-based foods varies depending on the level of precursors, the food matrix, and the type and extent of applied thermal processing. According to the European regulation 2017/2158, acrylamide level for soft bread should not exceed 100 µg/kg, for breakfast cereals not more than 300 µg/kg, for biscuits, crackers, and crisp bread not higher than 400 µg/kg, and for processed cereal-based baby foods not exceeding 150 µg/kg. Therefore, controlling its occurrence and reducing its risk to human health is important and necessary. Since it is impossible to completely remove acrylamide from food, food producers are trying to keep it as low as possible. Previous researches have explored strategies such as thermal processing, additives, and ingredient substitutions to control acrylamide formation in baked products. However, these approaches have resulted in nutritional and sensory changes in the final products. In this regard, factors such as recipe and product design, agricultural factors, processing conditions, and final product characteristics (such as color) should be controlled. It can be concluded that in future, it is expected that different methods, including natural methods (such as antioxidants) to be used to reduce the level of acrylamide in food products.

Please cite this article as: Hadi F, Eyshi S, Foroutani Z. Formation, Toxicity and Reduction Strategies of Acrylamide in Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S137.

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Int J Nutr Sci 2025;10(1-Supplement):S138.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Knowledge, Attitudes and Practice of Whole Bread at Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran

Setayesh Zamanpour, Shahram Saborirad, Ghazaleh Kashfi, Vahideh Afraz, Hamidreza Hafezi*

Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran

ARTICLE INFO

Keywords:
Whole meal
Bread
Knowledge
Attitude
Practice

**Corresponding author:*
Hamidreza Hafezi, PhD;
Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran.
Email: Dr.hrh53@gmail.com
HFem5357@gmail.com

ABSTRACT

Background: Bread is the most consumed food among Iranian households and its quality directly affects the health of society. Due to the limited consumption of whole grain food products, there are health concerns; therefore, stimulating and encouraging people to consume such products are essential. So the aim of this study was to investigate the knowledge, attitude and practice of the employees of the Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran in relation to whole bread.

Methods: The required data and information were collected through field surveys, by designing and completing a questionnaire from 50 employees of the Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran in 2024. The designed questionnaire included questions in the field of personal information, awareness, attitude and performance towards whole bread.

Results: It was shown that 58% of employees had relatively good knowledge and 42% were with average knowledge about whole meal bread. The employees revealed a relatively good attitude towards whole bread, but with relatively low practice.

Conclusion: Being aware of whole bread is considered an important issue due to its very high beneficial effects. Although the employees in this research had a good level of knowledge and attitude, but in order to improve the level of awareness, utilizing more whole meal bread and increase in the transfer of knowledge and skills to the general public seem necessary for a more detailed planning.

Please cite this article as: Zamanpour S, Saborirad S, Kashfi G, Afraz V, Hafezi HR. Knowledge, Attitudes and Practice of Whole Bread at Deputy of Food and Drug, Semnan University of Medical Sciences, Semnan, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S138.

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Int J Nutr Sci 2025;10(1-Supplement):S139.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Smart and Active Packaging and Future Prospects of New Types of Bread: A Review

Elnaz Harati*

Food Science and Technology, Neyshabur, Iran

ARTICLE INFO

Keywords:
Smart packaging
Active packaging
Bread

**Corresponding author:*
Elnaz Harati, MSc;
Food Science and Technology,
Neyshabur, Iran.
Email: elnaz127ha@gmail.com

ABSTRACT

Bread is a staple food around the world. It usually undergoes physical, chemical and microbiological changes that disrupt its quality and durability. This review assessed new types of bread; their smart and active packaging and future prospects. Google Scholar, PubMed, SID, Web of Science and Scopus databases were searched using related keywords. Rancidity determines organoleptic disorders, while microbiological spoilage causes visible mold growth and the production of mycotoxins, which are also factors in the occurrence of diseases such as cancer. To deal with this economic and safety issue, the bakery industry is trying to identify methods that provide the safety of bread and the long-term shelf life of this product, which has a lot of waste every year. Physical methods and chemical preservatives have been used for a long time. In conclusion, new methods such as active and intelligent packaging have been invented and used in some countries, which have given favorable results to increase the shelf life of bread.

Please cite this article as: Harati E. The Smart and Active Packaging and Future Prospects of New Types of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S139.

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Int J Nutr Sci 2025;10(1-Supplement):S140.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Effect of Biofertilizers and Fe Foliar Application on Bread Wheat Grain Quality

Javad Hasanpour[1]*, Laleh Dehghan[2]

1. Agricultural and Horticultural Research Department, Agriculture and Natural Resource Research Center of Tehran Province, Tehran, Iran
2. Greenhouse Research Department, Agriculture and Natural Resource Research Center of Tehran Province, Tehran, Iran

ARTICLE INFO

Keywords:
Bread wheat
Chemical fertilizer
Biofertilizer
Nitroxin
Fe foliar

**Corresponding author:*
Javad Hasanpour, PhD;
Agricultural and Horticultural Research Department, Agriculture and Natural Resource Research Center of Tehran Province, Tehran, Iran.
Email: j.hasanpour@areeo.ac.ir

ABSTRACT

Background: Nitroxin biofertilizer has the ability to provide a significant part of the plant's fertilizer needs for macro-elements. This study investigated the effect of nitroxin biofertilizer application and Fe element foliar application on bread wheat grain yield and quality.

Methods: During 2018-2019 in Agriculture and Natural Resources Research and Education Center of Tehran province, a split plot layout within randomized complete block design with three replications were performed. Main plots were five levels of fertilizers [no fertilizer, chemical fertilizer based on soil test, seed inoculation with nitroxin, nitroxin consumption in irrigation water (Fertigation), inoculation+fertigation]. Sub plots were Fe spraying with two levels including spraying with pure water and Fe spraying with 0.5% concentration.

Results: Use of nitroxin biofertilizer caused an increase in grain Fe absorption and grain protein percentage. Both levels of biofertilizer application increased grain yield by 26.4% and 27.5%. Chemical fertilizer increased the grain yield by 61.5%. Nitroxin consumption increased seed protein from 9.3% in control treatment to 12.3%, 12.5% and 13%, and also Fe content from 7.7 mg/kg in control treatment to 9.4, 10.7 and 12.3 mg/kg in inoculation treatments with biofertilizer, fertigation and simultaneous application of both, respectively.

Conclusion: Nitroxin biofertilizer has the ability to provide a significant part of the plant's fertilizer needs for macro-elements, especially nitrogen and phosphorus. It increases Fe absorption and bread wheat seed protein too. Consumption of these compounds along with chemical fertilizers can increase wheat grain yield and grain quality.

Please cite this article as: Hasanpour J, Dehghan L. Effect of Biofertilizers and Fe Foliar Application on Bread Wheat Grain Quality. Int J Nutr Sci. 2025;10(1-Supplement):S140.

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Int J Nutr Sci 2025;10(1-Supplement):S141.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Immunoaffinity Column with Metal-Organic Frameworks (MOFs) and Molecularly Imprinted Polymers (MIPs) for Solid Phase Extraction of Mycotoxins from Cereals

Fatemeh Kardani[1,2,3], Mohammad Hashemi[4,5*]

1. Food and Drug Laboratory Research Center, Food and Drug Administration, MOH&ME, Tehran, Iran
2. Food and Drug Administration, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
3. Chemistry Department, College of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran
4. Department of Nutrition, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
5. Medical Toxicology Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Keywords:
Immunoaffinity column
Metal-organic frameworks
Molecularly imprinted polymers
Mycotoxins
Cereal

**Corresponding author:*
Mohammad Hashemi, PhD;
Medical Toxicology Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.
Email: Hashemimd@mums.ac.ir

ABSTRACT

Background: The synthesis of immunoaffinity columns referred to as MIL(Al)-53-DES@MIPs, which combines two technologies: metal-organic frameworks (MOFs) and molecularly imprinted polymers (MIPs) were investigated. This study evaluated immunoaffinity column with mofs and mips for solid phase extraction of mycotoxins from cereals.

Methods: MOFs and MIPs with DES used in synthesizing immunoaffinity columns was subsequently used to extract and preconcentrate aflatoxins (AFB1, AFB2, AFG1, AFG2), octhraoxin A, and zearalenone. One-time variable method was used to optimize the parameters affecting on extraction efficiency of the target compounds.

Results: Under optimized conditions, the limits of detection of the four aflatoxin ranged from 0.023 to 0.033 $\mu g \cdot kg^{-1}$ (S/N=5), and the calibration graphs were linear in the concentration range from 0.1 to 400 $\mu g \cdot kg^{-1}$, the inter-day and intraday relative standard deviations (RSD) for various aflatoxin at three different concentration level (n=5) using a single column were 1.3-4.4%, and the column to column RSD% (n=5) was 4.3-6.7% at 5 µg L-1 of each analyte.

Conclusion: The method was successfully applied to quantify aflatoxin, octhraoxin A, and zearalenone in cereals samples, with the recoveries between 95.3-98.5%.

Please cite this article as: Kardani F, Hashemi M. Immunoaffinity Column with Metal-Organic Frameworks (MOFs) and Molecularly Imprinted Polymers (MIPs) for Solid Phase Extraction of Mycotoxins from Cereals. Int J Nutr Sci. 2025;10(1-Supplement):S141.

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Int J Nutr Sci 2025;10(1-Supplement):S142.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Factors Influencing Whole Wheat Bread Selection among Individuals with Diabetes

Saeed Hosseini[1,2], Moslem Taheri Soodejani[1], Vali Bahrevar[3], Narjes Hazar[4*]

1. Center for Healthcare Data Modeling, Department of Biostatistics and Epidemiology, School of public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran
2. Gerontology Unit, Department of Aging, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
4. Community Medicine Department, Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

ARTICLE INFO

Keywords:
Whole wheat bread
Diabetes
Diet
Content analysis

**Corresponding author:*
Narjes Hazar, MD;
Diabetes Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
Email: Narjeshazar@yahoo.com

ABSTRACT

Background: The consumption of whole wheat bread may offer beneficial effects for individuals with diabetes. This investigation aimed to examine the determinants that influence the selection of whole wheat bread among individuals with diabetes.

Methods: Utilizing convenience sampling of diabetic individuals, semi-structured interviews were used to gather data, and analyze via conventional content analysis by MAXQDA 20.

Results: Five principal categories and eighteen subcategories that impact the selection of whole wheat bread encompassed individual factors (awareness, knowledge, attitudes, beliefs, dietary habits, education level, age, gender), social factors (social support, access to information, availability, cost), psychological factors (motivation to manage the disease, self-efficacy, emotional states), disease-related factors (severity of the condition, complications), and product-related factors (taste, texture, brand, price).

Conclusion: This research underscored the necessity of addressing a wide array of factors to enhance whole wheat bread consumption among individuals with diabetes.

Please cite this article as: Hosseini S, Taheri Soodejani M, Bahrevar V, Hazar N. Factors Influencing Whole Wheat Bread Selection among Individuals with Diabetes. Int J Nutr Sci. 2025;10(1-Supplement):S142.

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Int J Nutr Sci 2025;10(1-Supplement):S143.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Nutritional Role of Bread and Cereal Products in Celiac Patients: A Review

Saba Hazratian*, Shahla Korani

Fats and Oils Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Bread
Flour
Cereal
Celiac disease
Gluten

ABSTRACT

Celiac disease is an autoimmune gastrointestinal disease caused by gluten digestion disorders and is triggered by gluten intake. It has permanent sensitivity to wheat gliadin or other prolamins in the atmosphere, which is defined in genetically predisposed individuals. The only practical treatment for this disease, in addition to medical and clinical care, includes a gluten-free diet or one that excludes prolamin group proteins throughout the patient's life. This review determined role of bread and cereal products in celiac patients. Google Scholar database was searched using related keywords. The main structural protein in wheat flour is gluten, which is composed of glutenin and gliadin proteins and causes the dough's elastic and stretchy properties. For the preparation of bread, some changes are made to delay the onset of staleness, reduce the loss of moisture and create a favorable organoleptic quality. Rice flour, corn, potato and rice starches, flour of some grains such as buckwheat, amaranth, millet, sorghum, cassava, quinoa, gowers, and oak flour and compounds such as lipoxygenase and transglutaminase enzymes,protein such as milk, soy, and egg white proteins, emulsifiers, protein sources, and most importantly, various hydrocolloids and gums such as hydroxypropyl methylcellulose, carboxymethylcellulose, guar, xanthan, gelatin, and pectin can be used to improve the flour for Celiac patients. To increase the nutritional value and improve the texture quality of gluten-free products, various sources such as jambulan, xanthan gum in cookies, barhang in bread, orange pomace powder in bread, green tea leaves in crackers, powder elderberry have been used in hamburger bread and skimmed milk has been used in bread. Gluten-free baked products have low fiber content, so their enrichment is necessary. In conclusion, considering the significant prevalence of Celiac disease, this article provides an overview over bead and cereal products specifically made for celiac patients.

**Corresponding author:*
Saba Hazratian, MSc;
Fats and Oils Research Center,
Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: sa.hazratian@gmail.com

Please cite this article as: Hazratian S, Korani S. Nutritional Role of Bread and Cereal Products in Celiac Patients: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S143.

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International Journal of Nutrition Sciences

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POSTER

Impact of Part-Baked Frozen Bread Produced from Wheat Flour and Balango Gum on Nutrition of Celiac Patients

Toktam Hejrani[1*], Zahra Sheikholeslami[2], Seyed Ali Mortazavi[3], Mahdi Karimi[2], Amir Hosesein Elhamirad[4]

1. University of Applied Science and Technology of Gardeshgaran Bonyad, Tehran, Iran
2. Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran
3. Food Science and Technology Department, Ferdowsi University of Mashhad, Mashhad, Iran
4. Food Science and Technology Department, Islamic Azad University, Sabzevar Branch, Sabzevar, Iran

ARTICLE INFO

Keywords:
Freezing
Transamidation
Celiac disease
Giliadin

**Corresponding author:*
Toktam Hejrani, PhD;
University of Applied Science and Technology of Gardeshgaran Bonyad, Tehran, Iran.
Email: hejrany_toktam@yahoo.com

ABSTRACT

Producing bread for celiac patients from wheat flour is an issue of concern. This study assessed impact of part-baked frozen bread produced from wheat flour and balango gum on nutrition of celiac patients. Google Scholar, PubMed, Scopus, Web of Science and SID were searched using related keywords. Gliadin as the main cause of immunological reactions is affected by the enzyme transglutaminase and methyl lysine ester and is broken under the influence of enzymes. SDS PAGE test was performed to check the breakdown of gliadin structure. It was shown that samples in which the combination of transglutaminase enzymes and L-lysine methyl ester enzyme were well hydrolyses gliadin protein. Gliadin-free flour was produced by adding balango gum at two levels (0.5% and 0.8%) in a part-baked frozen bread, and it was kept frozen for 15 days at -18°C, then was fully baked, and qualitative tests was conducted. It was shown that the frozen part-baked frozen bread made from flour without gliadin reduced these characteristics, but balango gum decreased hardness at the level of 0.8%. In conclusion, gliadin decreases the score of bread during frozen storage, but the use of balango gum at the level of 0.8% compensates the level of gliadin, and its quality was similar to that of control bread.

Please cite this article as: Toktam Hejrani, Zahra Sheikholeslami, Seyed Ali Mortazavi, Mahdi Karimi, Amir Hosesein Elhamirad. Impact of Part-Baked Frozen Bread Produced from Wheat Flour and Balango Gum on Nutrition of Celiac Patients. Int J Nutr Sci. 2025;10(1-Supplement):S144.

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Int J Nutr Sci 2025;10(1-Supplement):S145.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Gamma Irradiation on Aflatoxin Level of Wheat: A Review

Fatemeh Dezhgard, Hossein Bozorgpour Samakoush, Fatemeh Hemmati*

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Gamma irradiation
Aflatoxin
Aspergillus flavus
Wheat
Public health

ABSTRACT

Wheat is one of the most important agricultural products and is recognized as a primary food source in many countries. However, wheat can be affected by fungal contaminants, particularly by production of aflatoxins as the most dangerous natural toxin. Therefore, the reduction or elimination of these toxins from wheat products is essential for ensuring food security and public health. Thus, the present review aimed to investigate the effect of gamma irradiation on the reduction of aflatoxin level in wheat. In order to select the relevant articles, databases including Google Scholar, PubMed, and Scopus were searched using keywords of gamma irradiation, aflatoxin, *aspergillus flavus*, public health, and wheat. Gamma irradiation was illustrated to effectively reduce contamination by aflatoxin B1 (AFB1) in wheat and other grains. It was demonstrated that as radiation doses increased, the reduction of AFB1 also increased; while an 8 kGy dose can eliminate up to 69.29% of AFB1 in wheat. Exposure to a 5 kGy dose can inhibit the growth of *Aspergillus flavus* and AFB1 production without altering the chemical composition of the wheat grains. The gamma irradiation at a 6 kGy dose did not show any mutagenic effects in mice exposed to *A. flavus*-contaminated wheat. The combination of gamma irradiation with calcium oxide treatment revealed a greater impact on AFB1 reduction. For instance, 0.5% CaO combined with 10 kGy irradiation could significantly diminish the growth of *A. flavus* and aflatoxin production in wheat. Gamma irradiation appears to be a promising method to decrease the aflatoxin contamination in wheat, although higher doses may be necessary to meet legal limits established by food safety authorities. So it can be concluded that gamma irradiation is a method to decline aflatoxin in wheat and to improve the quality of agricultural products and to maintain public health.

*Corresponding author:
Fatemeh Hemmati, PhD;
Department of Food Hygiene and Quality Control,
School of Nutrition and Food Sciences,
Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Fhemmati88@gmail.com

Please cite this article as: Dezhgard F, Bozorgpour Samakoush H, Hemmati F. The Effect of Gamma Irradiation on Aflatoxin Level of Wheat: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S145.

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Int J Nutr Sci 2025;10(1-Supplement):S146.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Nutritional Effect of Quinoa Addition on Bread: A Review

Parisa Keshani[1], Sara Hedayati[2], Negin Shirvani[1], Faranak Rastgar[1], Mohammad Ghorbani[1], Mohammad Hossein Alaghehbandi[1], Behnam Honarvar[1]*, Kamran Bagheri Lankarani[1]

1. Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Nutritional value
Quinoa
Wheat
Bread
Protein

**Corresponding author:*
Behnam Honarvar, MD, MPH, MSc;
Health Policy Research Center,
Institute of Health,
Shiraz University of Medical
Sciences, Shiraz, Iran.
Email: Honarvarbh32@gmail.com

ABSTRACT

Improving quality of consumable bread has been a challenge in many countries. Therefore, among different interventions, quinoa has been claimed as one of the crops which may help in improvement of food security, worldwide. Considering the importance of bread as a staple food around the world included Iran, this review aimed to assess the nutritional values (proteins, fat, carbohydrate and vitamins and minerals content, and anti-oxidant activity) of quinoa-added bread compared to ordinary wheat bread. The electronic databases of PubMed, Scopus, Web of Science, and a search engine of Google Scholar were searched. Titles and full text were screened, data were extracted by two independent researchers and a third researcher interfered in case of disagreement. Keywords of *Chenopodium quinoa*, quinoa and bread were obtained from MeSh database and text of related articles. All English written articles which were published till March 2022 were selected. Among 159 initially founded articles, 38 were selected by screening titles, reviewing the references and removing duplicates and non-related articles. Eleven articles were included finally in this review. Results showed that significantly higher amounts of protein, fat and fiber content were demonstrated in quinoa- added bread. In conclusion, adding quinoa to the bread could develop healthier bread with more protein, lipid, fiber, and micronutrients compared to ordinary wheat bread. However, more studies are required to assess the cost-benefit and acceptability of such intervention in the public aspect.

Please cite this article as: Keshani P, Hedayati S, Shirvani N, Rastgar F, Ghorbani M, Alaghehbandi MH, Honarvar B, Bagheri Lankarani K. Nutritional Effect of Quinoa Addition on Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S146.

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Int J Nutr Sci 2025;10(1-Supplement):S147.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Evaluation of Implementation and Organization of Whole Wheat Bread Production in Line with Nutrition and Food Security Document in Kermanshah University of Medical Sciences, Kermanshah, Iran

Samira Azimi, Taranom Hoseinikia*, Mahnaz Fatahi, Ali Rezaei, Hosein Biglari, Saeed Samiei, Shahryar Mostofi

Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran

ARTICLE INFO

Keywords:
National document
Nutrition
Food security
Whole wheat bread
Iran

**Corresponding author:*
Taranom Hoseinikia, MSc;
Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran.
Email: hoseinikiar63@yahoo.com

ABSTRACT

Background: The National Nutrition and Food Security Document was issued for the first time by the relevant ministry to ensure the community's food security. One of the objectives of this program was to improve the health and quality of bread (from farm to table). This study evaluated the operational efficiency and the organization process of whole wheat bread production in accordance with the mentioned document in Kermanshah province, Iran.

Methods: Documents received on flour and bread from 20 responsible organizations were classified. The study focused on provincial implementation of the document aimed at organizing whole wheat bread production through several workshops regarding operational areas with relevant agencies and the health and nutrition commission, with participation of authorized representatives from agencies responsible for whole wheat bread in the province.

Results: In first step to facilitate development of a provincial plan, an operational program under the health and nutrition commission, with the participation of the departments of health, food and drug, etc., was prepared. This covered the areas of availability, access, consumption, nutritional health, food safety, and quality across the entire food chain, through the Secretariat of the Health and Food Security Task Force.

Conclusion: It was shown that the process of whole wheat bread production was successful regarding planning and coordination. However, there are challenges and obstacles in its implementation, which require upstream support.

Please cite this article as: Azimi S, Hoseinikia T, Fatahi M, Rezaei A, Biglari H, Samiei S, Mostofi S. Evaluation of Implementation and Organization of Whole Wheat Bread Production in Line with Nutrition and Food Security Document in Kermanshah University of Medical Sciences, Kermanshah, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S147.

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Int J Nutr Sci 2025;10(1-Supplement):S148.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Evaluation of Implementation and Organization of Whole Wheat Bread Production in Line with Nutrition and Food Security Document in Kermanshah University of Medical Sciences, Kermanshah, Iran

Samira Azimi, Taranom Hoseinikia*, Mahnaz Fatahi, Ali Rezaei, Hosein Biglari, Saeed Samiei, Shahryar Mostofi

Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran

ARTICLE INFO

Keywords:
Whole wheat bread
Food security
Iran

**Corresponding author:*
Taranom Hoseinikia, MSc;
Secretariat of Supreme Council for Health and Food Security, Ministry of Health and Medical Education, Kermanshah, Iran.
Email: hoseinikiar63@yahoo.com

ABSTRACT

Background: The National Nutrition and Food Security Document was issued for the first time by the relevant ministry to ensure the community's food security and to improve the health and quality of bread (from farm to table). This study aims to evaluate the operational efficiency and the organization process of whole wheat bread production in accordance with the mentioned document in Kermanshah, Iran.

Methods: Documents received on status of flour and bread from 20 responsible organizations were classified. The study focused on provincial implementation of the document aimed to organize production of whole wheat bread through several workshops on operational areas with relevant agencies and the Health and Nutrition Commission, with the participation of authorized representatives from agencies responsible for whole wheat bread in the area.

Results: To facilitate development of a provincial plan, an operational program under the Health and Nutrition Commission, with the participation of the departments of health, food and drug, etc. was prepared. This covered the areas of availability, access, consumption, nutritional health, food safety, and quality across the entire food chain, through the secretariat of the Health and Food Security Task Force.

Conclusion: It was shown that process of whole wheat bread production was successful in terms of planning and coordination so far.

Please cite this article as: Azimi S, Hoseinikia T, Fatahi M, Rezaei A, Biglari H, Samiei S, Mostofi S. Evaluation of Implementation and Organization of Whole Wheat Bread Production in Line with Nutrition and Food Security Document in Kermanshah University of Medical Sciences, Kermanshah, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S148.

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Int J Nutr Sci 2025;10(1-Supplement):S149.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Optimal Use of Chemical Fertilizers on Wheat Nutrition and Composition of Flour and Bread: A Review

Seyed Mashaallah Hosseini*

Soil and Water Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat
Whole bread
Flour
Nutrition
Chemical fertilizers

ABSTRACT

Bread wheat (Triticum aestivum) is the most important grain product of Iran. This study assessed the effect of wheat nutrition and optimal use of chemical fertilizers on composition of flour and bread. Google Scholar database was searched using the related keywords. In order to increase the production per unit area and also to improve the quality of wheat, in addition to the use of high-yield varieties, other agricultural operations, especially the management of optimal fertilizer consumption, are essential. It is obvious that the successful producers of wheat should adjust the management of their farm fertilizers in such a way that the plant does not suffer from deficiency or toxicity of nutrients and in addition, the percentage of protein and the concentration of micronutrients needed by humans in the grain increases. Management of optimal use of fertilizers is one of the priorities of wheat production. According to the studies, during the last three decades, between 30 and 40 percent and in some studies up to 60 percent increase in agricultural production was related to the use of fertilizer and optimal nutrition in agricultural fields, and for this reason, FAO considers fertilizer as the key to food security. Different species of plants have different nutritional requirements. A group of chemical elements called high-use elements including nitrogen, phosphorus, potassium, calcium, magnesium and sulfur and low-use elements or micronutrients such as iron, zinc, copper, manganese, boron and molybdenum are needed by the plant. It was concluded that production of wheat seeds suitable for baking whole meal bread requires the management of fertilizer consumption in wheat cultivation, which must be done correctly.

*Corresponding author:
Seyed Mashaallah Hosseini, PhD;
Soil and Water Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Shiraz, Iran.
Email: mhoseini20@yahoo.ca

Please cite this article as: Hosseini SM. The Effect of Optimal Use of Chemical Fertilizers on Wheat Nutrition and Composition of Flour and Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S149.

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Int J Nutr Sci 2025;10(1-Supplement):S150.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Identifying and Analyzing Barriers in Entrepreneurial Development of Whole Wheat Bread Industry

Mahdi Khayatan[1,2], Saeed Hosseini[1,3*]

1. Center for Healthcare Data Modeling, Department of Biostatistics and Epidemiology, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Faculty of Entrepreneurship, University of Tehran, Tehran, Iran
3. Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Entrepreneurship
Whole wheat bread
Barriers
Economy

**Corresponding author:*
Saeed Hosseini, PhD candidate; Center for Healthcare Data Modeling, Department of Biostatistics and Epidemiology, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
Email: saeed.hosseini2014@gmail.com

ABSTRACT

Background: Entrepreneurship in bread industry still encounters challenges and impediments. This study analyzed the barriers to entrepreneurial development in whole-grain bread industry.

Methods: A cohort of experts including entrepreneurship specialists, governmental representatives, and industry professionals were enrolled. Semi-structured interviews and focus group discussions collected and analyzed the data using MAXQDA 20 software.

Results: Themes were 5 categories of economic barriers (elevated production costs, high market competition, financial limitations, volatility in raw material prices), technical and technological barriers (deficiencies in know-how, high-cost equipment, infrastructural inadequacies), legal and regulatory barriers (complex and onerous regulations, rigorous quality standards, export limitations), marketing and sales barriers (absence of a robust brand presence, distribution challenges, competition from substitute products), and cultural and social barriers (traditional dietary customs, insufficient consumer awareness, lack of advocacy for domestic products).

Conclusion: Challenges were elevated production costs, intense competition, and inadequate governmental support that highlight the pivotal influence of cultural and social factors in shaping the barriers and serve as a strategic framework for policymakers and entrepreneurs.

Please cite this article as: Khayatan M, Hosseini S. Identifying and Analyzing Barriers in Entrepreneurial Development of Whole Wheat Bread Industry. Int J Nutr Sci. 2025;10(1-Supplement):S150.

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Int J Nutr Sci 2025;10(1-Supplement):S151.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Approaches to Improve the Low Quality of Traditional Bread in Iran: A Review

Mojtaba Hosseini[1*], Musa Salehi[2], Mohamad Reza Khajeh[3]

1. Amirieh Bread Complex, School of Agriculture, Ferdowsi University, Mashhad, Iran
2. School of Nutrition, Shiraz University of Medical Science, Shiraz, Iran
3. Isfahan University of Medical Sciences, Isfahan, Iran

ARTICLE INFO

Keywords:
Bread quality
Bread waste
Wheat
Quality

**Corresponding author:*
Mojtaba Hosseini, PhD;
Amirieh Bread Complex, School of Agriculture, Ferdowsi University, Mashhad, Iran.
Email: M57M60@yahoo.com

ABSTRACT

Bread is a staple food in Iran. However, several studies indicated that approximately 30% of this valuable food is wasted in the country. Due to the levels of waste, Iran is among the top ten wheat-consuming countries and major importer of this product. This research examines the reasons behind the low quality of traditional breads and offers potentials solutions. Google Scholar, PubMed, Web of Science, Scopus and SID database were searched using related keywords. Key reasons for the decline in bread quality of wheat are attributed to the government's policy of purchasing wheat at lower prices than global average, the low cost of bread, and the lower wages of bakery workers compared to other occupations. To enhance wheat quality, it is recommended that the government shift from quantity-based guaranteed purchases (based on wheat yield) to quality-based purchases (based on grain protein content). In addition, economics suggest that subsides should not be allocated to wheat and flour, as these goods do not meet the criteria for subsidization. Currently according to available statistics, the price of bread in Iran is the lowest among all Asian countries. Another reason for high waste is low price of bread. It is concluded that subsidies to be removed from this product and instead be provided as cash to lower-income group. Furthermore, bakeries should diverse their product offerings, encourage creativity among bakers and promote training within the industry.

Please cite this article as: Hosseini M, Salehi M, Khajeh MR. Approaches to Improve the Low Quality of Traditional Bread in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S151.

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Int J Nutr Sci 2025;10(1-Supplement):S152.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Nutritional Characteristics and Health Benefits of Flour Fortification: A Review

Sadaf Mohajjel Sadeghi[1], Sahar Majnouni[1], Arezou Khezerlou[2], Ali Ehsani[2], Nasim Jafari[2*]

1. Student Research Committee, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Food Safety and Hygiene Unit, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Fortification
Health
Micronutrients
Flour
Bread

**Corresponding author:*
Nasim Jafari, MSc;
Food Safety and Hygiene Unit, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: nasimjafari1115@gmail.com

ABSTRACT

Micronutrient deficiency is a serious and damaging issue with economic and health consequences for vulnerable populations globally. Food fortification programs are important in order to deal with this problem and meet the needs of micronutrients in these groups and are known as an effective way to correct nutritional deficiencies. This review evaluated nutritional and health characteristics of flour fortification. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords of bread, bakery products, wheat flour, and fortification. After corn and rice, wheat has the highest production rate and is known as the second most consumed grain in the world. Due to its high use in bread and pasta, wheat flour is one of the best options for fortification with micronutrients (iron, folic acid, B group vitamins, vitamins A, D and C, zinc and calcium). Industrial fortification of wheat flour, if properly implemented, is an effective and low-cost method for providing vitamins and minerals and improving the quality of nutrition and public health. It can be concluded that food fortification should be included as a key strategy to deal with the lack of micronutrients in national health and nutrition programs. This involves adding different micronutrients to staple foods to meet the diverse needs of the target population. Flour fortification has been identified as an effective and low-cost solution to combat micronutrient deficiencies and improve public health.

Please cite this article as: Mohajjel Sadeghi S, Majnouni S, Khezerlou A, Ehsani A, Jafari N. Nutritional Characteristics and Health Benefits of Flour Fortification: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S152.

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Int J Nutr Sci 2025;10(1-Supplement):S153.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Increasing Microbial Stability of Bakery Products by Herbal Antimicrobial Emulsions, Essential Oils and Plant Extracts: A Review

Majid Jafariniya*, Saeed Dadashi, Babak Ghanbarzadeh

Department of Food Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Microbial stability
Bakery products
Emulsions
Essential oils

ABSTRACT

The global demand for safe and healthy foods with minimal use of artificial preservatives is continuously increasing. Bakery products are recognized as an important part of a healthy diet, but their limited shelf life, particularly due to microbial spoilage, poses significant challenges for manufacturers. This review assessed the increasing microbial stability of bakery products by herbal antimicrobial emulsions, essential oils and plant extracts. PubMed, Scopus, Web of Science and Google Scholar databases were searched using the related keywords. This spoilage not only reduces product quality and leads to economic losses but also endangers consumer health. In the past, the use of chemical preservatives to extend the shelf life of these products was common; however, with growing consumer awareness of the harmful effects of these substances on health, the demand for natural and safe alternatives has risen. In this regard, the bakery industry has shifted towards using natural essential oils as an effective alternative to chemical preservatives. Essential oils, either as part of product formulations or in packaging systems, have gained attention for their antimicrobial properties. Research has shown that plant-based essential oils, such as cinnamon, thyme, lemongrass, and oregano, have significant potential to inhibit the growth of harmful microorganisms in bakery products and can extend their shelf life. The antimicrobial activity of essential oils is attributed to the bioactive compounds they contain. However, one limitation of using essential oils is their negative impact on the sensory properties of products, especially at higher concentrations. It was concluded that in order to overcome the limitation, essential oils can be used in combination with other preservation techniques, such as suitable packaging, to enhance both product shelf life and sensory quality. Further research is needed to commercially produce bakery products formulated with essential oils on a larger scale.

*Corresponding author:
Majid Jafariniya, PhD candidate;
Department of Food Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: majid_majlesi@yahoo.com

Please cite this article as: Majid Jafariniya, Saeed Dadashi, Babak Ghanbarzadeh. Increasing Microbial Stability of Bakery Products by Herbal Antimicrobial Emulsions, Essential Oils and Plant Extracts: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S153.

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Int J Nutr Sci 2025;10(1-Supplement):S154.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Factors Influencing the Bread Waste in Iran: A Review

Faride Sadat Jalali[1*], Zahra Zare[2], Mohadeseh Ghanbari-Jahromi[3]

1. School of Health Management and Information Sciences, Health Human Resources Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
2. Health Care Management, Department of Health Care Management, School of Management and Medical Informatics, Shiraz University of Medical Science, Shiraz, Iran
3. Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran

ARTICLE INFO

Keywords:
Bread waste
Bread
Quality
Iran

**Corresponding author:*
Faride Sadat Jalali,
School of Health Management and Information Sciences, Health Human Resources Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: fs.jalali@ yahoo.com

ABSTRACT

Bread is considered the Iranian people's main food. Therefore, this study was conducted to identify factors influencing the Bread Wastage in Iran. In this study, a literature search with keywords related to bread waste was conducted in Web of Science, PubMed, Scopus, SID, and Magiran databases based on the JBI framework until August 2024. The results of previous studies showed that the factors related to the increase of bread waste in Iran are in five categories of governance factors (lack of supervision, government monopoly in flour, low price of bread, lack of silo, low quality of raw materials), Factors related to the consumer (education level and age, improper storage of bread, number of bread purchased), factors related to the producer (improper processing of dough and failure to comply with the amount of yeast and fermentation time, use of baking soda and low-quality yeasts, low expertise of bakery workers, lack of uniform baking of bread), cultural factors (lack of information through the media, lack of adaptation of people's taste to machine-produced bread, weakening of the place of bread in people's beliefs, the job satisfaction of bakery employees), economic factors (low price of bread, price of bread waste, high cost of repairs) and technical factors (lack of expert staff, , traditional bread production methods, storage pests, packaging quality, device wear, and tear) took place. It can be concluded that high-quality bread is obtained when the decision-making, implementation, and consumption factors of each part perform their duties competently.

Please cite this article as: Jalali FS, Zare Z, Ghanbari-Jahromi M. Factors Influencing the Bread Waste in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S154.

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Int J Nutr Sci 2025;10(1-Supplement):S155.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Practical Solutions to Reduce Bread Waste in Iran: A Review

Faride Sadat Jalali[1*], Mohadeseh Ghanbari-Jahromi[2], Zahra Zare[3]

1. School of Health Management and Information Sciences, Health Human Resources Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
2. Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran
3. Health Care Management, Department of Health Care Management, School of Management and Medical Informatics, Shiraz University of Medical Science, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread waste
Bread quality
Iran

**Corresponding author:*
Faride Sadat Jalali, PhD;
School of Health Management and Information Sciences, Health Human Resources Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: fs.jalali@ yahoo.com

ABSTRACT

Food security is one of the most important challenges in Iran. Therefore, this study was conducted to provide solutions to reduce bread waste in Iran. In this study, a literature search with keywords related to bread waste reduction strategies was conducted in Web of Science, PubMed, Scopus, SID, and Magiran databases until August 2024. It was shown that the solutions to reduce bread waste in Iran are in three categories of governance factors (increasing the quality of raw materials, educational programs, monitoring, eliminating government subsidies for flour, eliminating traditional bakeries), consumer-related factors (buying bread according to consumption , correct storage of bread, heating the bread of the previous meal, increasing the level of awareness of consumers) and factors related to the producer (upgrading the factors related to bread processing, using the appropriate dough production technology, using additives, not using baking soda and using improvers, Dough temperature, mixing time and how to knead the dough, control of baking conditions by suitable ovens, bread production in smaller dimensions, workers sharing in bakery income and increasing their job security, bakery worker's skill, modification of bread baking trays, new bread packaging techniques) took place. The amount of bread waste in our country is higher than the world standard. It can be concluded that considering the conditions of the society, supervision and control, training and correction of the production process, supply and correct consumption of bread can be effective in reducing the amount of bread waste.

Please cite this article as: Jalali FS, Ghanbari-Jahromi M, Zare Z. Practical Solutions to Reduce Bread Waste in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S155.

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Int J Nutr Sci 2025;10(1-Supplement):S156.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Grains and Gut Microbiota: A Review

Afrooz Javidi[1*], Maryam RafRaf[1], Mina Babashahi[2], Masoumeh Marhamati[3]

1. Nutrition Department, Tabriz University of Medical Science, Tabriz, Iran
2. Shiraz University of Medical Science, Shiraz, Iran
3. Food Science Department, Tabriz University of Medical Science, Tabriz, Iran

ARTICLE INFO

Keywords:
Whole grains
Gut microbiota
Health

ABSTRACT

The human microbiota has potential benefits as improving immunity, cognition and mood and reducing risk of obesity, and type 2 diabetes. Dietary fiber may modify microbiota abundance, diversity, and metabolism including short-chain fatty acid production. Grains are important sources of carbohydrates in global dietary patterns. The majority of these carbohydrates, especially in refined-grain products are digestible. Most of carbohydrate digestion takes place in the small intestine where monosaccharides (predominantly glucose) are absorbed, that delivers energy to the body. However, a considerable part of the carbohydrates, especially in whole grains, is indigestible dietary fibers. They impact gut motility and transit and are useful substrates for the gut microbiota affecting its composition and quality. The profile of digestible and indigestible carbohydrates and their complexity determine the nutritional quality of carbohydrates. Whole grains are more complex than refined grains and are promoted as part of a healthy and sustainable diet mainly because the contribution of indigestible carbohydrates, and their co-passenger nutrients, is significantly higher. Higher consumption of whole grain is recommended because it is associated with lower incidence of, and mortality from, cardiovascular diseases, type 2 diabetes, and some cancers. This may be due to effects on the gut microbiota. Although processing of cereals during milling and food manufacturing is necessary to make them edible, it also offers the opportunity to still further improve the nutritional quality of whole-grain flours and foods made from them. It can be concluded that change in composition and availability of grain carbohydrates and phytochemicals during processing may positively affect gut microbiota and improve health.

**Corresponding author:*
Afrooz Javidi, PhD;
Nutrition Department, Tabriz University of Medical Science, Tabriz, Iran.
Email: a.javidi@tbzmed.ac.ir

Please cite this article as: Javidi A, RafRaf M, Babashahi M, Marhamati M. Whole Grains and Gut Microbiota: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S156.

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Int J Nutr Sci 2025;10(1-Supplement):S157.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Designing Formulation of Baguette Bread by Acorn Flour and Some Improvers to Promote the Quality and Nutritional Properties

Akbar Jokar[1*], Fariba Naghiporr[2]

1. Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Fars, Shiraz, Iran
2. Seed and Plant Improvement Institute, Agriculture Research, Education and Extension Organization (AREEO), Karaj, Iran

ARTICLE INFO

Keywords:
Baguette bread
Acorn
Quercus brantti
Nutrition
Quality

**Corresponding author:*
Akbar Jokar, PhD;
Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Shiraz, Iran.
Email: a.jokar@areeo.ac.ir

ABSTRACT

Background: Processing acorn fruit (*Quercus brantti*) in production of various foods, especially bread not only can benefit from its high nutritional and medicinal value, but also can help preservation of acorn forests. This study designed formulation of baguette bread by acorn flour and some improvers to improve quality and nutritional properties.

Methods: For baguette bread, 4 samples were prepared. Control (95% wheat flour with 80% extraction rate, 5% rye flour). Other 3 samples contained constant amounts of acorn (20%), corn (10%) and rye (5%) flours with different amounts of xanthan, guar and gluten (0.015 xanthan, 0.22 Guar, 0.7 gluten; 0.05, 0.7, 2.3; 0.15, 2, 7 % w/w based on wheat flour).

Results: The effects of acorn flour and various amounts of xanthan, guar, and gluten on most of the properties of Baguette bread were significant. The phenolic content of Baguette bread, which contained acorn flour, increased almost six times more than the control sample. Comparing to the control, 30% of fiber content increased, and mineral contents (Ca, Fe, and Mn) of the new breads boosted significantly. Most acceptable volume and sensorial characteristics were attributed to samples containing 0.05% xanthan, 0.7% guar, and 2.3% gluten. Texture of this sample, in comparison to the control was not significantly different.

Conclusion: Using right amounts of hydrocolloids and gluten has the possibility to produce breads with acorn flour. High sensorial, physical and nutritional qualities of these breads are higher than ordinary samples that can be widely put in people's food basket.

Please cite this article as: Jokar A, Naghiporr F. Designing Formulation of Baguette Bread by Acorn Flour and Some Improvers to Promote the Quality and Nutritional Properties. Int J Nutr Sci. 2025;10(1-Supplement):S157.

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Int J Nutr Sci 2025;10(1-Supplement):S158.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Production of Lavash Bread Combining Dehull Barley, Corn and Wheat Flour

Akbar Jokar[1*], Mohamah Javad Taghipoor[2]

1. Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Fars, Shiraz, Iran
2. Islamic Azad University Behbahan Branch, Behbahan, Iran

ARTICLE INFO

Keywords:
Bread
Corn
Hull-less barely
Wheat flour

**Corresponding author:*
Akbar Jokar, PhD;
Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, AREEO, Shiraz, Iran.
Email: a.jokar@areeo.ac.ir

ABSTRACT

Background: Bread has an important role in nutrition of developing countries. This study investigated production of flat bread (Lavash) combining hull-less barely (HLB), corn, and wheat flours.

Methods: Corn and HLB in four levels (0, 10, 20, and 30%) were combined with wheat flour (88% extraction, especial for Lavash bread). Sixteen treatments including control were obtained in a randomized design. Fat, protein, flour particle size, water absorption, falling number, and extensogragh and farinogragh properties of doughs were evaluated. Bread was produced based on commercial formulation (2% edible salt, 8% sour dough, for 3 kg of flour). The produced bread using combined flours such as those contained 10, and 20% HLB, 10, 20, and 30% corn, 10% HLB-10% corn, 20% HLB-10% corn, and 20% corn-10% HLB.

Results: HLB and corn flours increased water absorption and dough yield. HLB in wheat flour increased consistency, but decreased extensibility and surface area of bread. Adding 10% corn flour lowered consistency, but increased extensibility and improved dough properties. Breads with 10% HLB, 10% corn, 10% corn-10% HLB, 10% corn-20% HLB and control sample, did not have any significant differences regarding staling and shelf life. Sensory evaluations showed that samples were similar for taste and chewing ability, but their color was different as control and 10% HLB samples had higher scores.

Conclusion: Breads with 10% HLB, 10% corn, 10% corn-10% HLB, and 10% corn-20% HLB had no significant difference with control.

Please cite this article as: Jokar A, Taghipoor MJ. Production of Lavash Bread Combining Dehull Barley, Corn and Wheat Flour. Int J Nutr Sci. 2025;10(1-Supplement):S158.

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Int J Nutr Sci 2025;10(1-Supplement):S159.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Dried Pumpkin Powder Application in Bakery Products: A Review

Fatemeh Karimizadeh*

Food Technology Unit, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Pumpkin powder
Beta-carotene
Cake
Physicochemical analysis

ABSTRACT

In recent years, bakery and confectionery products have been enriched with various nutrients to transform them into complete foods with all necessary nutrients. Pumpkin includes several species of the Cucurbitaceae family, many of which have significant economic value. Using the dehydration method to produce pumpkin powder can be an effective technique in preserving this product and also creating new processed foods from dried pumpkin.This review focused on production of pumpkin powder using various drying methods and incorporating this powder into bakery products as a substitute for wheat flour. Additionally, the aim of this study was to enrich food products using the plant chemical compounds present in pumpkin. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. Physical and chemical analysis of pumpkin powder and bakery products based on it, along with sensory evaluation of these products, are other main aspects of this research. This review has addressed determining the level of wheat flour substitution with pumpkin flour in various bakery products. Researchers reported that increasing the concentration of pumpkin flour has a negative impact on sensory analysis and color of products. Results indicated that pumpkin flour at low to medium concentrations is more acceptable in terms of sensory attributes, and as concentration increased, sensory scores decreased. It can be concluded that adding pumpkin powder to bakery products also increased the level of carotene in these products. Phytochemicals also increased with increasing pumpkin concentration in these products, which helps enrich their nutritional value.

**Corresponding author:*
Fatemeh Karimizadeh, MSc;
Food Technology Unit, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran.
Email: f.karimizade70@gmail.com

Please cite this article as: Karimizadeh F. Dried Pumpkin Powder Application in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S159.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Examining National and International Requirements for Foods Containing Whole Grains with Focus on Whole Wheat Bread: A Review

Shaghayegh Khajehali Chaleshtori*, Azadeh Khajehali Chaleshtori

Department of Food Science and Technology, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran

ARTICLE INFO

Keywords:
Bread
Dietary fiber
Healthy diet
Nutritional requirement
Whole grain

ABSTRACT

Despite the health benefits of dietary fiber, global intake of dietary fiber and whole grains remains below recommended levels. Various standards have been established to promote the whole-grains consumption. Bread, being one of the most commonly consumed and popular food products, has received special attention in global standards, with ongoing updates to ensure compliance. This review examined national and international requirements for foods containing whole grains with focus on whole wheat bread. Google Scholar, PubMed, Scopus and Web of Science databases were searched using related keywords. Totally, 25 food standards and guidelines related to whole grains were enrolled, focusing on breads to update the requirements for whole grain product standards. There is no standardized definition for foods containing whole grains. The general consensus is that simply including whole grains in the food formulation is insufficient to meet the new requirements. Health food guidelines have been updated to impose stricter standards for food containing whole grains. These new standards, not only focus on the ingredients, but also consider health indicators like energy, protein, and fiber content wile limiting added sugar, salt, and fat. Despite recent revisions to bread standards in Iran, these standards have not adequately addressed whole grain bread. To align with global standards and the FDA's healthy food definition, it is crucial to revise the national standards of Iran for bread and whole grains products. It can be concluded that it is necessary to complete the nutritional (energy, protein, fiber and ash content) and technological (pH, moisture, solids content, etc.) requirements and establishing a clearer definition for whole grain foods and bread.

*Corresponding author:
Shaghayegh Khajehali Chaleshtori, MSc;
Department of Food Science and Technology, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran. Member of Iran national standards organization, Shahrekord, Iran.
Email: sh.khajehali1990@gmail.com

Please cite this article as: Khajehali Chaleshtori S, Khajehali Chaleshtori A. Examining National and International Requirements for Foods Containing Whole Grains with Focus on Whole Wheat Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S160.

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Int J Nutr Sci 2025;10(1-Supplement):S161.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Assessment of Blanket in Whitening of Traditional Bread and Its Dangers to Human Health: A Review

Saeed Khaledian*, Behnaz Bazargani-Gilani, Liya Eghbalian

Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Buali Sina University, Hamadan, Iran

ARTICLE INFO

Keywords:
Blanket
Whitening
Bleaching
Traditional bread
Human health

**Corresponding author:*
Saeed Khaledian, PhD;
Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Buali Sina University, Hamadan, Iran.
Email: khaledian.saeed.68@gmail.com

ABSTRACT

Today, food manufacturers use various additives to increase the shelf life of the product and improve the technological and organoleptic characteristics of the product. Sodium hydrosulfite or sodium dithionite with the brand name Blanket or dithionite is used in many food products to bleach and whiten the product. This review assessed use of blanket to whiten traditional bread and its dangers to human health. Scopus, Google Scholar and PubMed were searched applying appropriate keywords. These and similar sulfite compounds act as inhibiting compounds from enzymatic and non-enzymatic browning reactions and prevent the formation of coloring compounds in food products. In some traditional bakeries, non-permissible additives such as blanket are used for better dough processing, increase the transparency and whiteness of bread, improve the quality of undesirable flours and shorten the fermentation time. The use of blankets in food is allowed, but using more than the allowed limit and without technical knowledge will cause residues in food products. The maximum residue of this compound in bread is 10 mg/kg. The excessive presence of this compound in bread can cause skin, digestive and respiratory complications in humans, and due to long-term consumption, it can have more destructive effects on human health. It can be concluded that based on per capita consumption of bread that is high in Iran, it is necessary to monitor these compounds in all types of bread by the relevant organizations.

Please cite this article as: Khaledian S, Bazargani-Gilani B, Eghbalian L. Assessment of Blanket in Whitening of Traditional Bread and Its Dangers to Human Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S161.

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Int J Nutr Sci 2025;10(1-Supplement):S162.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Risk of Acrylamide Formation in Various Types of Bread Prepared in High Temperature Thermal Processes: A Review

Saeed Khaledian*, Behnaz Bazargani-Gilani, Liya Eghbalian

Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Buali Sina University, Hamadan, Iran

ARTICLE INFO

Keywords:
Acrylamide
Bread
Thermal process
Maillard reaction
Human health

**Corresponding author:*
Saeed Khaledian, PhD;
Department of Food Hygiene and Quality Control, Faculty of Veterinary Medicine, Buali Sina University, Hamadan, Iran.
Email: khaledian.saeed.68@gmail.com

ABSTRACT

Acrylamide is an undesirable compound produced in some foods with high carbohydrate content, such as some types of bread, fried potatoes, coffee, etc. The use of a heat process above 120ºC during food processing creates this compound. This review evaluated risk of acrylamide formation in various types of bread prepared in high temperature thermal processes. Google Scholar, Scopus and PubMed were searched using related keywords. Acrylamide is a harmful compound and a byproduct of non-enzymatic browning or Maillard reaction that is formed more in foods that contain the amino acid asparagine and lack sugars such as glucose and fructose. Many traditional bread in our country are baked using ovens or ovens with direct flame and high temperature, which increase the risk of acrylamide formation. Also, in the belief of some consumers, there is a recommendation to consume very toasted bread, which can cause problems for humans. When acrylamide enters the body in excess, it can affect the peripheral and central nervous system (CNS) and cause neurotoxicity by destroying the nervous system. These compounds can cause mutagenesis and carcinogenesis in humans too. In Iran, the per capita consumption of bread is high and the monitoring of acrylamide in all types of bread and other products is very low, it is recommended that the controlling organizations have continuous monitoring in this field. It can be concluded that the use of ovens with indirect flame and low temperature in the production of traditional breads and consumption of industrial breads can be recommended to the consumers in order to receive lower daily amounts of acrylamide.

Please cite this article as: Khaledian S, Bazargani-Gilani B, Eghbalian L. Risk of Acrylamide Formation in Various Types of Bread Prepared in High Temperature Thermal Processes: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S162.

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Int J Nutr Sci 2025;10(1-Supplement):S163.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Role of Whole Grain Dietary Fiber in Gut Health and Prevention of Metabolic Syndrome: A Review

Saba Khatapoush*

Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Dietary fiber
Whole grain
Gut health
Metabolic syndrome

**Corresponding author:*
Saba Khatapoush, MSc;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Sba.khtpsh@gmail.com

ABSTRACT

Dietary fiber is recognized as a key factor in promoting public health and preventing diseases, particularly metabolic syndrome. Whole grains, as one of the best sources of dietary fiber, have garnered increasing attention due to their beneficial effects on gut health and their potential role in preventing metabolic syndrome. This review investigates the role of whole grain dietary fiber in gut health and metabolic syndrome prevention. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords of whole grain fiber intake, gut health, microbial diversity, short-chain fatty acid production, and inflammatory markers. Furthermore, this review explores the association between whole grain fiber consumption and components of metabolic syndrome, such as obesity, insulin resistance, and dyslipidemia. The findings indicated that higher intake of dietary fiber from whole grains is associated with improved diversity and functionality of the gut microbiota, which may contribute to enhanced metabolic health. This review also emphasized the need for further research to elucidate the underlying mechanisms of these associations. It can be concluded that this study underscores the significance of whole grain consumption as a strategy for improving gut health and reducing the risk of metabolic syndrome, highlighting the necessity for evidence-based dietary recommendations to promote public health.

Please cite this article as: Khatapoush S. The Role of Whole Grain Dietary Fiber in Gut Health and Prevention of Metabolic Syndrome: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S163.

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Int J Nutr Sci 2025;10(1-Supplement):S164.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Bread as a Functional Food: A Review

Hajar Zolfaghari[1], Mahmood Alizadeh Sani[2], Arezou Khezerlou[1*]

1. Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Department of Food Science and Technology, School of Nutritional Sciences and Dietetics, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Bread
Bakery products
Antioxidant
Functional food

**Corresponding author:*
Arezou Khezerlou, PhD;
Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: arezou.khezerlou@gmail.com

ABSTRACT

Considering the variety of food available in the market, it is our responsibility to choose the best food for the fastest effect on the development of the mind and health. In general, the best food is one that, in addition to meeting the body's basic needs for energy and nutrients, it contains biologically active compounds that help improve body functions and reduce the risk of disease. Functional foods are enriched foods that have more health benefits by adding vitamins, minerals, and plant antioxidants. Phytochemicals and phenolic antioxidants found in plants including fruits, vegetables, medicinal plants and spices are known as active substances responsible for human health. Breads are enriched with a variety of compounds such as plant proteins, soluble and insoluble fibers, strong antioxidants, medicinal plants, spices, and phytosterols to act as carriers of nutrients and bioactive substances to improve the health of consumers. The present review was conducted by searching the sources in SID, Scopus, and Google Scholar search databases using keywords of bread and functional food. Therefore, antioxidant/phenolic-containing bread may lead to high consumer demand. This article presents the potential of plants with high antioxidant properties in bread to make it as a functional food. The presence of antioxidants in bread acts as a defense barrier against free radicals and by neutralizing peroxides, hydroperoxides can prevent occurrence of oxidative chain reactions that lead to the formation of harmful compounds and degenerative diseases. It prevents lipid peroxidation in bread and improves the quality and shelf life of bread. It can be concluded that the production of functional bread and bakery products with physiological effectiveness and consumer acceptance in terms of appearance, taste, and texture is very important.

Please cite this article as: Zolfaghari H, Alizadeh Sani M, Khezerlou A. Bread as a Functional Food: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S164.

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Int J Nutr Sci 2025;10(1-Supplement):S165.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Comparing Microbiological Specifications of Bread Regarding National and International Standards: A Review

Mohamad Khezri*

Food Microbiology Laboratoaty, Food and Drug Vice Presidency, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Keywords:
Bread
Microbiological test
Standards
Mold
Coliform

ABSTRACT

Given the essential role of bread in global diets, ensuring its safety against microbial contamination is vital. This review compared microbiological characteristics of bread in national and international microbiological. standards. Google Scholar was searched using related keywords. Ten valid standards at the international and national levels, including Codex Alimentarius standards: CXS 152-, USDA and FDA regulations in the United States, EC Reg 2073/2005 for microbiological safety criteria in European Union, directives 92/46/EEC, AS/NZS 4674, AS 5300 from Australia and New Zealand, the Tanzanian standard DEAS 43:2022, the microbiological characteristics of the Codex Alimentarius of Turkey (5996, 2011), and the ISIRI 19888:2015 standard of Iran were compared. In microbiological characteristics of European Union and Codex, microbiological criteria of $\leq 10^4$ CFU/g for total viable counts (TVC) were established, emphasizing absence of pathogenic bacteria in 25 grams of the samples. In USDA and FDA guidelines in United States, a zero-tolerance policy for pathogens in bread is enforced and strict testing methods are emphasized to ensure microbiological safety. In AS/NZS 4674 and AS 5300, microbiological limits of ≤1000 CFU/g for TVC and specific limits for molds and yeasts are defined. The Tanzanian standard specifies maximum limits for powdered breads, with yeast and mold counts of ≤100 CFU/g, the absence of *Salmonella spp.* in 25 grams, and the absence of *E. coli*. The microbiological Codex of Turkey establishes a limit of ≤1000 CFU/g for yeast and mold and specifies a rope spore count of 1.1×10^4. In national standard of Iran (ISIRI 19888:2015), the permissible limit for mold in flat, bulk, and semi-bulk industrial breads is defined as a maximum of ≤100-500 CFU/g for mold, ≤10 CFU/g for coliforms, and absence of *E. coli*. It can be concluded that despite differences in characteristics and microbiological limits of bread standards, the goal of these standards is protection of public health through strict microbiological controls in bread production.

*Corresponding author:
Mohamad Khepri, PhD;
Food Microbiology Laboratoaty,
Food and Drug Vice Presidency,
Mashhad University of Medical
Sciences, Mashhad, Iran.
Email: khezrim@mums.ac.ir

Please cite this article as: Khezri M. Comparing Microbiological Specifications of Bread Regarding National and International Standards: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S165.

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Int J Nutr Sci 2025;10(1-Supplement):S166.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Educational Activity on Elementary School Girls in Reducing Menstruation

Faride Khosravi Mayab*, Somayeh Nadaf Kohne Gichan

Educational Sciences, Quchan, Khorasan Razavi, Iran

ARTICLE INFO

Keywords:
Bread
Consumption pattern
Consumption education
Waste

**Corresponding author:*
Faride Khosravi Mayab, MSc;
Educational Sciences, Quchan,
Khorasan Razavi, Iran.
Email: simafahiminia1041@gmail.com

ABSTRACT

Background: Bread is a staple food all over the world. Usually, wheat flour is used to prepare dough that is prepared with the help of yeast and its volume increases, and finally it is cooked in the oven. Bread is one of the most important food items consumed in the world, which in most countries, especially in Iran, constitutes an important part of the needs of the low-income and vulnerable classes of the society. The present study was conducted with the aim of determining the effect of bread consumption education on reducing bread waste among female primary school students in the academic year of 2024.

Methods: The method of this research was semi-experimental with a pre-test and post-test design with a control group. The statistical population of the research consisted of all female students in the academic year 2023-2024, who were selected by multi-stage cluster sampling, 30 people in two groups of 15 people. Researcher-made questionnaires were used for data collection. After conducting the pre-test of the experimental group of the bread saving training protocol during 15 weekly sessions, each session lasted for 90 minutes, but the control group did not receive any training. After the completion of the intervention program, a post-test was conducted for both groups. The obtained data were analyzed by means of descriptive statistics (mean, standard deviation) and inferential statistics (analysis of covariance).

Results: It was shown that bread consumption education had a significant effect in reducing bread waste.

Conclusion: It was demonstrated that educational program on bread consumption can affect and decrease the bread waste.

Please cite this article as: Khosravi Mayab F, Nadaf Kohne Gichan S. The Effect of Educational Activity on Elementary School Girls in Reducing Menstruation. Int J Nutr Sci. 2025;10(1-Supplement):S166.

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Int J Nutr Sci 2025;10(1-Supplement):S167.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Influence of Temperature, Equilibrium Relative Humidity and Storage Time on Starch Thermal Characteristics and Gluten FTIR Spectroscopy of Wheat Grains

Neda Maftoonazad*, Akbar Jokar

Food Processing and Postharvest Technology Agricultural Engineering Research Department, Fars Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran

ARTICLE INFO

Keywords:
Temperature
Equilibrium relative humidity
Storage time
Wheat grains

**Corresponding author:*
Neda Maftoonazad, PhD;
Agricultural Engineering Research Department, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran.
Email: n.maftoon@areeo.ac.ir

ABSTRACT

Background: Ageing after harvesting or ripening of seeds during short-term storage is under influence of humidity and temperature. The purpose of this study was to investigate the effect of accelerated ageing on starch gelatinization properties and changes in gluten structure.

Methods: Fresh wheat grains were placed in air tight buckets of uniform size for each treatment and stored in different temperatures (30, 40 and 50°C) for specified times (2, 5 and 8 days) after increasing their moisture content (16, 18 and 20%) by addition of water. Samples were milled and thermal properties of wheat flour starches were determined using differential scanning calorimeter (DSC) and changes in secondary protein structure of gluten network was determined by ATR FTIR spectroscopy. RSM with central composite design was applied to determine the significance of the factors.

Results: Increase in moisture content led to decrease in onset, peak and end set temperatures of gelatinization. Increase in storage time and temperature increased these parameters. By progressing storage time, band intensity of thiol groups decreased; while that of disulfide groups of gluten increased to improve gluten quality. Increasing moisture content from 16 to 20% and higher storage temperature (50°C) decreased intensity of disulfide bands.

Conclusion: Characteristics of starch gelatinization and gluten structure of fresh wheat are affected by temperature, relative humidity and storage time.

Please cite this article as: Maftoonazad N, Jokar A. The Influence of Temperature, Equilibrium Relative Humidity and Storage Time on Starch Thermal Characteristics and Gluten FTIR Spectroscopy of Wheat Grains. Int J Nutr Sci. 2025;10(1-Supplement):S167.

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Int J Nutr Sci 2025;10(1-Supplement):S168.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Environmental Conditions on Rheological Properties of Wheat Flour

Neda Maftoonazad*, Maryam Shahamirian

Food Processing Postharvest Technology Agricultural Engineering Research Department, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran

ARTICLE INFO

Keywords:
Wheat flour
Environmental condition
Rheological properties
Storage time

**Corresponding author:*
Neda Maftoonazad, PhD;
Agricultural Engineering Research Department, Agricultural Research, Education and Extension Organization (AREEO), Shiraz, Iran.
Email: n.maftoon@areeo.ac.ir

ABSTRACT

Background: Accelerated ageing of wheat is obtained in higher temperatures during a specific storage time under controlled humidity to improve wheat flour quality. This study addressed the effect of accelerated ageing on rheological properties of fresh wheat flour.

Methods: Accelerated aging was performed by three different factors including rise in wheat moisture content (16, 18 and 20% w/w), control of storage temperature (30, 40 and 50ºC) and control of the storage time (2, 5 and 8 days) using a central composite design. After the grain milling, rheological properties of wheat flour of different treatments were determined.

Results: Promoting the storage time to 8 days and temperature up to 40ºC could improve rheological properties that can be due to oxidation and rearrangement of disulfide bonds resulting in increasing strength and improving flour quality. Increasing moisture content and storing in higher temperatures resulted in weakening rheological properties. The determined optimum processing conditions were temperature of 40.53°C, storage time of 8 days and moisture content of 16%. At these conditions, the following contents were noticed as water absorption (78.9%), development time (10.1min), stability (10.6), degree of softening (38.6 FU), farinograph quality number (88.5) with the desirability value of 0.830.

Conclusion: Ageing increased the organization within the wheat grain and made it less susceptible to disintegration during mixing. These changes were dependent upon storage time, temperature and moisture content as well as their interaction.

Please cite this article as: Maftoonazad N, Shahamirian M. The Effect of Environmental Conditions on Rheological Properties of Wheat Flour. Int J Nutr Sci. 2025;10(1-Supplement):S168.

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Int J Nutr Sci 2025;10(1-Supplement):S169.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Knowledge on Baking Soda among Adults Referring to Comprehensive Health Services Covered by Shiraz University of Medical Sciences, Shiraz, Iran

Maryam Maharat*, Ourang Eelami, Marzie Kamran, Seyedeh Parisa Moosavian, Azam Farmani, Zeinab Rashidi, Sare Mooze

Department of Community Nutrition, Vice-Chancellery for Health, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Baking soda
Knowledge
Fermentation
Health

**Corresponding author:*
Maryam Maharat, MSc;
Department of Community Nutrition, Vice-Chancellery for Health, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Maharatnut@mail.com

ABSTRACT

Background: Since fermentation stage is long, some bakers use baking soda to speed up the fermentation process and give the bread a good look; but it reduces the quality and increases the amount of bread waste, neutralizes stomach acid and disrupts the digestion and absorption of minerals. Therefore, the purpose of this study was to evaluate the knowledge regarding baking soda in bakeries.

Methods: In a cross-sectional study, 720 adults in Shiraz, Iran were enrolled and their data were collected through face to face interviews by nutrition experts in Shiraz, Iran.

Results: Of participants, 62.2% had a diploma or higher education, 78% were women and 22% were men. About 33.9% of adults were aware of the one the bread fermentation benefits, and 29.3% pointed to all benefits considered by the researcher (better aroma and longer shelf life, increased nutritional value and better absorption of iron, zinc and calcium), while 36.8% did not know about benefits. Regarding disadvantages of baking soda, 36.4% of individuals mentioned one of the disadvantages of baking soda and 33.9% mentioned all information (staleness of bread, difficult digestion and reduced absorption of salts).

Conclusion: It is suggested to provide necessary educations in order to improve the level of knowledge and attitude of the society toward the harms of using baking soda. Also, due to the adverse effects of baking soda on health, it is necessary to reduce and eliminate the use of baking soda in bread preparation with more careful monitoring of bakers' work.

Please cite this article as: Maharat M, Eelami O, Kamran M, Moosavian SP, Farmani A, Rashidi Z, Mooze S. Knowledge on Baking Soda among Adults Referring to Comprehensive Health Services Covered by Shiraz University of Medical Sciences, Shiraz, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S169.

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Int J Nutr Sci 2025;10(1-Supplement):S170.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Function of Sourdough Lactic Acid Bacteria in Bread: A Review

Sahar Majnouni[1], Nasim Jafari[2], Arezou Khezerlou[2], Ali Ehsani[2], Sadaf Mohajjel Sadeghi[1*]

1. Student Research Committee, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Sourdough
Bread
Lactic acid bacteria
Starter
Antifungal

**Corresponding author:*
Sadaf Mohajjel Sadeghi, MSc;
Department of Food Science and Technology, Faculty of Nutrition and Food Science, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: sadaf.m.sadeghi79@gmail.com

ABSTRACT

Sourdough is a starter and traditional method used to ferment grains to produce bread. Compared to active dry yeast, which is usually used in the food industry, bread produced with sourdough has a unique taste, texture, nutrition, shelf life, and less allergenicity. Microorganisms, especially lactic acid bacteria, play a major role in creating the characteristics of sourdough used for bread production. Lactic acid bacteria in sourdough can originate from flour, other dough ingredients or the production environment, which helps form the diversity of lactic acid bacteria in sourdough. This review evaluated function of sourdough lactic acid bacteria in bread. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords using the keywords sourdough, bread, lactic acid bacteria. It was shown that the presence of lactic acid bacteria in sourdough caused production of many aromatic compounds in bread, as well as antifungal activity, controlling and reducing the production of mycotoxins and acrylamide. In addition, bread produced with this method has a higher nutritional value compared to foods fermented with yeast alone. Considering that in the industrial age, delicious, natural, nutritious, healthy and fermented foods based on flour are in demand, it can be concluded that utilizing the full potential of sourdough requires the selection of the most effective single acid bacteria strains with high performance and the best strain combinations from complex microbiota compositions.

Please cite this article as: Majnouni S, Jafari N, Khezerlou A, Ehsani A, Mohajjel Sadeghi S. Function of Sourdough Lactic Acid Bacteria in Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S170.

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Int J Nutr Sci 2025;10(1-Supplement):S171.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Dietary Fiber Addition on Wheat Bread Quality: A Review

Nasim Jafari[1], Sadaf Mohajjel Sadeghi[1], Arezou Khezerlou[2], Ali Ehsani[1], Sahar Majnouni[1*]

1. Student Research Committee, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Food Safety and Hygiene, Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Dietary fiber
Bioactive compounds
Bread quality
Antioxidant

**Corresponding author:*
Sahar Majnouni, MSc;
Department of Food Science and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: saharmajnouni@gmail.com

ABSTRACT

Dietary fiber, as a complex carbohydrate, is not digested in the digestive system and can have positive effects such as regulating blood sugar, lowering cholesterol, improving bowel function and increasing the feeling of satiety. This review investigated the effect of dietary fiber on the change of physical parameters, shelf life and sensory characteristics of bread. Articles were searched in PubMed, Scopus and Web of Science using keywords of bread, dietary fiber, bread quality, dough characteristics. The most commonly used fibers were wheat fiber, beetroot and fruit and vegetable fiber that can be added to bread. The use of dietary fiber in the preparation of bread is due to its technological properties (water retention capacity), which prevents bread from becoming stale and can increase the shelf life of bread. Also, the addition of dietary fiber changes the hardness of the bread and the volume of the bread loaf. The sensory characteristics of bread in terms of appearance, taste, texture and overall acceptance can be affected by the addition of fibers. It can be concluded that adding dietary fiber to wheat bread significantly increases the nutritional value of bread and improves its sensory properties, making it a healthier food. To achieve desired results and produce bread with high quality and better nutritional properties, type and amount of fiber used, production process and other effective factors must be carefully examined.

Please cite this article as: Jafari N, Mohajjel Sadeghi S, Khezerlou A, Ehsani A, Majnouni S. The Effect of Dietary Fiber Addition on Wheat Bread Quality: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S171.

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Int J Nutr Sci 2025;10(1-Supplement):S172.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Food Safety Enhancement through Phenolic Compounds; the Strategy against Harmful Maillard Reaction By-Products: A Review

Farhoud Manafi[1*], Roshanak Rouzegari[1], Saeed Dadashi[2]

1. Department of Food Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran
2. Department of Food Industry Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Phenolic compounds
Maillard reaction
Antioxidants
Food safety

**Corresponding author:*
Farhoud Manafi, MSc;
Department of Food Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran.
Email: farhoudmanafi@gmail.com

ABSTRACT

Phenolic compounds, known for their antioxidant properties, have gained attention for their role in inhibiting the Maillard Reaction (MR) during food processing. The MR leads to the formation of harmful advanced glycation end-products (AGEs), which are linked to chronic diseases such as diabetes and cardiovascular disorders. This review explored the mechanisms by which phenolic compounds inhibit the MR and assess their potential applications in food safety and quality improvement. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords of phenolic compounds, α-dicarbonyl species, breads, biscuits, and Maillard reaction. Phenolic compounds were found to effectively inhibit the MR by two primary mechanisms: blocking amine groups and trapping reactive intermediates like glyoxal and methylglyoxal. The addition of phenolic extracts, such as green tea and grapeseed, to bakery products resulted in a significant reduction in the formation of acrylamide and other harmful AGEs, without adversely affecting sensory attributes like flavor and texture. It can be concluded that phenolic compounds offer a promising approach for reducing the formation of harmful MR by-products in food, contributing to enhanced food safety and health outcomes. Future research should focus on optimizing their use in various food matrices while preserving the sensory and nutritional quality of the products.

Please cite this article as: Manafi F, Rouzegari R, Dadashi S. Food Safety Enhancement through Phenolic Compounds; the Strategy against Harmful Maillard Reaction By-Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S172.

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Int J Nutr Sci 2025;10(1-Supplement):S173.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Role of Wheat Flour in Food Industry and Modified Wheat Flour Production: A Review

Farhoud Manafi*, Mahdi Habibi, Saeed Dadashi

Department of Food Industry Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Wheat flour
Modified wheat flour
Gluten
Physical processing

**Corresponding author:*
Farhoud Manafi, MSc;
Department of Food Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran.
Email: farhoudmanafi@gmail.com

ABSTRACT

Wheat flour is one of the most widely used raw materials in the food industry, primarily due to its nutritional and structural properties, making it a key ingredient in the production of bread, pasta, cakes, and various grain-based products. With advancements in food technology, modified wheat flours have been developed to improve their functional and nutritional properties. The objective of this study was to review the types of wheat flour, including modified flours, and their applications in the food industry. Google Scholar was searched using keywords related to wheat flour and modified flours from credible scientific sources. The selected studies focus on the physical, chemical, and enzymatic modifications of wheat flour and their impact on the quality of the final products. The findings indicate that modified wheat flours, depending on the type of processing, exhibit enhanced properties such as increased water absorption, improved elasticity and dough texture, extended shelf life, and better digestibility. These flours can be effectively utilized in the production of gluten-free products and other baked goods that require specific characteristics. Modified wheat flours, with their improved features compared to regular wheat flour, contribute to the enhancement of quality and nutritional value in food products. In conclusion, these flours not only meet the dietary needs of consumers sensitive to gluten but also play a crucial role in the food industry as a suitable alternative for improving the sensory and functional properties of various products.

Please cite this article as: Manafi F, Habibi M, Dadashi S. The Role of Wheat Flour in Food Industry and Modified Wheat Flour Production: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S173.

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Int J Nutr Sci 2025;10(1-Supplement):S174.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Beneficial Effect of Whole Grain Fiber on Fatty Liver: A Review

Seyed Jalil Masoumi[1,2,3*], Sanaz Jamshidi[1]

1. Center for Cohort Study of Shiraz University of Medical Sciences Employees, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Fatty liver
Non-alcoholic fatty liver disease
Whole grain
Fiber

**Corresponding author:*
Seyed Jalil Masoumi, MD, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: sjm@sums.ac.ir
masoumi7415@gmail.com

ABSTRACT

Fatty liver disease, particularly non-alcoholic fatty liver disease (NAFLD) is often associated with obesity and metabolic syndrome. Modifications in diet, particularly an increase in whole grain fiber consumption were identified as potential strategies in management of fatty liver. This review assessed beneficial effects of whole grains fiber intake on fatty liver. PubMed, Scopus, ISI and Cochrane were searched using related keywords. The study revealed that whole grain fiber significantly enhanced markers of hepatic steatosis. Participants who incorporated higher quantities of whole grains into their diets exhibited reduction in liver fat content. Furthermore, improvements in insulin sensitivity and lipid profiles were observed among individuals following high-fiber diets abundant in whole grains. Soluble fibers, particularly those found in oats and barley, were notably advantageous due to their influence on gut microbiota. The intake of whole grain fiber appears to be a promising dietary intervention for the management of fatty liver disease, contributing to the reduction of hepatic fat accumulation and the enhancement of metabolic health markers. In conclusion, this review highlights the necessity of incorporating whole grains into the diets of individuals at risk for or affected by NAFLD. Future research should aim to explore the long-term effects of high-fiber diets.

Please cite this article as: Masoumi SJ, Jamshidi S. Nutrition and Health Benefits of Whole Grain Bread and Cereal: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S174.

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Int J Nutr Sci 2025;10(1-Supplement):S175.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Nutrition and Health Benefits of Whole Grain Bread and Cereal Products: A Review

Narges Mazloomi[1,2*], Atena Ramezani[1,2], Masoud Ghanbari[3], Mohammadhosein Esfahanizadeh[2,3], Maryam Gholipour[2,3], Marya Khanpoor[2]

1. Department of Nutritional Sciences, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran
2. Health of Plant and Livestock Products Research Center, Mazandaran University of Medical Sciences, Sari, Iran
3. Food and Drug Deputy, Mazandaran University of Medical Sciences, Sari, Iran

ARTICLE INFO

Keywords:
Whole grains
Chronic diseases
Cardiovascular diseases
Diabetes
Cancer

**Corresponding author:*
Narges Mazloomi, PhD;
Department of Nutritional Sciences, Faculty of Health, Mazandaran University of Medical Sciences, Sari, Iran.
Email: samira.mazloomi@yahoo.com

ABSTRACT

An inverse relationship was shown between the consumption of whole grains and chronic diseases such as cancer, diabetes, cardiovascular diseases (CVDs), and gastrointestinal health. This review aimed to address the relationship between whole grain consumption and these diseases. Databases of PubMed, Google Scholar, and Science Direct using keywords of whole grains, CVDs, hypertriglyceridemia, cancer, and digestive health were searched. Consumption of whole grains was associated with lower mortality from inflammatory and infectious diseases. The incidence of rheumatoid arthritis, gout, asthma, ulcerative colitis, and Crohn's disease in individuals who consumed whole grains was 30% when compared to those who rarely consumed fiber-rich foods. Additionally, the risk of mortality from CVDs and cancer in these individuals was 23% and 20%, respectively, in comparison to general population. These compounds significantly led to a reduction in total cholesterol, LDL, triglycerides, and insulin levels. The fiber, nutrients, and phytochemicals present in them could improve insulin sensitivity and glucose metabolism, slow down food absorption, and prevent blood sugar spikes. Consuming 2 servings of whole grains per day could reduce risk of developing diabetes up to 21%. These compounds offer moderate protection against colorectal cancer with a cumulative risk reduction of 21%. Their fiber helps prevent constipation and diverticular disease. It can be concluded that consumption of whole grains can reduce inflammatory factors and cancer, improve lipid and fasting insulin levels, affect glycemic control, and improve blood pressure and digestive health. So based on various health benefits of whole grains, as well as the potential harmful effects of consuming primarily refined grains, use of more whole grains instead of refined grains is recommended.

Please cite this article as: Mazloomi N, Ramezani A, Ghanbari M, Esfahanizadeh MH, Gholipour M, Khanpoor M. Nutrition and Health Benefits of Whole Grain Bread and Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S175.

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Int J Nutr Sci 2025;10(1-Supplement):S176.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Various Diagnostic Aspects in Celiac Disease: A Review

Mahsa Moazen*

Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Gluten
Diagnosis
Serology
Biopsy

ABSTRACT

Celiac disease (CD) is an autoimmune, chronic inflammatory disorder triggered by ingestion of gluten in genetically predisposed people. CD diagnosis is made from clinical, laboratory, and histologic assessments. Although diarrhea is the most common symptom in CD, most patients are diagnosed with CD based on other signs or symptoms, including osteoporosis, anemia, abdominal distention, or irregular bowel habits. Moreover, some patients have less common symptoms, such as infertility, neuropsychiatric symptoms, migraines, and abnormal levels of liver enzyme. Individuals suspected of having CD should also be evaluated for their family history. Therefore, this review investigated on various diagnostic aspects in CD. To enroll the relevant articles, databases including Google Scholar, PubMed, and Scopus were searched using keywords of celiac disease, gluten, and diagnosis. Serological tests are done for CD diagnosis. Increased blood levels of certain autoantibodies are observed in patients with CD. The tests assess serum immunoglobin A (IgA) antibodies levels to tissue transglutaminase (tTG IgA). There is a higher incidence of IgA deficiency in individuals with CD. Therefore, physicians often evaluate total IgA levels when serologic tests are normal, while the overall clinical symptoms suggest CD. If serology test is positive, biopsy of the small intestine is regarded as the gold standard for confirming diagnosis of CD. So it can be concluded that the small intestinal biopsies in the duodenum can indicate a severe to moderately severe architectural disturbance by showing crypt epithelial hyperplasia with more epithelial cell mitotic figures together with villous flattening, higher numbers of lamina propria plasma cells and lymphocytes and more intra-epithelial lymphocytes in untreated disease form.

*Corresponding author:
Mahsa Moazen, PhD;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Mahsa_moazen@yahoon.com

Please cite this article as: Moazen M. Various Diagnostic Aspects in Celiac Disease: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S176.

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Int J Nutr Sci 2025;10(1-Supplement):S177.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Nutrient Composition of Whole Grains on Human Health: A Review

Mahsa Moazen*

Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grains
Health status
Vitamin
Fiber
Chronic diseases

ABSTRACT

Grains are the prominent source of carbohydrates in the diet of people around the world and even are important contributors to intake of protein in some countries. This review evaluated the effect of nutrient composition of whole grains on human health. Web of Science, Pubmed and Scopus databases were searched utilizing keywords of nutrient composition, whole grains, and human health. It was shown that whole grains (grains with the endosperm, germ, and bran) have more nutrients than refined grains. The bran contains various nutrients including fiber, antioxidants, B group vitamins, phytochemicals, as well as minerals such as iron, copper, zinc, and magnesium. The germ also has healthful fats, B group vitamins, phytochemicals, and antioxidants such as vitamin E. The endosperm, which is the largest layer, contains mostly carbohydrates and proteins, and low content of some B vitamins and minerals. The dietary fiber present in whole grain is believed to be, at least to some extent, responsible for its health benefits. Whole grains are abundant in both soluble and insoluble functional dietary fibers. The consumption of whole grain foods is often associated with beneficial effects on individuals' health. There is a wide range of documents that regular consumption of whole grain food sources may decrease the risk of chronic diseases. For example, there is evidence for beneficial effects of dietary whole grain consumption on the prevention of type 2 diabetes mellitus, cardiovascular diseases, and cancers of the colon, pancreas, and stomach. It can be concluded that consuming 2 to 3 servings of whole grains per day may be a justifiable public health purpose.

*Corresponding author:
Mahsa Moazen, PhD;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Mahsa_moazen@yahoo.com

Please cite this article as: Mahsa Moazen. The Effect of Nutrient Composition of Whole Grains on Human Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S177.

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Int J Nutr Sci 2025;10(1-Supplement):S178.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Different Ammonium Salts on Baked Bread

Parinaz Moazzeni*, Saeed Dadashi

Tabriz University, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Diammonium hydrogen phosphate
Ammonium Bbicarbonate
Baked bread

ABSTRACT

Background: Addition of ammonium salts causes the bread to darken and harden due to the Maillard reaction in bread production. Bread with ammonium salts can produce more pyrazine compounds such as deoxyfructosine and some volatile flavor due to Maillard reaction between ammonium salts and reducing sugar in bread preparation. The effect of different ammonium salts on baked bread was investigated in this study.

Methods: Bread samples baked with 240 g high-gluten flour, 2.4 g edible sodium chloride, 24 g sugar (using 12 g fructose and 12 g glucose to simulate 1:1 high-fructose corn syrup), 2.4 g powder (yeast powder) was produced. Mix uniformly with 120 ml of water at 40°C) and a certain amount of ammonium salt. Baked bread without ammonium salt was the control sample. Three types of ammonium salts were used as additives, which are diammonium hydrogen phosphate, ammonium bicarbonate and ammonium carbonate. The content of each was maintained at high, medium and low levels. Among them, the "high" content was 80% of the maximum limit for the use of these ammonium salts, which are used as additives in baking products in the national standard for food safety regarding the use of food additives. "Medium" was defined as 1/2 of the "high" content and "low" as 1/2 of the "medium" content. In the bread samples used in this research, the highest amount of addition of diammonium phosphate was 4.94 grams, ammonium bicarbonate was 5.78 g, and ammonium carbonate was 3.59 g. The ammonium concentration of the three salts was the same and an electronic scale was used for weighing. The above ingredients are mixed with the mixer dough and then 10 grams of butter is added to it and mixed with the mixer dough until a smooth surface is formed. Then the dough was taken out, kneaded and aerated and divided into three pieces of equal weight (134±2 g) which were placed in the same toast mold (7.5×7.5×7.5 cm) and kept at 30°C. They were fermented for 30 minutes. After that, cover the toast mold and bake the doughs in the oven at 160°C for 30 minutes. The weight of each bread after baking was about 128±2 g, and then the bread samples were removed from the mold and kept at room temperature for 2 hours before testing.

Results: Bread color, especially crust and interior color, is an important reflection of bread quality, which directly affects consumers' preferences for bread. Therefore, color is critical for evaluating bread quality during baking. When various ammonium salts are used as leavening agents in bread, a Maillard reaction occurs between the ammonium salts and the reducing sugar of the bread, which affects the color of the bread. Three ammonium salts were investigated in different concentrations. It is clear that the addition of different types and concentrations of ammonium salts during bread preparation gives a varied appearance to bread, especially in color. The higher the amount of ammonium salts added, the darker the skin color of the bread sample. The color of the inside of the bread also had a similar change in depth, but it was not as obvious as the change in the color of the bread skin. For bread samples with the same level of ammonium salt, the color of the inside and outside of the bread is also different due to the different types of ammonium salts added.

Conclusion: Three ammonium salts, diammonium hydrogen phosphate, ammonium bicarbonate and ammonium carbonate, were used as additives in the preparation of bread. Color, texture, deoxyfructosine and pyrazine flavoring substance, which were closely related to bread quality, were investigated. The texture of the bread samples with different ammonium salts did not differ significantly, and compared to the control bread without adding ammonium salt, the hardness and viscosity increased.

*Corresponding author:
Parinaz Moazzeni, MSc student;
Faculty of Agriculture, University of Tabriz, Tabriz, Iran.
Email: moazzeniparinaz@gmail.com

Please cite this article as: Moazzeni P, Dadashi S. The Effect of Different Ammonium Salts on Baked Bread. Int J Nutr Sci. 2025;10(1-Supplement):S178.

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Int J Nutr Sci 2025;10(1-Supplement):S179.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Role of Encapsulation Technologies in Transfer of Bioactive Compounds by Bread: A Review

Delara Moradi Mirhesari[1], Maral Neyestani[1], Nastaran Nikjo[2], Reza Mohammadi[1*]

1. Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Health and Food Quality Control, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Microencapsulation
Nanoencapsulation
Whole bread
Wheat bread

ABSTRACT

Bread can be an effective means of delivery and transport of bioactive compounds essential for health such as vitamins, minerals and phytochemicals. The bioavailability of these compounds may be limited during processes such as grinding, cooking, storage, digestion and absorption in the digestive system. This review assessed the role of encapsulation technologies in transfer of bioactive compounds by bread. Google Scholar database was searched utilizing appropriate key words. It was shown that flours as functional ingredients have health-enhancing potentials such as improving antioxidant status. Encapsulation technologies such as nanoencapsulation, microencapsulation, and liposome- and emulsion-based delivery systems are used to protect bioactive compounds from degradation during bread processing and digestion. The bioavailability of nutrients can be increased using spray drying and freeze drying due to their increased solubility, stability and permeability across the intestinal epithelium. Encapsulating bioactive compounds has positive effects on shelf life, sensory characteristics, physicochemical and rheological properties in bread due to reducing their interaction with other food components that increases their absorption. It can be concluded that encapsulation technologies can be a revolution in the delivery of bioactive compounds by bread. Further studies on the use of encapsulation are recommended in order to fully understand the mechanisms of these technologies and to evaluate the bioavailability and validation of the health benefits associated with the consumption of such breads.

**Corresponding author:*
Reza Mohammadi, PhD;
Department of Nutrition and Food Industry, Kermanshah University of Medical Sciences, Kermanshah Iran.
Email: R.mohammadi@kums.ac.ir

Please cite this article as: Moradi Mirhesari D, Neyestani M, Nikjo N, Mohammadi R. The Role of Encapsulation Technologies in Transfer of Bioactive Compounds by Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S179.

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Int J Nutr Sci 2025;10(1-Supplement):S180.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Impact of Millet and Rice Flours on Production of Gluten-Free Baguette Bread: A Review

Samira Beikzadeh[1], Ghazaleh Mohammad-Rezaei[2]*, Zahra Sohrabi[2]

1. Department of Food Science and Nutrition, Maragheh University of Medical Science, Maragheh, Iran
2. Student Research Committee, Maragheh University of Medical Sciences, Maragheh, Iran

ARTICLE INFO

Keywords:
Celiac disease
Bread
Millet flour
Rice flour

**Corresponding author:*
Ghazaleh Mohammad-Rezaei, BSc; Maragheh University of Medical Sciences, Maragheh, Iran.
Email: ghazalehmohammadrezaei@gmail.com

ABSTRACT

Celiac disease is a chronic disorder and a lifelong genetic abnormality of the intestine that occurs as a result of consuming gluten from common food sources and gluten-containing grains, while the only way to treat the disease is to consume gluten-free foods. Nowadays, due to the increase in the population of celiac patients all over the world, the production and improvement of the quality of gluten-free bread for celiac patients is one of the most important challenges in the food industry. Articles were selected from Science Direct, Google Scholar and PubMed from 2000 to 2024 utilizing keywords of celiac disease, bread, Millet flour, and rice flour. Flour is a widely used ingredient in many foods including bread, cakes and pastries, common desserts and noodles. While many people have no problem consuming white flour, people with celiac disease are allergic to gluten and should not consume this type of flour. Gluten-free grains such as corn, rice, quinoa, sorghum, Millet, cassava starch, and safflower are grains that can reduce the pathogenic effects of gluten and wheat allergy; if they are replaced with wheat flour in bakery products. It was shown that Millet flour baguette bread was more acceptable than wheat flour baguette bread due to the different taste and texture, but this overall acceptability decreased with the increase of Millet flour in the composition. The results of the present research indicated the high potential of Millet flour for use in different food formulations. It can be concluded that gluten-free grains such as corn, rice, quinoa, sorghum, Millet, cassava starch, and safflower are grains that can reduce the pathogenic effects of gluten and wheat allergy; if they are replaced with wheat flour in bakery products.

Please cite this article as: Beikzadeh S, Mohammad-Rezaei G, Sohrabi Z. The Impact of Millet and Rice Flours on Production of Gluten-Free Baguette Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S180.

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Int J Nutr Sci 2025;10(1-Supplement):S181.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Flour Enrichment Using Grains, Legumes, Algae, Vegetables, and Fruits: A Review

Ameneh Albutaha[1], Narges Morki[2*]

1. Food Hygiene Department, Faculty of Nutrition Science and Food Industry, Islamic Azad University, North Tehran Branch, Tehran, Iran
2. Fisheries and Aquatic and Fishery Products Processing Department, Faculty of Nutrition Sciences and Food Industry, Islamic Azad University, North Tehran Branch, Tehran, Iran

ARTICLE INFO

Keywords:
Flour
Legumes
Grains
Algae
Fruit

**Corresponding author:*
Narges Morki, PhD;
Fisheries and Aquatic and Fishery Products Processing Department, Faculty of Nutrition Sciences and Food Industry, Islamic Azad University, North Tehran Branch, Tehran, Iran.
Email: Nargess_mooraki@yahoo.com

ABSTRACT

Milled grains are an important means of food fortification to deliver micronutrients lacking in grains. Although several foods can be used to carry micronutrients. This review assessed flour enrichment using grains, legumes, algae, vegetables, and fruits. Google Scholar, PubMed, SID, Scopus and Web of Science databases were searched using related keywords. Among the fruits used, citrus fruits and berries were distinguished due to their high content of ascorbic acid, flavonoids and anthocyanins, respectively. Other fruits used were pear, guava, apple, banana, apricot and baobab. Legumes have a strong bad taste, which prevents their incorporation in high concentrations in food products. Sweet flavors can mask these bitter flavors and therefore sweet bakery products such as cookies and cakes seem to be suitable food products to be enriched with legume flour. So far, spirulina palatensis biomass powder has been used to produce various food products such as biscuits, bread, cakes and enriched flour. Bread can be successfully used as a means to enrich the bioactive compounds of fruits, vegetables, legumes, grains, and algae. The combination of fruits and vegetables significantly increased the total phenol content and antioxidant activity of all enriched breads. In conclusion, the preparation of bread is a very complex process with many physical and biochemical limitations that can affect the bioavailability of bioactive compounds.

Please cite this article as: Albutaha A, Morki N. Flour Enrichment Using Grains, Legumes, Algae, Vegetables, and Fruits: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S181.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Challenges and Strategies to Enhance Whole Wheat Bread Consumption

Saeed Hosseini[1,2], Mohammad Hassan Najafi[3], Vali Bahrevar[4], Zahra Naqibi Nodoushan[5], Delaram Akhavan Hammami[5], Seyed Masood Mousavi[6*]

1. Center for Healthcare Data Modeling, Department of Biostatistics and Epidemiology, School of public health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Department of Epidemiology, School of Public Health, Iran University of Medical Sciences, Tehran, Iran
3. Department of Traditional Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
4. Gerontology Department of Aging, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran
5. Shahid Sadoughi University of Medical Sciences, Yazd, Iran
6. Department of Health Management and Economics, Health Policy and Management Research Center, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

ARTICLE INFO

Keywords:
Nutrition
Diet
Whole wheat bread
Health promotion
Strategy

**Corresponding author:*
Seyed Masood Mousavi, PhD;
Department of Health Management and Economics, Health Policy and Management Research Center, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
Email: m.mousavihp93@gmail.com

ABSTRACT

Background: Whole wheat bread, a food item abundant in nutrients and linked to an array of health advantages, is frequently overlooked in favor of refined grains in numerous nations, including Iran. This qualitative investigation sought to elucidate the predominant challenges and effective methodologies for enhancing whole wheat bread consumption within the local people in Yazd, Iran.

Methods: A purposive sampling technique was utilized to enlist experts, and encompass university academicians, governmental representatives, and industry specialists. Semi-structured interviews were conducted to collect data, which was subsequently subjected to analysis through conventional content analysis employing MAXQDA 20 software.

Results: the analysis of the data yielded two principal categories of challenges and strategies. Within the challenges category, the identified subcategories comprised cultural preferences, perceived taste and texture, lack of awareness, accessibility and affordability, as well as misinformation and misconceptions. The strategies recognized included educational campaigns, product development, government initiatives, synergy among supply chain components, community engagement, promotion of local whole wheat breads, school programs, retailers' partnerships, incorporation of knowledge-based companies and research and development.

Conclusion: The promotion of whole wheat bread consumption in the area necessitates a comprehensive strategy that effectively addresses cultural preferences, prevalent misconceptions, and issues of accessibility. By executing the strategies, it becomes feasible to foster a wider acceptance of healthier and more sustainable dietary practices among population residing in Yazd, Iran.

Please cite this article as: Hosseini S, Najafi MH, Bahrevar V, Naqibi Nodoushan Z, Akhavan Hammami D, Mousavi SM. Challenges and Strategies to Enhance Whole Wheat Bread Consumption. Int J Nutr Sci. 2025;10(1-Supplement):S182.

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Int J Nutr Sci 2025;10(1-Supplement):S183.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Grains and Systemic Lupus Erythematosus: A Review of Interventional Studies on Dietary Impact and Disease Activity

Sahand Behzadi-Azad[1], Fatemeh Shafiee[2], Zahra Mirshekaran[1], Zahra Mousavi-Shirazi-Fard[2]*

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Systemic lupus erythematosus
Dietary intervention
Disease activity

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Recent interest in dietary factors, particularly whole grain intake, has emerged concerning their potential impact on systemic lupus erythematosus (SLE) activity and inflammation in lupus patients. This review investigated the effects of whole grain consumption on health outcomes in individuals with SLE. PubMed, Scopus, Cochrane Library, Web of Science and Google Scholar up to 2023 were searched using related keywords. Six interventional studies met inclusion criteria, revealing that increased whole grain consumption was significantly associated with reductions in inflammatory markers like C-reactive protein (CRP) and interleukin-6 (IL-6), along with improvements in disease activity scores measured by the SLE Disease Activity Index (SLEDAI). Intervention durations varied from 8 to 24 weeks and included multiple whole grains, such as oats, brown rice, and whole wheat. Participants reported enhanced health-related quality of life, with noticeable decreases in fatigue and better physical functioning. In conclusion, whole grain intake was shown to positively influence inflammation and disease activity in SLE patients, indicating a promising dietary approach for management.

Please cite this article as: Behzadi-Azad S, Shafiee F, Mirshekaran Z, Mousavi-Shirazi-Fard Z. Whole Grains and Systemic Lupus Erythematosus: A Review of Interventional Studies on Dietary Impact and Disease Activity. Int J Nutr Sci. 2025;10(1-Supplement):S183.

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Int J Nutr Sci 2025;10(1-Supplement):S184.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Proper Cooking Methods to Minimize Contaminants in Whole Grains: A Review

Fatemeh Shafiee[1], Zahra Mousavi-Shirazi-Fard[1*], Sahand Behzadi-Azad[2], Zahra Mirshekaran[2]

1. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grains
Cooking
Heavy metals
Mycotoxins
Food safety

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Whole grains can harbor contaminants of mycotoxins and heavy metals that have health risks. This review assessed cooking methods to minimize contaminants in whole grains. PubMed, Scopus, Web of Science and Google Scholar up to 2023 were searched using related keywords. Various cooking methods can reduce contaminants, and enhance safety and nutritional quality of whole grains. Washing, soaking, rinsing, boiling, pressure cooking, fermentation, and sprouting techniques can reduce harmful compounds. Washing and soaking decrease arsenic in rice and deoxynivalenol in barley. Boiling declines pesticides and boiling can remove inorganic arsenic. Pressure cooking decreases total arsenic in rice and lowers mycotoxins. Fermentation and sprouting enhance nutritional value and decline contaminant levels. These methods can mitigate risks associated with contaminants in whole grains, and promote better health outcomes. In conclusion, proper cooking methods can play a significant role in reducing levels of certain contaminants in whole grains. Washing, soaking, boiling in excess water, and pressure cooking were shown effective in reducing heavy metals and mycotoxins. So the choice of method should consider both contaminant reduction and nutrient retention.

Please cite this article as: Shafiee F, Mousavi-Shirazi-Fard Z, Behzadi-Azad S, Mirshekaran Z. Proper Cooking Methods to Minimize Contaminants in Whole Grains: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S184.

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Int J Nutr Sci 2025;10(1-Supplement):S185.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Strategies and Interventions to Promote Whole Grain Consumption: A Review

Fatemeh Shafiee[1], Zahra Mousavi Shirazi-Fard[1*], Sahand Behzadi-Azad[2], Zahra Mirshekaran[2]

1. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Strategy
Intervention
Chronic diseases

**Corresponding author:*
Zahra Mousavi Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Whole grains offer numerous health benefits such as reduced risks of chronic diseases; but whole grain consumption still remains below recommended levels in many populations. This review explored strategies and interventions to promote whole grain consumption. Google Scholar was searched using related keywords. There are multifaceted approaches to increase whole grain intake including (i) enhancing consumer education and awareness; (ii) improving product development and sensory appeal; (iii) implementing supportive policies and regulations; (iv) modifying food environments to increase availability and accessibility; (v) integrating whole grains into existing dietary patterns and food cultures; (vi) fostering collaborations among stakeholders and (vii) culinary education, and school and workplace programs. Implementing these approaches can improve public health outcomes and reduces prevalence of associated chronic diseases. In conclusion, increasing whole grain consumption requires a multifaceted approach that involves consumer education, food industry initiatives, policy and environmental factors, and community-based interventions. By implementing them, healthier and more sustainable food environment are created.

Please cite this article as: Strategies and Interventions to Promote Whole Grain Consumption: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S185.

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Int J Nutr Sci 2025;10(1-Supplement):S186.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Whole Grain Intake on Blood Pressure: A Review

Zahra Mirshekaran[1], Sahand Behzadi-Azad[1], Fatemeh Shafiee[2], Zahra Mousavi-Shirazi-Fard[3*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Whole wheat
Blood pressure
Hypertension

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Whole grains have gained focus for their potential health benefits, also epidemiologic evidences support their inverse relationship with some chronic disorders, such as hypertension. This review aims to examine the effect of whole grain consumption on blood pressure among adults. Randomized controlled trials (RCTs) in the PubMed database were searched using correlated keywords. Both types of crossover and parallel designs of RCTs that measured blood pressure along with other factors were investigated, comparing the periods or groups receiving whole grains with control periods or groups with less or no intake of whole grains. The findings regarding dietary whole grains impact on blood pressure varied among RCTs. Some studies demonstrated that whole grain consumption led to significant reductions in systolic blood pressure (SBP), diastolic blood pressure (DBP), or both. However, some other studies did not report any significant changes in blood pressure following whole grain intake. Interventional studies have recorded inconsistent results regarding the effect of dietary whole grains on SBP and DBP. It can be concluded that various types and amounts of dietary whole grains, the diversity of participants, as well as the different durations of the interventions across studies are needed for further research.

Please cite this article as: Mirshekaran Z, Behzadi-Azad S, Shafiee F, Mousavi-Shirazi-Fard Z. The Effect of Whole Grain Intake on Blood Pressure: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S186.

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Int J Nutr Sci 2025;10(1-Supplement):S187.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Whole Grain Consumption on Appetite and Food Intake among Healthy Individuals: A Review

Zahra Mirshekaran[1], Fatemeh Shafiee[2], Sahand Behzadi-Azad[1], Zahra Mousavi-Shirazi-Fard[3*]

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Whole grain barley
Whole grain rye
Appetite
Food intake

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Considering the rising prevalence of obesity and overweight as a cause of concern, and the potential role of healthy diet in managing these conditions, this review study aims to investigate the effects of whole grain consumption on appetite and food intake in healthy individuals. Randomized controlled trials (RCTs) in PubMed database were searched utilizing related keywords in a crossover design. Appetite was rated by a visual analogue scale assessing feelings of hunger, fullness and desire to eat. Intervention groups that received various whole grains were compared with control groups that received refined grains. The weight of food or energy intake was measured. In most studies, whole grains intake showed a significant reduction in desire to eat. Feelings of fullness were not significant in majority of studies, and a few revealed a significant increase. In most researches, no significant association was visible between whole grain consumption and energy intake. It can be concluded that incorporating more whole grains into daily diets can be considered as an effective approach in managing overweight and obesity by aiding in appetite control.

Please cite this article as: Mirshekaran Z, Shafiee F, Behzadi-Azad S, Mousavi-Shirazi-Fard Z. The Effect of Whole Grain Consumption on Appetite and Food Intake among Healthy Individuals: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S187.

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Int J Nutr Sci 2025;10(1-Supplement):S188.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Unraveling the Protective Benefits of Whole Grains against Non-Alcoholic Fatty Liver Disease: A Review

Sahand Behzadi-Azad[1], Zahra Mirshekaran[1], Fatemeh Shafiee[2], Zahra Mousavi-Shirazi-Fard[2]*

1. Student Research Committee, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Non-alcoholic fatty liver disease
Hepatic steatosis
Liver enzymes

**Corresponding author:*
Zahra Mousavi-Shirazi-Fard, PhD;
Nutrition Research Center,
Department of Clinical Nutrition,
School of Nutrition and Food
Sciences, Shiraz University of
Medical Sciences, Shiraz, Iran.
Email: Shirazifard1393@gmail.com

ABSTRACT

Recent studies suggest that whole grains may offer protective benefits against non-alcoholic fatty liver disease (NAFLD). This review determined the impact of whole grain on liver health, specifically focusing on hepatic steatosis and liver enzyme levels in NAFLD patients. PubMed, Scopus, Web of Science and Google Scholar up to 2023 were searched using related keywords. Multiple studies demonstrated that increased whole grain intake was correlated with significant improvements in liver health markers. Randomized controlled trials indicated reductions in hepatic steatosis grades and serum liver enzyme levels (ALT and AST) among participants consuming whole grains compared to those on refined grains. Additionally, epidemiological studies revealed a link between high whole grain consumption and lower rates of NAFLD-related comorbidities such as obesity and insulin resistance. In conclusion, incorporating whole grains into the diet may confer protective benefits against NAFLD by improving liver health and reducing fat accumulation. Healthcare professionals should advocate for whole grain consumption in dietary guidelines for individuals at risk of or diagnosed with NAFLD. Future research should explore the long-term effects of specific whole grains on liver health.

Please cite this article as: Behzadi-Azad S, Mirshekaran Z, Shafiee F, Mousavi-Shirazi-Fard Z. Unraveling the Protective Benefits of Whole Grains against Non-Alcoholic Fatty Liver Disease: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S188.

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Int J Nutr Sci 2025;10(1-Supplement):S189.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Functional Effects of Whole Grains on Nutritional Health: A Review

Shima Mozaffari[1]*, Matina Ghahremany[2]

1. Nutrition Sciences Department, Faculty of Medical Sciences and Technologies, Islamic Azad University, Science and Research Unit, Tehran, Iran
2. Nutrition and Diet Therapy, Shahid Babaei Faculty, Qazvin University of Medical Sciences, Qazvin, Iran

ARTICLE INFO

Keywords:
Whole grains
Obesity
Inflammation
Body Mass Index
Waist circumference

**Corresponding author:*
Shima Mozaffari, MSc;
Nutrition Sciences Department, Faculty of Medical Sciences and Technologies, Islamic Azad University, Science and Research Unit, Tehran, Iran.
Email: Shima.mozaffari999@gmail.com

ABSTRACT

Whole grains consumption is associated with reduced risk of chronic diseases and metabolic syndromes. This review evaluated the functional effects of whole grains on nutritional health status. PubMed database was searched using the related keywords. The specific effects of whole grain structure include increasing satiety, reducing transit time and glycemic response, fiber intake (improving stool volume and satiety, viscosity and SCFA production and/or reducing glycemic response) and magnesium intake (better glycemic homeostasis and increased insulin secretion). The whole grain diet did not improve insulin sensitivity, but it did lead to weight loss. A whole grain diet reduced levels of circulating inflammatory markers without affecting intestinal permeability. According to the studies conducted; during 12 weeks, in the rye group, the level of C-reactive protein and blood fat showed a significant decrease compared to refined wheat, and it led to more satiety up to 8 hours. Whole grains have multiple properties to improve performance with anti-cancer, anti-allergic and anti-inflammatory approaches. Whole grains increase the feeling of satiety by using the husk and bran in their structure and then reduce BMI. It was concluded that using whole grains in order to get enough vitamins and minerals such as group B vitamins improves peripheral and central nerve function. Higher consumption of whole grains significantly reduced the concentration of inflammatory markers.

Please cite this article as: Mozaffari S, Ghahremany M. The Functional Effects of Whole Grains on Nutritional Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S189.

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Int J Nutr Sci 2025;10(1-Supplement):S190.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Making Bread with Triticale Flour in A Practical Way: A Review

Hassan Nabi*

Science and Food Engineering Department, Fars Province, Shiraz, Iran

ARTICLE INFO

Keywords:
Triticale
Bread
Flour
Wheat

ABSTRACT

Triticale is a new grain created by humans and a hybrid product of wheat (triticum) and rye (secale), which has shown high performance and can be a very attractive alternative to increase grain production at the global level. In any case, until today, the progress regarding triticale has been very impressive. Nowadays, the speed of food preparation for human population is growing, and compared to other old grains, this speed is significant for triticale. The objectice of this review was making bread with triticale flour in a practical way. To do so, Google Scholar, PubMed, Web of Science, Scopus and SID database were searched using related keywords. During the last 25 years, this product contributed to the global grain production by growing at the level of 2.4 million hectares around the world and producing more than six million tons per year. Australia, Brazil, Germany, Poland, and Russia use some types of bread with triticale flour. One of the characteristics of triticale that makes it attractive is its high amount of amino acids including lysine, which is the main limiting amino acid in cereals. Triticale contains higher fiber minerals such as magnesium, zinc, iron, etc. compared to both of its parents, making triticale a super grain. Considering the higher amount of fiber in triticale flour compared to wheat flour, the beneficial effects of fiber consumption in diabetes include reducing fasting blood sugar, reducing sugar in urine, reducing the need for insulin and increasing the effect of insulin in diabetic people. From the operational point of view, triticale flour for making bread has its own difficulties compared to wheat flour, and in Iran, we have been able to produce bread with high quality and shelf life by mixing it with wheat flour. It can be concluded that the responsible institutions need cultivation and training knowledge to use effective methods to increase the amount of fiber.

*Corresponding author:
Hassan Nabi, BSc;
Science and Food Engineering Department, Shiraz, Iran.
Email: hasannabi243@gmail.com

Please cite this article as: Nabi H. Making Bread with Triticale Flour in A Practical Way: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S190.

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Int J Nutr Sci 2025;10(1-Supplement):S191.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Innovative Solutions for Bread Waste with Emphasis on Islamic Principles: A Review

Aida Najafi*

Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Bread waste
Food waste
Upcycling
Management
Islam

**Corresponding author:*
Aida Najafi, MSc;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: aida.najafi91@yahoo.com

ABSTRACT

Bread is a staple in many Islamic cultures, making its waste a significant concern. Islamic teachings emphasize minimizing waste and promoting charity, providing a framework for addressing food waste. Understanding these cultural and religious contexts is essential for effective waste management. This review investigated the integration of Islamic principles into food waste management, focusing on innovative strategies to reduce bread waste in Muslim communities. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. It aims to demonstrate how religious teachings can foster sustainable practices and community involvement. A mixed-method approach was employed, including the literature on food waste in relation to Islamic principles, case studies of successful community initiatives, and interviews with stakeholders such as bakers, consumers, and religious leaders. This comprehensive strategy aimed to gather insights and best practices. Findings revealed effective strategies for reducing bread waste, including community education, partnerships with local charities, and the use of technology to monitor bread freshness. It can be concluded that this study highlights the role of Islamic values in promoting sustainability and responsibility, offering actionable recommendations for stakeholders to enhance community well-being and minimize waste.

Please cite this article as: Najafi A. Innovative Solutions for Bread Waste with Emphasis on Islamic Principles: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S191.

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Int J Nutr Sci 2025;10(1-Supplement):S192.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Nutritional Advantages of Folic Acid Addition to Baked Products Including Bread: A Review

Aida Najafi*

Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Folic acid
Bread
Nutritional fortification
Public health
Dietary deficiencies

**Corresponding author:*
Aida Najafi, MSc;
Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: aida.najafi91@yahoo.com

ABSTRACT

Folic acid, a vital B-vitamin, is essential for DNA synthesis and cellular health. Its addition to baked products can help address common dietary deficiencies, especially among pregnant women and individuals with limited food variety. This study evaluated the nutritional benefits of incorporating folic acid into baked products, particularly bread. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. This review analyzed various studies on the bioavailability and stability of folic acid in baked products, along with its health benefits. The findings indicated that fortifying cakes with folic acid can significantly enhance their nutritional profile, potentially reducing the risks of neural tube defects and improving cardiovascular health.

Please cite this article as: Najafi A. Nutritional Advantages of Folic Acid Addition to Baked Products Including Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S192.

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Int J Nutr Sci 2025;10(1-Supplement):S193.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Bovine Milk Fats and Their Replacers in Baked Products: A Review

Mina Nasiri*, Babak Ganbarzade

Department of Food Science and Technology, Faculty of Agriculture, Tabriz, Iran

ARTICLE INFO

Keywords:
Milk
Lipids
Bakery
Fat replacer
Baking activity

ABSTRACT

Milk fats and related dairy products have multiple roles in bakery products that cover the dominant diet of people. Milk fats in these types of products have roles such as dough strengthening, texture softening, filling fats, coating fats, flavoring and improvement. In this review, it reports the interaction of milk fat with the main ingredients of bakery products and cereal products (lipid-protein and starch interaction, starch-lipid complex). Google Scholar, PubMed, Scopus and Web of Science were searched utilizing related keywords. Fatty acid-wheat starch complexes may reduce the glycemic response and increase the shelf life of bakery products. As a result, milk fats have multiple functions in both technological and nutritional aspects. Milk fat is used in bakery products to balance saturated lipids, improve nutritional quality and consumer acceptance. Milk fat has high calories (3665 kJ per 100 grams of AMF), which can be reduced by using alternative fats (conventional fats). It is produced with reduced calories and saturated fat, which is important in terms of health, as these fat substitutes each have different properties that affect the quality of a food product. Milk fat substitutes based on carbohydrates (vegetable polysaccharides, Dietary fiber such as inulin, pectin and starch), Lipid (margarine, shortening), emulsion-based (oleogel, organogel) and whole foods (avocado, oatrim, chia and banana) or a combination of them are used, and the use of each has limitations according to the type of product. In conclusion, this study confirms the relevance and importance of milk fat and its replacement in bakery products and cereal products, whose role is to change the structural, rheological, nutritional and sensory characteristics.

*Corresponding author:
Mina Nasiri, PhD Candidate;
Department of Food Science and Technology, Faculty of Agriculture, Tabriz, Iran.
Email: nasiri.m67@gmail.com

Please cite this article as: Nasiri M, Ganbarzade B. Bovine Milk Fats and Their Replacers in Baked Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S193.

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Int J Nutr Sci 2025;10(1-Supplement):S194.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Effect of Whole-Wheat Breads on Fasting Blood Sugar, hemoglobin A1c, and Blood Lipids in Patients with Type 2 Diabetes

Javad Nazari[1*], Nasrin Yadegari[2], Susan Khoda[3], Amir Almasi-Hashian[4]

1. Pediatrics Department, Medical School, Arak University of Medical Sciences, Arak, Iran
2. Nutrition Department, Deputy of Health, Arak University of Medical Sciences, Arak, Iran
3. Epidemiology Department, Health School, Arak University of Medical Sciences, Arak, Iran
4. Department of Health Services Management, Khomein University of Medical Sciences, Khomein, Iran

ARTICLE INFO

Keywords:
Diabetes
Dietary fiber
Insulin resistance
Lipid profile
Whole grains

**Corresponding author:*
Javad Nazari, MD;
Department of Pediatrics, School of Medicine, Arak University of Medical Sciences, Arak, Iran.
Email: Javad nazari1972@gmail.com

ABSTRACT

Background: Whole-wheat can have positive effect on blood sugar and fat profiles in patients with diabetic. This study assessed the effect of whole-wheat breads on hemoglobin A1c (HbA1c) and blood lipids in patients with type 2 diabetes (T2D).

Methods: Sixty Men and women with T2D aged 30 years old and older in Arak, Iran were enrolled using random sampling method and divided into control and intervention groups. After taking blood samples, the intervention group received 180 g of whole grain wheat for 12 weeks. The participants were asked not to change their diets and amounts of physical activity during the study period. After 12 weeks, insulin resistance indexes, blood glucose levels, and lipid profiles were examined.

Results: Consumption of whole-wheat bread for 12 weeks could significantly reduce body weight, HbA1c, triglyceride, total cholesterol, and low density lipoprotein cholesterol (LDL-c) levels, and increase high density lipoprotein cholesterol (HDL-c) level when compared to the control.

Conclusion: As consumption of whole-wheat bread has positive effects on physical and biochemical indictors in diabetes, its consumption is suggested in educational programs.

Please cite this article as: Nazari J, Yadegari N, Khoda S, Almasi-Hashian A. Effect of Whole-Wheat Breads on Fasting Blood Sugar, hemoglobin A1c, and Blood Lipids in Patients with Type 2 Diabetes. Int J Nutr Sci. 2025;10(1-Supplement):S194.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Gastroesophageal Reflux Disease among Adults and Children with Celiac Disease

Ramin Niknam[1*], Siavash Babajafari Esfandabad[2], Ebrahim Fallahzadeh Abarghooei[1], Naser Honar[1], Yousef Nikmanesh[1]

1. Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran
2. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Nutrition Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Gastroesophageal reflux disease
Adults
Children
Celiac disease

**Corresponding author:*
Ramin Niknam, MD;
Gastroenterohepatology Research Center, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: niknamramin@yahoo.com

ABSTRACT

Background: There is little research on the prevalence of gastroesophageal reflux disease (GERD) in children and adults with celiac disease (CD) in Iran. This study determined gastroesophageal reflux disease among adults and children with celiac disease.

Methods: Patient data were extracted from the Fars Celiac Registry (approval ID: IR.SUMS.REC.1399.525) affiliated with Shiraz University of Medical Sciences. Patients with increased anti-transglutaminase antibodies and Marsh type 2 or more in histology were included. Comparative analysis was performed in two groups of adults (>18 years) and children (≤18 years).

Results: Totally, 1047 patients were included in the study, of which 743 (0.71%) were children and 304 (0.29%) were adults. Overall, 331 (31.6%) of CD patients had GERD, of which 177 (28%) were in the children group and 154 (50.7%) were in the adults group. The adults were significantly associated with GERD compared to children.

Conclusion: GERD is a common problem in CD, occurring in approximately one-third of patients and being more prevalent in adults. Studies in both age groups are recommended to investigate and compare risk factors.

Please cite this article as: Niknam R, Babajafari Esfandabad S, Fallahzadeh Abarghooei E, Honar N, Nikmanesh Y. Gastroesophageal Reflux Disease among Adults and Children with Celiac Disease. Int J Nutr Sci. 2025;10(1-Supplement):S195.

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Int J Nutr Sci 2025;10(1-Supplement):S196.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Carboxymethyl Cellulose Derived from Date Kernel on Physical, Chemical and Sensory Properties of Gluten-Free Biscuits Formulated with Oak Flour

Razieh Noroozi[1*], Nabi Shariatifar[1], Ebrahim Molaee-aghaee[1], Seyyed Mohammad Ali Noori[2], Mehdi Fathollahi[1], Sayedeh Mahsa Khodaei[1]

1. Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Nutritional Sciences, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

ARTICLE INFO

Keywords:
Gluten-free biscuit
Acorn flour
Carboxymethyl cellulose
Date kernel

**Corresponding author:*
Razieh Noroozi, PhD Candidate; Division of Food Safety and Hygiene, Department of Environmental Health Engineering, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: raznoroozi@yahoo.com
r_noroozi@razi.tums.ac.ir

ABSTRACT

Background: People who have problems digesting and absorbing gluten should use gluten-free foods. The purpose of this research was to use Carboxymethyl cellulose (CMC) from date kernels to improve the physicochemical and sensory properties of oak flour biscuits.

Methods: CMC was extracted from date kernels via alkali treatment and neutralization and purification steps; while its characteristics were investigated. Biscuits were formulated with three concentrations of CMC (0.2%, 0.5%, 1%) and four percentages of oak flour (20%, 30%, 50%, 70%). The moisture content, texture profile (hardness, cohesiveness), antioxidant activity, and sensory evaluation of samples were determined.

Results: CMC exhibited 92.7% purity, 78.3% efficiency, and a degree of substitution of 0.85. FTIR and TGA analyses confirmed its suitability for bakery products. Incorporation of 0.5% CMC and 30% oak flour resulted in significant improvement in texture with more volume and brittle, and higher sensory acceptance and antioxidant activity. Biscuits with 50% oak flour, while nutritionally rich, showed lower sensory acceptability with a darker appearance.

Conclusion: It was shown that optimal formulation of gluten-free biscuits with 0.5% CMC extracted from date kernels and 30% oak flour improved texture and increased antioxidant activity, and maintained moisture and sensory quality of the product.

Please cite this article as: Noroozi R, Shariatifar N, Molaee-aghaee E, Noori SMA, Fathollahi M, Khodaei SM. The Effect of Carboxymethyl Cellulose Derived from Date Kernel on Physical, Chemical and Sensory Properties of Gluten-Free Biscuits Formulated with Oak Flour. Int J Nutr Sci. 2025;10(1-Supplement):S196.

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Int J Nutr Sci 2025;10(1-Supplement):S197.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Recent Progresses on Use of Bioactive Compounds in Bakery and Confectionery Products Including Industrial Bread, Cakes, Biscuits and Chocolates: A Review

Mahdi Norozi*, Morteza Radkhah

Food Technology Unit, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Bioactive compounds
Encapsulation
Bakery confectionery products
Antioxidant

ABSTRACT

The demand for the consumption of bakery and confectionery products that have fewer preservatives and have high nutritional value by enriching them with bioactive compounds is increasing. Antioxidant properties that inhibit the growth of bacteria and prevent oxidative stress in the body are among the most important properties of bioactive compounds that can replace preservatives, as well as replace fat, sugar and dietary fibers. Bioactive ingredients mostly used in biscuits, bread, chocolate and cake. Natural pigments and flavors instead of chemical compounds are one of the newest growing applications of bioactive compounds in sweets and cakes, which is also an important demand of consumers. This review determined recent progresses on use of bioactive compounds in bakery and confectionery products including industrial bread, cakes, biscuits and chocolates. Google Scholar was searched using related keywords. ubstitution of bioactive compounds from safe green sources and agricultural byproducts requires an extraction process, enabling its use by methods such as encapsulation. Micro coating of bioactive compounds with spray dryer is one of the common techniques in this field. Encapsulation should not change the taste or rheology of the product during the food process, the length of storage and the time of consumption, maintain the sensory properties of the product and not have side effects on the body's metabolism. If bioactive compounds are extracted as a whole, such as proteins or carbohydrates, from grass sources (approved by the FDA), there is less sensitivity in their safety in certain doses, but if used has been used through more advanced extraction, such as essential oils, or from non-grass plants sources, their legal procedure and safety must be confirmed before use. In conclusion, the mechanism of action of bioactive compounds or their release during storage in food is important and should be designed in such a way that their functional value is maintained until the moment of consumption.

*Corresponding author:
Mahdi Norozi, MSc;
Department of Food Science,
College of Agriculture, University of
Tabriz, Tabriz, Iran.
Email: mahdinorozi229@gmail.com

Please cite this article as: Norozi M, Radkhah M. Recent Progresses on Use of Bioactive Compounds in Bakery and Confectionery Products Including Industrial Bread, Cakes, Biscuits and Chocolates: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S197.

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Int J Nutr Sci 2025;10(1-Supplement):S198.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Flour Bread; Challenges and Solutions: A Review

Saeed Parsaei*

Department of Food Industry, Gorgan University, Gorgan, Iran

ARTICLE INFO

Keywords:
Whole flour bread
Gluten
Bran
Particle size

ABSTRACT

Whole wheat grains have health benefits of prevention of cancer, obesity, diabetes and cardiovascular diseases due to their high levels of dietary fiber, unsaturated fatty acids, antioxidants, and nutrients such as B vitamins. Whole wheat bread has low acceptance by consumers because of its poor quality. As the bran in whole flour weakens the gluten network, it causes the air-holding capacity to decrease, and results in a smaller volume of whole wheat bread. The dietary fiber in bran competes with gluten protein to absorb water, which decreases extensibility of dough. Bran shortens the shelf life of whole flour bread. This review assessed challenges and solutions regarding whole flour bread. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. Reduction in particle size of whole wheat flour causes the bread softer and increase the volume of bread. Superfine grinding is used to reduce the particle size of whole wheat. Bread quality is commonly modified by the addition of gluten protein (is a natural protein extracted from wheat flour). The addition of gluten expands the gluten network and improves its stability. Also, with the new kneading method, gluten was completely hydrated before bran was added, and bran's negative impact on the gluten network was reduced. In contrast to the health benefits of whole flour bread, its special features such as the smaller volume of the bread, hardness and less shelf life, it has caused its consumption to be less than expected. Therefore, to increase the consumption of whole flour bread, there is a need for methods to improve the quality baking whole flour bread and its sensory and appearance characteristics. Adding various ingredients, reduce particle size of bran and new method of kneading are the ways to improve the quality of whole flour bread. Science Direct database was searched using related keywords. In Conclusion, researchers are looking for ways to increase the quality of whole flour bread in order to create an easier production. They also want the whole flour bread to be more acceptable among consumers.

*Corresponding author:
Saeed Parsaei, MSc;
Department of Food Industry,
Gorgan University, Gorgan, Iran.
Email: Saeedparsaei45@yahoo.com

Please cite this article as: Parsaei S. Whole Flour Bread; Challenges and Solutions: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S198.

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Int J Nutr Sci 2025;10(1-Supplement):S199.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Application of Barley and Barley Products in Manufacturing Functional Foods: A Review

Maryam Pourjam[1*], Mohammad Rostami[2]

1. Research and Development Unit of Shahd Zagros Jahanbin Company, Material Engineering and Food Industry Design, Shahrekord, Iran
2. CEO of Shahd Zagros Jahanbin Company, Research and Development Unit of Shahd Zagros Jahanbin Company, Expert, Electrical Engineering, Shahrekord, Iran

ARTICLE INFO

Keywords:
Barley
Barley products
Bread
Functional foods

**Corresponding author:*
Maryam Pourjam, MSc;
Senior Expert, Research and Development Unit of Shahd Zagros Jahanbin Company, Material Engineering and Food Industry Design, Shahrekord, Iran.
Email: pourjam23eng@gmail.com

ABSTRACT

In recent decades, the use of barley as a useful food source for humans has been growing. The interest increase in barley has coincided with a rise in prevalence of obesity and chronic diseases such as cancer. It was shown that dietary fiber has many health benefits. Since barley is a very good source of dietary fibers, especially beta-glucan, the present review has searched articles in Google Scholar, Iranmedex, Scopus, Cochrane library, PubMed, Science Direct within the time limit from 1900 to 2024 utilizing keywords of barley, barley products, bread, and functional foods. After searching, 84 articles were selected based on research criteria revealing that barley has the potential to be used in a variety of bakery products. The rise in obesity has led to an increased research on whole grains, especially those that are high in beta-glucan level. It can be concluded that more researches are needed regarding the use of barley in order to maximize the health of in bread production containing barley with minimal negative effects and the appearance and quality of breads, so that consumers can replace these valuable breads with today conventional breads.

Please cite this article as: Pourjam M, Rostami M. Application of Barley and Barley Products in Manufacturing Functional Foods: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S199.

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Int J Nutr Sci 2025;10(1-Supplement):S200.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Role and Function of Different Emulsifiers and Hydrocolloids in the Bakery Industry: A Review

Pardis Rad*

Food Science and Technology, Shiraz University, Iran

ARTICLE INFO

Keywords:
Food additives
Bakery
Emulsifiers
Hydrocolloids

**Corresponding author:*
Pardis Rad, MSc;
Food Science and Technology,
Shiraz University, Shiraz, Iran.
Email: Rad.pardis@gmail.com

ABSTRACT

Food additives refer to a variety of substances that are used during food processing to maintain or improve taste and appearance and increase the quality and storage time. An overview of the role and function of different emulsifiers and hydrocolloids in the bakery industry was aimed in this review. Google Scholar, PubMed, Web of Science, Scopus, Science Direct and SID databases were searched utilizing the keywords of food additives, bakery, emulsifiers and hydrocolloids. It is obvious that food additives can improve the sensory properties and the level of comfort for people, but they may also cause potential risks to human health. These materials are widely used in various industries, including bakery, and considering that bakery products and cereals are an important part of the diet of today's consumers, therefore, performing a quantitative and qualitative analysis on the additive content Food is very important. In conclusion, according to the function of food additives, their classification included colors, preservatives, antioxidants, sweeteners, emulsifiers, stabilizers, thickeners and gelling agents.

Please cite this article as: Rad P. The Role and Function of Different Emulsifiers and Hydrocolloids in the Bakery Industry: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S200.

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Int J Nutr Sci 2025;10(1-Supplement):S201.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Plant Proteins as Gluten Substitutes in Cereal Products on Prevention of Celiac Disease

Morteza Radkhah*, Seyed Hadi Peighambardoust, Amir Akbarmehr

Food Technology Unit, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Gluten
Cereal products
Protein

**Corresponding author:*
Morteza Radkhah, MSc;
Department of Food Science,
College of Agriculture, University of
Tabriz, Tabriz, Iran.
Email: mortezaradkhah1@gmail.com

ABSTRACT

Celiac disease is a common autoimmune disorder. The digestive system of susceptible individuals is damaged by the consumption of gluten protein, resulting in malabsorption of nutrients. Physicians usually recommend avoiding gluten protein or substituting it with other protein sources to effectively reduce the symptoms of this disorder. As a result, the demand for gluten-free foods among celiac patients has been increasing in most societies. This review determined the effect of plant proteins as gluten substitutes in cereal products on prevention of celiac disease. Google Scholar, PubMed, Scopus, Web of Science and SID were searched using related keywords. Rice, being gluten-free, is a suitable option for producing gluten-free cereal products. However, new research focuses on using novel protein sources as gluten substitutes. Today, plant proteins derived from sources such as pumpkin, potato, millet, cassava, fruits, and vegetables have gained attention in scientific communities. It should be noted that substituting gluten with other plant protein sources faces challenges such as protein extraction methods, digestibility, dough water retention capacity, and economic viability. In conclusion, this study examines and assesses the feasibility of substituting plant proteins for gluten and discusses the effects of gluten protein intolerance in patients with celiac disease.

Please cite this article as: Radkhah M, Peighambardoust SH, Akbarmehr A. The Effect of Plant Proteins as Gluten Substitutes in Cereal Products on Prevention of Celiac Disease. Int J Nutr Sci. 2025;10(1-Supplement):S201.

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Int J Nutr Sci 2025;10(1-Supplement):S202.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Recent Progresses on Use of Bioactive Compounds in Bakery and Confectionery Products Including Industrial Bread, Cakes, Biscuits and Chocolate: A Review

Mahdi Norozi, Morteza Radkhah*

Food Technology Unit, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Bioactive compounds
Encapsulation
Bakery
Confectionery products
Antioxidant properties

ABSTRACT

Bioactive ingredients mostly used in biscuits, bread, chocolate and cake. Natural pigments and flavors instead of chemical compounds are one of the newest growing applications of bioactive compounds in sweets and cakes, which is also an important demand of consumers. Substitution of bioactive compounds from safe green sources and agricultural byproducts requires an extraction process, enabling its use by methods such as encapsulation. This review assessed recent progresses on use of bioactive compounds in bakery and confectionery products; industrial bread, cakes, biscuits and chocolate. Google Scholar was searched using related keywords. Micro coating of bioactive compounds with spray dryer is one of the common techniques in this field. Encapsulation should not change the taste or rheology of the product during the food process, the length of storage and the time of consumption, maintain the sensory properties of the product and not have side effects on the body's metabolism. If bioactive compounds are extracted as a whole, such as proteins or carbohydrates, from grass sources (approved by the FDA), there is less sensitivity in their safety in certain doses, but if used has been used through more advanced extraction, such as essential oils, or from non-grass plants sources, their legal procedure and safety must be confirmed before use. In conclusion, the mechanism of action of bioactive compounds or their release during storage in food is important and should be designed in such a way that their functional value is maintained until the moment of consumption.

**Corresponding author:*
Morteza Radkhah, MSc;
Department of Food Science,
College of Agriculture, University of
Tabriz, Tabriz, Iran.
Email: mahdinorozi229@gmail.com

Please cite this article as: Norozi M, Radkhah M. Recent Progresses on Use of Bioactive Compounds in Bakery and Confectionery Products Including Industrial Bread, Cakes, Biscuits and Chocolate: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S202.

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Int J Nutr Sci 2025;10(1-Supplement):S203.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Fermentation with Sourdough on Quality of Berber Bread Made From Whole Meal Flour: A Review

Samane Rajabzadeh*, Esmaeil Eataye Salehi

Grain Company and Commercial Services, Khorasan Razavi Province, Mashhad, Iran

ARTICLE INFO

Keywords:
Fermentation
Sourdough
Berber bread
Whole meal flour
Quality

**Corresponding author:*
Samane Rajabzadeh, MSc;
Grain Company and Commercial Services, Khorasan Razavi Province, Mashhad, Iran.
Email: samane.rajabzadeh61@gmail.com

ABSTRACT

Nowadays, the use of bread made from whole wheat flour has become popular in western countries and recently in our country due to its high amount of fiber, vitamins and minerals. However, whole wheat flour contains some undesirable factors, the most important of which is phytic acid. is, it is high. This review determined the effect of fermentation with sourdough on quality of berber bread made from whole meal flour. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. Phytic acid is a compound of phosphorus that exists in the form of potassium-magnesium salt, especially in the cell and aleron layer of cereals, and is usually seen in the form of organic phytate salt. The amount of this composition varies depending on the percentage of flour extraction. Sourdough technology as a tool to increase the quality of pan bread has been discussed by many researchers around the world from different perspectives. In the present study, the use of the amount of simultaneous use of sourdough and yeast and its effect on the physicochemical, microbial, textural and sensory characteristics of Berber bread was evaluated, the results showed that with the increase of sourdough, the amount of phytic acid decreased significantly. In conclusion, a significant increase was observed in the preservation of breads that used more sourdough and the use of 50% sourdough and 50% yeast can have a significant effect on the sensory properties of the resulting bread and also the use Sour dough did not affect the amount of iron.

Please cite this article as: Rajabzadeh S, Eataye Salehi E. The Effect of Fermentation with Sourdough on Quality of Berber Bread Made From Whole Meal Flour: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S203.

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Int J Nutr Sci 2025;10(1-Supplement):S204.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Whole Grains vs. Refined Grains and Risk of Cardiovascular Diseases, Diabetes, Metabolic Syndrome and Cancer: A Review

Somayeh Sadat Rajaei[1,2*], Nasrin Salehi[1]

1. Treatment Assistance, Isfahan University of Medical Sciences, Isfahan, Iran
2. Nutrition and Food Security Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

ARTICLE INFO

Keywords:
Whole grain
Refined grain
Metabolic syndrome
Chronic diseases
Diabetes

**Corresponding author:*
Somayeh sadat Rajaei, MSc;
Treatment Assistance, Isfahan University of Medical Sciences, Isfahan, Iran.
Email: somayeh.rajaie@yahoo.com

ABSTRACT

Efforts to control the prevalence of chronic metabolic diseases worldwide have attracted attention. This review assessed whole grains vs. refined grains and risk of cardiovascular diseases, diabetes, metabolic syndrome and cancer. Pubmed, Cochrane, Embase and Web of Science databases in last 10 years were searched using related keywords. It was shown that oat whole grains (WG) consumption improved total and LDL-c, rice-WG, decreased triglyceride, and mixed-WG, and declined FBS, HbA1C and CRP. Oats/barley consumption was associated with lower risk of cardiovascular diseases (CVD), diabetes incidence and more weight loss. It was demonstrated that WG was associated with 20% less and 37% higher risks of metabolic syndrome for refined grains. Increasing WG intake up to 50 g/d, reduced type (II)-diabetes risk to 25%, and increasing up to 150 g/d was recommended to prevent diabetes. Increase in fiber intake was correlated with 15-30% less CVD, stroke, diabetes and colorectal cancer mortality in observational studies and a greater reduction in weight, systolic blood pressure and total-cholesterol in clinical-trials; while most of these effects were observed for 25-29 g/d. Consumption of WG was related with 6-12% less risk of death from cancers, especially colorectal cancer. In conclusion, the findings of these studies support the recommendation of whole grains consumption to prevent and control chronic CVDs, diabetes, metabolic syndrome and cancers.

Please cite this article as: Rajaei SS, Salehi N. Whole Grains vs. Refined Grains and Risk of Cardiovascular Diseases, Diabetes, Metabolic Syndrome and Cancer: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S204.

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Int J Nutr Sci 2025;10(1-Supplement):S205.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Free or Capsulated Additives to Bread: A Review

Nasrin Salehi[1], Somayeh Sadat Rajaei[1,2*]

1. Treatment Assistance, Isfahan University of Medical Sciences, Isfahan, Iran
2. Nutrition and Food Security Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

ARTICLE INFO

Keywords:
Bread
Grain
Fortification
Supplementation
Capsulated

ABSTRACT

Bread is one of the most common foods for people around the world. Despite being rich in complex carbohydrates, it is poor in other micro- and macronutrients. Rising consumer demand for healthier food has resulted in growth of studies focused on bread fortification with bioactive ingredients. This study was conducted with the aim of reviewing the systematic review and meta-analysis articles. PubMed, Embase, Web of Science databases published in the last 10 years were searched using keywords of bread, grain, fortification, supplementation, capsulated/free. Clinical-trials have shown health benefits of consuming bread fortified with vitamins (B, C, D), minerals (K, P, Ca, Mg, Fe, Zn, Cr, Se), fiber, proteins, and polyphenolic compounds. However, direct inclusion of bioactive compounds and additives into bread has some limitations, such as adverse effects on sensory characteristics and undesirable interaction with other food ingredients. Encapsulation provides the possibility to overcome these disadvantages. It improves the shelf-life of bread by controlling diffusion, protection and uniform distribution of these compounds. The incorporation of oilseeds (flaxseed, chia, sunflower, pumpkin, sesame and poppy seed) modifies the rheology of doughs, products amount and their texture, organoleptic characteristics and acceptability. Vitamin D-fortified bread is an effective strategy to increase serum concentrations of 25(OH)D and decreased parathyroid hormone. In conclusion, despite that prebiotics play a role in the prevention of colorectal cancer, the beneficial effects of bread prepared with inulin and other prebiotics are still controversial. Micro-nano-encapsulated bioactive substances instead of free compounds can enrich bread without negative effects. It provides its physical, chemical and textural characteristics.

**Corresponding author:*
Somayeh sadat Rajaei, MSc;
Treatment Assistance, Isfahan University of Medical Sciences, Isfahan, Iran.
Email: somayeh.rajaie@yahoo.com

Please cite this article as: Salehi N, Rajaei SS. The Effect of Free or Capsulated Additives to Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S205.

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Int J Nutr Sci 2025;10(1-Supplement):S206.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Modulation of Telomere Length by Healthy Diet Including Whole Grains: A Review

Maryam Ranjbar Zahedani[1*], Habibollah Abbasi[2,3]

1. Department of Nutrition Sciences, School of Health, Larestan University of Medical Sciences, Larestan, Iran
2. Food Science and Technology Unit, Department of Chemical Engineering, Jundi-Shapur University of Technology, Dezful, Iran
3. Department of Food Science and Technology, School of Nursing, Larestan University of Medical Sciences, Larestan, Iran

ARTICLE INFO

Keywords:
Telomere length
Healthy diet
Whole grains
Aging
Chronic diseases

**Corresponding author:*
Maryam Ranjbar Zahedani, PhD;
Department of Nutrition Sciences,
School of Health, Larestan
University of Medical Sciences,
Larestan, Iran.
Email: ranjbarmaryam29@yahoo.com

ABSTRACT

Diet, physical activity, and other lifestyle factors are linked to development of various chronic diseases, aging, mortality and life expectancy. Telomere length (TL) as key indicator of biological aging is associated with chronological age and metabolic health and serves as a protective function in cellular aging and death. Individuals with shorter telomeres face a higher risk of chronic diseases and mortality. Diet may affect TL through several mechanisms such as regulation of oxidative stress and inflammation or modulation of epigenetic reactions. This review assessed modulation of telomere length by healthy diet including whole grains. PRISMA guidelines, PubMed, Embase, and Cochrane databases from 2015 to 2024 were searched using related keywords. Certain antioxidant nutrients, intake of whole grains, fruits and vegetables, and adherence to Mediterranean diet are primarily linked to longer telomeres. As most of evidences come from heterogeneous observational studies; so the associations still require validation through larger prospective cohort studies and RCTs. This review analyzed findings of epidemiological and clinical studies in humans regarding impact of nutrients, food groups, and dietary patterns on TL. In conclusion, lifestyle factors, including healthy diet are linked to telomere length and healthy diets, as essential components of lifestyle can mitigate telomere shortening and delay aging and chronic diseases.

Please cite this article as: Ranjbar Zahedani M, Abbasi H. Modulation of Telomere Length by Healthy Diet Including Whole Grains: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S206.

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Int J Nutr Sci 2025;10(1-Supplement):S207.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Second-Meal Effect of Wholegrain Bread Consumption on Metabolic Health: A Review

Maryam Ranjbar Zahedani[1*], Habibollah Abbasi[2,3]

1. Department of Nutrition Sciences, School of Health, Larestan University of Medical Sciences, Larestan, Iran
2. Food Science and Technology Unit, Department of Chemical Engineering, Jundi-Shapur University of Technology, Dezful, Iran
3. Department of Food Science and Technology, School of nursing, Larestan University of Medical Sciences, Larestan, Iran

ARTICLE INFO

Keywords:
Second-meal effect
Glycemic response
Whole grain
Insulin sensitivity

**Corresponding author:*
Maryam Ranjbar Zahedani, PhD;
Department of Nutrition Sciences,
School of Health, Larestan
University of Medical Sciences,
Larestan, Iran.
Email: ranjbarmaryam29@yahoo.com

ABSTRACT

The "second-meal effect" refers to the phenomenon where the glycemic response to a subsequent meal is influenced by the composition of a prior meal. This review examines the role of wholegrain bread in modulating the second-meal effect and its implications for metabolic health. Following PRISMA guidelines, PubMed, Embase, and Cochrane databases were searched from 2015 to 2024 using keywords of second-meal effect, glycemic response, whole grains, and insulin sensitivity. Whole grain bread, known for its higher fiber content and lower glycemic index has been suggested to impact postprandial glucose levels. Evidences from clinical trials and observational studies indicated that whole grain bread consumption may lead to improved glycemic control during subsequent meals by reducing postprandial blood glucose levels and enhancing insulin sensitivity. The mechanisms proposed include increased fiber intake, which slows carbohydrate absorption, and the presence of bioactive compounds that may influence glucose metabolism. It can be concluded that potential benefits of whole grain bread in dietary strategies aim at managing glycemic response and suggests areas for future research.

Please cite this article as: Ranjbar Zahedani M, Abbasi H. Second-Meal Effect of Wholegrain Bread Consumption on Metabolic Health: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S207.

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Int J Nutr Sci 2025;10(1-Supplement):S208.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Physicochemical and Quality Monitoring of Whole Wheat Flour Prepared From Markazi Province, Iran during 2022-2023

Maryam Raoufi*, Azar Mokhtari

Food and drug administration, Arak University of Mediacl Sciences, Arak, Iran

ARTICLE INFO

Keywords:
Whole wheat flour
Physicochemical properties
Standard
Iran

ABSTRACT

Background: Nearly 70% of the world's corp area is dedicated to cereals, and half of human food needs, especially in Asia, are met by cereals. The quality of wheat is influenced by physicochemical, qualitative and agronomic characteristics, and it is essential to choose suitable varieties for the production of specific products. The aim of this study was to determine physicochemical and quality monitoring of whole wheat flour prepared from Markazi Province, Iran.

Methods: In this research, the chemical, physical and qualitative characteristics of different samples of whole wheat flour obtained from producers and the market in Markazi Province during the years during 2022-2023 were examined.

Results: Whole wheat flour sampled in 2022 was evaluated according to the national standard. The ash, moisture and protein of the samples were reported to be stable and were in accordance with the standard, and the amount of gluten in the samples was also at a desirable level (above 20). In terms of acidity, the whole wheat flour samples were reported to be around 2.3. Additionally, they complied with the national microbiological standards of Iran. The whole wheat flour samples examined in 2023 also conformed to national standards, with non-compliance reported only in two samples.

Conclusion: The results of this research indicated that the whole wheat flours produced in Central Province, Iran in during 2022-2023 mostly complied with national standards and had good quality in terms of characteristics such as ash, moisture, protein, gluten and microbial population.

**Corresponding author:*
Maryam Raoufi, MSc;
Arak University of Mediacl Sciences, Arak, Iran.
Email: m.raoufi63@yahoo.com

Please cite this article as: Raoufi M, Mokhtari A. Physicochemical and Quality Monitoring of Whole Wheat Flour Prepared From Markazi Province, Iran during 2022-2023. Int J Nutr Sci. 2025;10(1-Supplement):S208.

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Int J Nutr Sci 2025;10(1-Supplement):S209.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Substitute Compounds on Cookie Formulation; The Challenges, Production Process, and Benefits of Consuming Whole-Grain Bread in Iran: A Review

Zabihollah Razmjoue*

Quality Control management, Sepidan Flour Company, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole wheat flour
Wheat
Whole grain bread
Nutrition
Milling

**Corresponding author:*
Zabihollah Razmjouei, BSc;
Quality Control management,
Sepidan Flour Company,
Shiraz, Iran.
Email: zabihallah.razmjooi@gmail.com

ABSTRACT

In the contemporary world, where healthy nutrition has gained paramount importance, whole-grain flour has become a nutritious and wholesome dietary option. As a staple food in Iranian households, bread has long been a focal point of dietary habits. This review assessed the challenges, production process, and benefits of consuming whole-grain bread in Iran. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. Unlike refined white flour, whole grain flour incorporates all parts of the wheat kernel, including the bran, germ, and endosperm, making it a rich source of fiber, vitamins, and minerals. Consuming bread made from whole grain flour can contribute to improved digestive health, reduced risk of cardiovascular diseases, better blood sugar control, and a decreased likelihood of developing various cancers, particularly colorectal cancer. Recognizing these benefits, Sepidan Flour Company has employed advanced milling technologies to produce whole-grain flour while preserving its maximum nutritional value. However, the production of whole grain flour is not without its challenges, such as shorter shelf life, alterations in the taste and texture of bread, and the presence of certain antinutrients. This article investigates the production process of whole grain flour in Iran, compares it with refined white flour, and explores its nutritional properties. In conclusion, highlighting the advantages of consuming whole-grain flour, the study also delves into the challenges associated with its production and proposes potential solutions.

Please cite this article as: Razmjoue Z. The Effect of Substitute Compounds on Cookie Formulation; The Challenges, Production Process, and Benefits of Consuming Whole-Grain Bread in Iran: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S209.

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Int J Nutr Sci 2025;10(1-Supplement):S210.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Impact of Microencapsulation Process on Enrichment of Functional Bread: A Review

Nima Roshandoost*, Seyed Hadi Peighambardoust

Food Science and Technology, Agriculture Faculty, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Microencapsulation
Functional bread
Enrichment
Bioactive compounds
Nutrient stability

ABSTRACT

Enrichment of bread with bioactive compounds can increase its nutritional value, but there are challenges such as the instability of these compounds against heat and processing conditions. Microencapsulation, as an innovative method, can overcome these obstacles. This review study examines research conducted in the field of microencapsulation technology for bread enrichment. In order to choose the needed articles, databases of Google Scholar, PubMed, and Scopus were searched using keywords of microencapsulation; functional bread; enrichment; bioactive compounds; nutrient stability. Various microencapsulation methods such as spray drying, lyophilization, coacervation, and emulsification were discussed. Also, different bioactive compounds used in bread enrichment, including vitamins, minerals, carotenoids, probiotics, and enzymes, were investigated. It was shown that microencapsulation can increase the stability and shelf life of vitamins and minerals against heat and processing conditions. This technology enables addition of probiotics to bread, which was impossible before. Microencapsulation can improve the efficiency and stability of enzymes in the final product and mask the unpleasant flavors of some compounds like fish oil. Also, use of microencapsulated compounds has not negatively affected the sensory and rheological properties of bread, and even may improve these characteristics. It can be concluded that microencapsulation is a promising method for enriching bread with bioactive compounds and has a significant potential for producing functional breads with high nutritional value and desirable sensory properties. Further studies are still needed to optimize microencapsulation methods, comprehensive evaluation of its impact on bread quality and consumer acceptance, and economic assessment of the process on an industrial scale.

*Corresponding author:
Nima Roshandoost, MSc;
Food Science & Technology,
Agriculture Faculty, University of
Tabriz, Tabriz, Iran.
Email: nima_rst@yahoo.com

Please cite this article as: Roshandoost N, Peighambardoust SH. The Impact of Microencapsulation Process on Enrichment of Functional Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S210.

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Int J Nutr Sci 2025;10(1-Supplement):S211.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Comparison of Rheological and Antioxidant Properties of Whole Meal and Refined Flour Bread

Maral Neyestani[1], Mohadeseh Fesahat[2], Delara Moradi Mirhesari[1], Ehsan Sadeghi[3*]

1. Student Research Committee of the Faculty of Nutrition Sciences and Food Industries, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Environmental Health, Tehran University of Medical Sciences, Tehran, Iran
3. Department of Food Industries Faculty of Nutrition Sciences and Food Industries, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Whole meal bread
White bread
Bioactive compounds
Rheological properties

**Corresponding author:*
Ehsan Sadeghi, PhD;
Department of Food Industries, Faculty of Nutrition Sciences and Food Industries, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: ehsan.sadeghi59@yahoo.com

ABSTRACT

Background: Production of bread using whole flour shows a high content of fiber and antioxidant compounds due to the presence of all the layers in the wheat. Production of bread using refined flour not only lacks health benefits, but due to the higher amount of carbohydrates and lower fiber content due to the removal of the crust, it will increase diseases such as diabetes and obesity. The purpose of this study was to investigate the amount of antioxidant activity and improve the rheological properties of the bread.

Methods: Two samples of 3 types of red, whole white and refined flour were prepared. The desired paste was prepared with suitable proportions and 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activities and farinography properties were measured in the samples.

Results: DPPH radical scavenging activity was higher in red flour than whole white flour and refined flour. The rheological properties of whole flour obtained from red and white wheat were better than refined flour.

Conclusion: Use of whole wheat flour can be effective to improve physical and chemical properties of bread as well as antioxidant properties.

Please cite this article as: Neyestani M, Fesahat M, Moradi Mirhesari D, Sadeghi E. Comparison of Rheological and Antioxidant Properties of Whole Meal and Refined Flour Bread. Int J Nutr Sci. 2025;10(1-Supplement):S211.

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Int J Nutr Sci 2025;10(1-Supplement):S212.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Biopreservation Methods to Control of Bread Spoilage: A Review

Mohammad Hadi Moradiyan[1], Reza Abedi-Firoozjah[1], Ehsan Sadghi[2*]

1. Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Food Science and Technology, School of Nutrition Sciences and Food Technology, Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Biopreservation
Control
Bread
Bakery products
Spoilage

**Corresponding author:*
Ehsan Sadeghi, PhD;
Department of Food Science and Technology, School of Nutrition Sciences and Food Technology, Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: ehsan.sadeghi59@yahoo.com

ABSTRACT

Bakery industry widely uses natural preservatives to prevent spoilage, while avoiding chemical preservatives due to health hazards. Traditional chemical preservatives, while effective, but have the possibility of health risks for consumers. The aim of this study was to investigate innovative biopreservation methods to control spoilage in bread. Herein, databases of PubMed, Scopus and Google Scholar were searched utilizing proper correlated keywords. It was shown that bread treated with lactic acid bacteria could significantly extend shelf life, inhibit mold growth by up to 40%. Essential oils, particularly thyme and clove, demonstrated strong antifungal properties and reduced spoilage rates effectively. Plant extracts like raisin and cherry laurel were also found to have potent antifungal effects, enhancing both flavor and quality. Moreover, whey as a bio-preservative could improve shelf life by preventing fungal contamination when used in bread formulations. It can be concluded that integration of natural preservatives not only provides safer and healthier products, but also minimizes food waste by increasing shelf life. By using the antifungal properties of lactic acid bacteria, essential oils, plant extracts and animal derivatives, the bakery sector can achieve a delicate balance between maintaining product quality and ensuring consumer health. So the future of bread storage lies in these innovative and environmentally friendly strategies that can pave the way for safer and more sustainable food options.

Please cite this article as: Moradiyan MH, Abedi-Firoozjah R, Sadghi E. Biopreservation Methods to Control of Bread Spoilage: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S212.

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Int J Nutr Sci 2025;10(1-Supplement):S213.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Trends and Innovations to Increase Shelf Life of Bread and Bakery Products: A Review

Reza Abedi-Firoozjah[1], Mohammad Hadi Moradiyan[1], Ehsan Sadghi[2*]

1. Student Research Committee, Kermanshah University of Medical Sciences, Kermanshah, Iran
2. Department of Food Science and Technology, School of Nutrition Sciences and Food Technology, Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Shelf life
Bread
Bakery products
Spoilage
Biopreservation

**Corresponding author:*
Ehsan Sadeghi, PhD;
Department of Food Science and Technology, School of Nutrition Sciences and Food Technology, Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: ehsan.sadeghi59@yahoo.com

ABSTRACT

The shelf life of bread and bakery products is one of the important and vital factors affecting food safety, consumer satisfaction and economic sustainability. These products are susceptible to physical, chemical and microbial spoilage. So increasing the shelf life is an important challenge for bakery manufacturers. This review investigated the latest trends and innovations to increase shelf life of bakery items. Database of Google Scholar was searched using correlated keywords. Addition of natural preservatives of essential oils and microbial cultures can significantly increase the shelf life of cooked products together with quality and taste. Use of smart and active packaging can effectively reduce spoilage rates, and decrease products being prone to becoming stale. Biopreservation by using beneficial microorganisms illustrated promising results to inhibit pathogens and increase the immunity and longevity. Gluten-free growth products with these innovations demonstrated a better shelf life compared to traditional methods. In conclusion, various methods such as the combined use of natural preservatives, sophisticated packaging technologies, and biopreservation strategies in bakery industry can effectively address modern challenges related to freshness and food waste. This research showed that a proactive approach to shelf-life management not only meets consumer expectations, but also contributes to environmental sustainability.

Please cite this article as: Abedi-Firoozjah R, Moradiyan MH, Sadghi E. Trends and Innovations to Increase Shelf Life of Bread and Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S213.

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Int J Nutr Sci 2025;10(1-Supplement):S214.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Primary Fermentation Time and Bakery Improver on Quality of Lavash Bread Containing Whole Meal Flour

Mahdi Karimi[1], Bahareh Sahraiyan[2*], Zahra Sheikholeslami[1]

1. Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran
2. Food Quality and Safety Research Department, ACECR, Khorasan Razavi Branch, Mashhad, Iran

ARTICLE INFO

Keywords:
Whole meal flour
Lavash bread
Fermentation
Improver
Guar gum

**Corresponding author:*
Bahareh Sahraiyan, PhD;
Food Quality and Safety Research Department, ACECR, Khorasan Razavi Branch, Mashhad, Iran.
Email: Baharehsahraiyan@yahoo.com

ABSTRACT

Background: Separating bran from wheat is a challenge in wheat production and consumption in Iran. So, this research investigated the effect of primary fermentation time and bakery improver on quality of lavash bread containing whole meal flour.

Methods: Sample 1 contained flour with 78% extraction degree, samples 2 and 3 contained flour with 93% extraction degree, and samples 4 and 5 contained flour with 97% extraction degree. Samples 3 and 5 contained 0.25% guar gum and 0.3% improver. The fermentation time for samples 1 to 5 was 60, 55, 75, 50, and 70 minutes, respectively. The physicochemical characteristics of flour, phytic acid, fiber, moisture, texture stiffness, and sensory characteristics of the produced bread were evaluated.

Results: Phytic acid and fiber of the flour and bread had more than 78% extraction degree. Increasing fermentation time was significant in reducing phytic acid. Samples 3 and 5 had more moisture, less texture stiffness, and favorable sensory characteristics.

Conclusion: Sample with 93% extraction degree, 0.25% gum, 0.3% improver and 75 minutes fermentation time and sample with 97% extraction degree, 0.25% gum, 0.3% improver and 75 minutes fermentation time were introduced as high-quality health-oriented products.

Please cite this article as: Mahdi Karimi, Bahareh Sahraiyan, Zahra Sheikholeslami. The Effect of Primary Fermentation Time and Bakery Improver on Quality of Lavash Bread Containing Whole Meal Flour. Int J Nutr Sci. 2025;10(1-Supplement):S214.

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Int J Nutr Sci 2025;10(1-Supplement):S215.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Investigating Migration of Nanoparticles in Nano-Biocomposites Used in Bread Products

Shima Salarbashi*, Marziyeh Mehrzad, Elham Fahmideh Rad, Davood Salarbashi

School of Medicine, Gonabad University of Medical Sciences, Gonabad, Iran

ARTICLE INFO

Keywords:
Nanoparticles
Nano-biocomposites
Bread
Carbohydrate-based edible films

ABSTRACT

Background: Carbohydrate-based edible films have the ability to form films due to their unique colloidal properties. Recently, a new polysaccharide has been extracted from the cell wall material of soybean. This polysaccharide, soy soluble polysaccharide (SSPS), has a pectin-like structure. Pectins showed that SSPS can produce biodegradable films with good appearance and satisfactory mechanical properties.

Methods: Two dry and wet methods were used in the production of biological packaging. The dry method was used to produce semi-hard packaging such as trays and cups. The wet method (solvent method) was mostly used to produce coatings that could be eaten. In this method, the biopolymer was spread and dissolved in a suitable solvent, and then the solvent was separated from it.

Results: A SSPS concentration of less than 3% was not sufficient to obtain a strong supporting matrix. A 3% SSPS concentration was selected as the suitable polysaccharide concentration in the film-forming solution**.** DMTA curves revealed a single Tg, which may indicate the compatibility of essential oil and SSPS. The electron scanning micrograph for the composite film was homogeneous.

Conclusion: Due to the lower WVP value of films produced in this study (in comparison with other polysaccharide-based films), SSPS films could be a potential alternative for synthetic packaging, and for the storage of low- or intermediate-moisture foods such as nuts. Nevertheless, further studies are required before using such films as an active packaging for real food products.

**Corresponding author:*
Shima Salarbashi, MSc;
School of Medicine, Gonabad University of Medical Sciences, Gonabad, Iran.
Email: shimasalarbashi1@gmail.com

Please cite this article as: Salarbashi S, Mehrzad M, Fahmideh Rad E, Salarbashi D. Investigating Migration of Nanoparticles in Nano-Biocomposites Used in Bread Products. Int J Nutr Sci. 2025;10(1-Supplement):S215.

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Int J Nutr Sci 2025;10(1-Supplement):S216.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Factors Affecting the Increase in Quality and Shelf Life of Whole Meal Bread and Cereal Products: A Review

Maryam Sardarodiyan*

North Khorasan Agricultural and Natural Resources Research Center, Bojnourd, Iran

ARTICLE INFO

Keywords:
Bread
Whole meal flour
Cereal
Bran
Shelf life

**Corresponding author:*
Maryam Sardarodiyan, PhD,
North Khorasan Agricultural and Natural Resources Research Center, Bojnourd, Iran.
Email: sardarodiyan_5@yahoo.com

ABSTRACT

Bread is the main ingredient in the food basket of Iranian households and provides most of the energy, protein, some minerals and vitamins needed by the body daily. Considering the amount of bread consumption in the society's food basket, the waste of the bread industry is very important from an economic point of view, and also consumers prefer products with higher sensory characteristics, quality and shelf life. This review assessed factors affecting increase in quality and shelf life of whole meal bread and cereal products. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. In the last few decades, the remarkable efforts of researchers to improve the quality and shelf life of bread products have led to the presentation of various solutions for this purpose. It is clear that the properties of the dough have an effect on the quality and durability of the final product. The use of whole meal flour in the preparation of dough can take advantage of its beneficial nutritional properties. It can be concluded that considering the high nutritional value of whole meal flour (it is a good source of fiber, salts and minerals needed by the body), if this flour is used in the production of bread, people's nutritional problems (malnutrition and indigestion) can be well compensated.

Please cite this article as: Sardarodiyan M. Factors Affecting the Increase in Quality and Shelf Life of Whole Meal Bread and Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S216.

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Int J Nutr Sci 2025;10(1-Supplement):S217.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Meal Flour Production Technology, Storage and Characteristics in Dough: A Review

Zahra Shahkhajeh*

Food Technology and Science, Monitoring Implementation of Standards Department, Iran National Standard Organization, Yazd, Iran

ARTICLE INFO

Keywords:
Whole flour
Microbiome
Wheat
Storage
Dough

ABSTRACT

Grain milling is one of the oldest production processes in the world. The milling process greatly affects the dough rheology and the bread making process, and because of that, the food industry is constantly looking for strategies and techniques that can improve milling operations. Whole meal flour production technology, as one of the new methods in the food industry, helps to meet nutritional needs and improve the quality of bakery and food products. This review investigated whole meal flour production technology, storage and characteristics in dough. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords. This technology uses different parts of wheat grain, including bran, germ and endosperm, and as a result, flour richer in vitamins, minerals and fiber is produced. Due to the presence of lipids and decomposing enzymes of these compounds, the shelf life of whole wheat flour is shorter than white flour, and lipolytic decomposition leads to a decrease in the functional properties and nutritional value of whole wheat flour. The characteristics of dough made from whole meal flour are also significantly different from dough made with white flour. Whole flour dough has higher elasticity and strength, and also retains moisture better due to the presence of additional fibers. It can be concluded that referring to the health and nutritional effects of this type of flour on human health, the process of producing whole meal flour, the challenges of flour production and storage and the unique characteristics of the resulting dough should be evaluated.

**Corresponding author:*
Zahra Shahkhajeh, MSc;
Food Technology and Science,
Monitoring Implementation of
Standards Department, Iran
National Standard Organization,
Yazd, Iran.
Email: z.shahkhajeh@gmail.com

Please cite this article as: Shahkhajeh Z. Whole Meal Flour Production Technology, Storage and Characteristics in Dough: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S217.

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Int J Nutr Sci 2025;10(1-Supplement):S218.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Acrylamide on Health Risks, Legal Regulations and Strategies in Bakery Products: A Review

Mohammad Ali Shahnaz Eynoddin[1*], Maryam Khakbaz Heshmati[2]

1. Food Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran
2. Department of Food Industry Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran

ARTICLE INFO

Keywords:
Acrylamide
Toxicity
Public health
Legal regulations
Bakery products

**Corresponding author:*
Mohammad Ali Shahnaz Eynoddin, MSc;
Food Science and Engineering, Faculty of Agriculture, Tabriz University, Tabriz, Iran.
Email: m.ali.shahnazy@gmail.com

ABSTRACT

Acrylamide is a pollutant and is considered a chemical hazard in food chain with toxic effects on humans. This review focused on the effect of acrylamide on health risks, legal regulations and strategies in bakery products. Google Scholar was searched using related keywords. Several methods were developed to reduce the level of acrylamide in bakery products based on reduction of asparagine including addition of enzymes such as asparaginase, acids and lacto-fermentation, addition of multivalent cations, addition of antioxidants, reducing ammonium bicarbonate such as ammonium salts in nanomaterials, and optimization of cooking. These are some of the best solutions to reduce asparagine and reduce the level of acrylamide from bakery products. It is not possible to completely remove acrylamide from food, so food manufacturers try to reduce this contamination. Classical methods were used to reduce the formation of acrylamide in foods by changes in product composition or processing conditions may have adverse effects on nutritional and sensory characteristics (changes in taste, texture, color, etc.) and have food safety. The presence of acrylamide in bakery products is one of the most difficult problems facing the bread industry today. Since bakery products are among the most consumed products worldwide, the levels of acrylamide that are created during the baking process lead to unavoidable exposure to acrylamide through the consumption of bakery products. In conclusion, it is necessary to know the toxic effects of acrylamide on the human body and how to reduce its content in order to obtain safe products.

Please cite this article as: Shahnaz Eynoddin MA, Khakbaz Heshmati M. The Effect of Acrylamide on Health Risks, Legal Regulations and Strategies in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S218.

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Int J Nutr Sci 2025;10(1-Supplement):S219.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Evaluation of Part-Baked Frozen Bread Produced from Wheat Flour and Balango Gum in Diet of Celiac Patients

Toktam Hejrani[1], Farzneh Shahraki[2]*

1. University of Applied Science and Technology of Gardeshgaran Bonyad, Tehran, Iran
2. Deputy of Food and Drug Administration, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Keywords:
Triticale flour
Texture
Nutrition
Sourdough

**Corresponding author:*
Farzneh Shahraki, MSc;
Deputy of Food and Drug Administration, Mashhad University of Medical Sciences, Mashad, Iran.
Email: m.f.shahraki@gmail.com

ABSTRACT

Background: In recent years, improving the quality of bread has received much attention, which is done by mixing different flours or different production technologies. The purpose of this research was to investigate the possibility of producing wheat-triticale bread by using sourdough fermentation.

Methods: To prepare sourdough, 1% yeast was mixed with a mixture of wheat flour and triticale flour in a ratio of 50:50 and water (100) and fermentation at 30°C for 16 hours. Then the bread samples were prepared by replacing two levels of triticale flour (10% and 20%) added to the bread formulation with sour dough.

Results: The use of triticale flour up to level 20 increased the content of minerals. By increasing the replacement of triticale flour in the bread formula, the texture became harder and the specific volume decreased. The bread made with sourdough, the amount of specific volume and texture in the sample made with 10% triticale flour, was similar to the control bread. The highest amount of phenolic compounds and the amount of antioxidants were obtained in the combined bread with 20% triticale flour and sourdough.

Conclusion: The bread with 10 triticale flours fermented with sourdough had a higher sensory characteristic score when compared to the bread prepared by conventional method and it was introduced as an optimal treatment.

Please cite this article as: Hejrani T, Shahraki F. Evaluation of Part-Baked Frozen Bread Produced from Wheat Flour and Balango Gum in Diet of Celiac Patients. Int J Nutr Sci. 2025;10(1-Supplement):S219.

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Int J Nutr Sci 2025;10(1-Supplement):S220.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Impact of Whole Wheat Bread Consumption on Weight of Individuals Aged 18 Years and Older Attending Comprehensive Urban Health Service Centers in Kermanshah, Iran

Ebrahim Shakiba*, Sara Arbabi, Mohammad Hosein Shakiba, Leila Rezazadeh, Maryam Babakhani, Badriyeh Karami, Kamal Fakhredini

Behavioral Diseases Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

ARTICLE INFO

Keywords:
Whole wheat
Bread
Weight
Health Status
Iran

**Corresponding author:*
Ebrahim Shakiba, PhD;
Behavioral Diseases Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: Power.3325@yahoo.com

ABSTRACT

Background: The consumption of whole wheat bread is particularly vital for health. So this investigation assessed the effects of whole wheat bread consumption on the weight of individuals attending the urban health service centers within Kermanshah province, Iran.

Methods: In a case-control analysis and a randomized sampling technique during 2024, individuals aged 18 and older who sought services from comprehensive urban health service centers in Kermanshah, Iran were enrolled. Participants were categorized into two groups of 31 in the case group and 30 in the control group. The case group was instructed to consume whole wheat bread for three months and compared with the control group.

Results: Mean age of the participants was 47.81±9.85 years, 82% were female and 18% were male. Totally, 67.2% were housewive, 42.6% had educational qualifications, 18% experienced high blood pressure and equally had hyperlipidemia. The initial and follow-up weights in the control group were 80.50±4.76 and 80.03±4.91 kg, respectively, while no significant difference wasseen between before and after the study. These figures in the case group were 79.27±4.43 and 76.56±5.45 kg. Consuming whole wheat bread decreased after three months. Individuals who received whole wheat bread exhibited more normative weight, diminished abdominal adiposity, and more suitable body surface.

Conclusion: It is advisable that health policies aim a transition to a diet of whole wheat bread by educational plans.

Please cite this article as: Shakiba E, Arbabi S, Shakiba MH, Rezazadeh L, Babakhani M, Karami B, Fakhredini K. The Impact of Whole Wheat Bread Consumption on Weight of Individuals Aged 18 Years and Older Attending Comprehensive Urban Health Service Centers in Kermanshah, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S220.

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Int J Nutr Sci 2025;10(1-Supplement):S221.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Effect of Adding Lentil and Chickpea Powder on Rheological and Physico-Chemical Properties of Dough Taftoon Bread

Mehdi Hasani Shahmoradmahalle, Akram Sharifi*

Department of Food Science and Technology, Qazvin Branch, Islamic Azad University, Qazvin, Iran

ARTICLE INFO

Keywords:
Lentils
Chickpeas
Taftoon bread
Falling number
Flour

**Corresponding author:*
Akram Sharifi, PhD;
Department of Food Science and Technology, Qazvin Branch, Islamic Azad University, Qazvin, Iran.
Email: asharifi81@gmail.com

ABSTRACT

Background: Bread is still a major part of nutrition in developing countries. This study investigated the effect of adding lentil and chickpeas flour on physicochemical, rheological and organoleptic of taftoon bread.

Methods: The effect of adding lentil and chickpeas flour on physicochemical, rheological and organoleptic of taftoon bread was determined.

Results: Pea and lentil flour contained plenty of protein, fat, ash and crude fiber Addition of pea flour and lentils (25%), wet gluten resulted in a decrease from 5.26 to 3.7%. The absorption rate of wheat flour increased gradually and at different levels of chickpea flour and lentils from 2.66 to 5.73%. Wheat flour dough increased by 10 to 25% of flour, chickpea and lentil. Adding 15% of chickpea flour and lentils increased elasticity and maximum resistance to traction. Wheat flour falling number containing 10, 15 and 25% of chickpea flour and lentils were 330, 305 and 294 s, respectively.

Conclusion: The activity of alpha-amylase enzyme in chickpea flour and lentils was desirable. When it was added to wheat flour, lentil flour and chickpeas slightly reduced. Pea flour and lentils were a good source for formation of a mixture of taftoon bread.

Please cite this article as: Hasani Shahmoradmahalle M, Sharifi A. Effect of Adding Lentil and Chickpea Powder on Rheological and Physico-Chemical Properties of Dough Taftoon Bread. Int J Nutr Sci. 2025;10(1-Supplement):S221.

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Int J Nutr Sci 2025;10(1-Supplement):S222.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

National and International Standards for Production of Bread and Cereal Products: A Review

Shokoufeh Sharokhi Rezaei[1]*, Ehsan Zayerzadeh[2]

1. Food Industries and Agricultural Products Research Group, Food Industries and Agricultural Products Research Institute, Standards Research Institute, Karaj, Iran
2. Food Toxicology Research Group, Research Center of Food Technology and Agricultural Products, Standard Research, Institute, Karaj, Iran

ARTICLE INFO

Keywords:
National standards
International standards
Bread
Cereal
Food safety

**Corresponding author:*
Shokoufeh Sharokhi Rezaei, PhD;
Food and Agriculture Research Institute, Standards Research Institute, Iranian National Standards Organization (INSO), Karaj, Iran.
Email: sharokhi@standard.ac.ir

ABSTRACT

The production of bread and cereal products, as a primary food source globally, requires compliance with both national and international standards to ensure quality, safety, and consumer health. In Iran, the Iranian National Standards Organization (INSO) has developed several standards, including INSO 104 (2020) for traditional Iranian bread and INSO 2628 (2020) for the quality of cereal products. Internationally, the ISO 22000:2018 standard outlines food safety management systems applicable to the production of bread and cereal products. This review assessed national and international standards for production of bread and cereal products. Google Scholar, PubMed, Web of Science, Scopus and SID databases were searched using related keywords of national standards, international standards, bread, cereal, and food safety. These standards cover the selection of raw materials, production processes, packaging, labeling, and transportation. It was shown that both national and international standards have the role in ensuring product quality and safety; while their challenges in their implementation in the food industry, such as high compliance costs and the need for specialized training should be determined. It can be concluded that the alignment of national standards with international benchmarks is crucial for improving competitiveness and enhancing product safety.

Please cite this article as: Sharokhi Rezaei S, Zayerzadeh E. National and International Standards for Production of Bread and Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S222.

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Int J Nutr Sci 2025;10(1-Supplement):S223.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Factors Affecting the Quality and Shelf Life of Whole Meal Bread and Cereal Products: A Review

Shokoufeh Sharokhi Rezaei*

Food Science, Technology and Chemistry Department, Food and Agricultural Products Research Institute, Standard Research Institute, National Standards Organization, Karaj, Iran

ARTICLE INFO

Keywords:
Bread quality
Bread shelf life
Whole grain bread
Cereal
Packaging

ABSTRACT

Whole grain bread, as one of the primary sources of fiber and nutrients in the diet plays a significant role in maintaining health and preventing chronic diseases. However, due to the absence of chemical preservatives and its natural processing, the shelf life of whole grain bread is short, and its quality deteriorates over time. The purpose of this review article was to examine the factors influencing the improvement of the quality and shelf life of whole grain bread and cereal products. Google Scholar, Scopus and Pubmed databases were searched using keywords of quality, shelf life, whole grain bread, natural ingredients, enzymes, dietary fibers, and modern packaging technologies. The effect of storage temperature, humidity, and the use of natural preservatives such as organic acids on bread quality were explored. The results showed that various factors, such as reducing moisture during the baking process and using appropriate packaging could help extend the shelf life of bread. The use of natural ingredients like antifungal enzymes and antioxidants could also prevent early spoilage and maintain the quality of the bread. Moreover, applying modern technologies such as vacuum packaging and incorporating active materials in packaging had a positive impact on the bread's shelf life and quality. It can be concluded that combining modern technologies with traditional processing methods and using natural ingredients can significantly improve the shelf life and quality of whole grain bread. Continued research in this field can provide new solutions for enhancing the production and preservation processes of whole grain bread and cereal products.

*Corresponding author:
Shokoufeh Sharokhi Rezaei, PhD; Food Science, Technology and Chemistry Department, Food and Agricultural Products Research Institute, Standard Research Institute, National Standards Organization, Karaj, Iran.
Email: sharokhi@standard.ac.ir

Please cite this article as: Sharokhi Rezaei S. Factors Affecting the Quality and Shelf Life of Whole Meal Bread and Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S223.

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Int J Nutr Sci 2025;10(1-Supplement):S224.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Methods, Benefits, and Contemporary Challenges in Flour Fortification and Functional Cereal Products: A Review

Shokoufeh Sharokhi Rezaei*

Food Science, Technology and Chemistry Department, Food and Agricultural Products Research Institute, Standard Research Institute, National Standards Organization, Karaj, Iran

ARTICLE INFO

Keywords:
Flour fortification
Cereal
Probiotics
Sourdough
Shelf life

ABSTRACT

The fortification of flour and functional cereal products is recognized as a fundamental innovation in the food industry, aiming to improve the nutritional quality and enhance the functional properties of these products. This review focused on innovations in flour fortification and functional cereal products regarding the methods, benefits, and contemporary challenges. Google Scholar, PubMed and Scopus databases were searched using related keywords. The use of bioactive compounds such as probiotics, prebiotics, symbiotic, and dietary fibers in the fortification process contributes to promoting public health and reducing the risk of chronic diseases, including diabetes and cardiovascular diseases. Recent studies have shown that the use of industrial sourdough starters can lead to improvement of sensory properties, enhancement of texture and flavor quality of whole grain products, and reduction in the need for artificial additives. The results of this study indicated that combining modern technologies with traditional processing methods, especially the use of lactic sourdough and bioactive compounds can significantly improve the shelf life and nutritional quality of whole grain products. It can be concluded that smart and active packaging methods in cereal products have a positive effect on maintaining freshness and extending the shelf life of these products. However, challenges such as maintaining sensory characteristics and consumer acceptance remain as key barriers to further development of these products.

*Corresponding author:
Shokoufeh Sharokhi Rezaei, PhD; Food Science, Technology and Chemistry Department, Food and Agricultural Products Research Institute, Standard Research Institute, National Standards Organization, Karaj, Iran.
Email: sharokhi@standard.ac.ir

Please cite this article as: Sharokhi Rezaei S. Methods, Benefits, and Contemporary Challenges in Flour Fortification and Functional Cereal Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S224.

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Int J Nutr Sci 2025;10(1-Supplement):S225.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Functional Breads on Type 2 Diabetes: A Review

Parisa Shavali-Gilani[1*], Zahra Esmaeili[2], Parisa Sadighara[1], Nader Akbari[1], Mahdy Fatolahi[1]

1. Department of Environmental Health, Food Safety Division, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Medical Nanotechnology, Tehran University of Medical Sciences, Tehran, Iran

ARTICLE INFO

Keywords:
Functional bread
Diet
Diabetes
Blood glucose

**Corresponding author:*
Parisa Shavali-Gilani, PhD Candidate; Food Safety Division, Department of Environmental Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.
Email: parisashavalii@gmail.com

ABSTRACT

Diabetes disorder is a chronic condition characterized by elevated blood glucose due to insulin resistance or impaired insulin secretion. Managing diabetes effectively requires careful dietary choices, particularly carbohydrate intake. Enriched breads, which are fortified with essential nutrients, can be included in a diabetic diet when selected wisely. Whole grain and whole wheat breads are recommended for their high fiber content, which aid slowing glucose absorption and promote satiety. Additionally, The enrichment of bread with plant seeds gained attention for its potential to enhance nutritional value and improve health benefits. This study investigated the effect of functional breads on type 2 diabetes. The search was conducted ntil August 22, 2024 searching databases of PubMed, Scopus, and Science Direct utilizing keywords of functional breads, diabetes and blood glucose. Research on functional breads enriched with plant seeds showed promising results in managing type 2 diabetes mellitus. These studies highlighted the potential benefits of incorporating specific seeds and grains into bread formulations to improve glycemic control and overall health status. It can be concluded that functional breads enriched with specific nutrients or made from alternative grains can have significant potential for glycemic control and overall health in individuals with diabetes. Continued researches are essential to further validate these findings and explore the long-term benefits of incorporating these breads into diabetic diets.

Please cite this article as: Shavali-Gilani P, Esmaeili Z, Sadighara P, Akbari N, Fatolahi M. The Effect of Functional Breads on Type 2 Diabetes: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S225.

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Int J Nutr Sci 2025;10(1-Supplement):S226.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Whole Bread: Dos and Don'ts: A Review

Zahra Sheikholeslami[1*], Mahdi Karimi[1], Arezou Rouhi[2]

1. Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran
2. Department of Food Science and Technology, Ferdowsi University of Mashhad (FUM), Mashhad, Iran

ARTICLE INFO

Keywords:
Whole bread
Phytic acid
Fermentation
Bran
Enhancer

**Corresponding author:*
Zahra Sheikholeslami, PhD;
Agricultural Engineering Research Department, Khorasan Razavi Agricultural and Natural Resources Research and Education Center, AREEO, Mashhad, Iran.
Email: shivasheikholeslami@yahoo.com

ABSTRACT

Currently, due to the problems caused by the negative effect of bran on the fermentation process of bread and creating stickiness in the dough, about 15% of wheat grains are separated in the form of bran and used as animal feed. If bran is returned into the bread production by adhering to technical and nutritional considerations, it can be a significant step for the country both economically and nutritionally. This review investigated "Dos and Don'ts" for whole bread. PubMed, Scopus and Google Scholar databases were searched regarding correlated keywords. It was shown that whole grain bread contains more nutrients compared to white bread, including fiber, vitamins, and minerals. Additionally, consuming whole grain bread can contribute to improved digestive health and a reduced risk of chronic diseases. Moreover, the impact of whole bread on health can vary based on individual dietary needs, such as gluten sensitivity or carbohydrate intake. It is important to pay attention to the ingredients, the production process, and the quality of the flour when selecting whole grain bread. It can be concluded that the consumption of whole bread should be institutionalized as an appropriate option in individuals' daily diets. However, it is essential to avoid poor choices and processed breads with additives. To achieve the maximum benefits of whole bread, educating consumers and producers is of great importance.

Please cite this article as: Sheikholeslami Z, Karimi M, Rouhi A. Whole Bread: Dos and Don'ts: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S226.

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Int J Nutr Sci 2025;10(1-Supplement):S227.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Evaluation of Policy to Modify Permissible Limit of Salt in Traditional Breads and Industrial Food Products

Razieh Shenavar[1*], Nasrin Omidvar[1], Delaram Ghodsi[1], Siyamak Shams[2], Seyed Mohammad Mazloomi[3], Payam Ramezani[4], Maryam Aghayan[1]

1. Department of Community Nutrition, School of Nutrition Sciences and Food Technology, Shahid Beheshti University of Medical science, Tehran, Iran
2. Department of Environment, Health Vice Chancellor, Shiraz University of Medical Science, Shiraz, Iran
3. Nutrition Research Center, Quality Control and Food Safety Department, Faculty of Nutrition Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
4. Food and Drug Vice Chancellor, Food Management, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Health policy
Bread
Salt
Standard
Industrial food

**Corresponding author:*
Razieh Shenavar, PhD;
Department of Community Nutrition, School of Nutrition Sciences and Food Technology, Shahid Beheshti University of Medical science, Tehran, Iran.
Email: Shenavar.razieh@yahoo.com

ABSTRACT

Background: Among policies to reduce salt consumption, modification of permitted limit of bread and industrial food products can be beneficial. This study evaluated the policy of implementing salt limit in traditional breads and industrial food products in Shiraz, Iran.

Methods: In a retrospective qualitative study, qualitative data were collected using semi-structured interviews with key individuals in the field. Participation was selected in a targeted manner being snowballed. The interview guide was restructured to reach the information.

Results: Average amount of salt in traditional breads was 34.4%. In dairy and meat industrial food products, the amount of salt was 100% in accordance with permissible limit, and in tomato paste and industrial bread was higher than permissible limit. Important methods and facilitators of bread salt reduction policies, weakness in supervision and monitoring, multiplicity of trustees and parallel work, poor quality of flour, etc. were identified.

Conclusion: Improving bread depends on wheat production, processing, storage and its preparation.

Please cite this article as: Shenavar R, Omidvar N, Ghodsi D, Shams S, Mazloomi SM, Ramezani P, Aghayan M. Evaluation of Policy to Modify Permissible Limit of Salt in Traditional Breads and Industrial Food Products. Int J Nutr Sci. 2025;10(1-Supplement):S227.

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Int J Nutr Sci 2025;10(1-Supplement):S228.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Substitute Compounds on Cookie Formulation: A Review

Melika Fallahi[1], Khadijeh Jafari[1], Nikta Shojaei Borjouei[2*]

1. Department of Food Science and Industry, Islamic Azad University, Noor Branch, Tehran, Iran
2. Department of Food Science and Industry, Islamic Azad University, Science and Research Branch, Tehran, Iran

ARTICLE INFO

Keywords:
Cereal
Formulation
Cookie

**Corresponding author:*
Nikta Shojaei Borjouei, PhD Candidate;
Department of Food Science and Industry, Islamic Azad University, Science and Research Branch, Tehran, Iran.
Email: niktashojaei@yahoo.com

ABSTRACT

As a traditional and popular sweet, cookies play an important role in different cultures. Due to the variety in preparation and pleasant taste, cookies still have a special place among people, and more research in this field can help to better understand and develop this sweet. This review determined the effect of substitute compounds on cookie formulation. Google Scholar, PubMed, Web of Science and Scopus were searched using related keywords. Due to the increase in people's awareness of healthy eating and the need for gluten-free products, many researches have been conducted in the field of replacing wheat with other grains and legumes in the preparation of cookies. In the cookie formulation, you can use different substitutes (substitutes for flour, sugar, oil, eggs, and baking powder) to improve quality, nutritional value, and even reduce costs. Using oat flour instead of wheat flour can add more fiber to the cookies and help improve digestion. hese researches have been carried out in order to improve the nutritional value and sensory properties of cookies. In conclusion, this review takes a brief look at some alternatives in the formulation of cookie production and its effects on texture, physico-chemical characteristics, according to previous records.

Please cite this article as: Fallahi M, Jafari K, Shojaei Borjouei N. The Effect of Substitute Compounds on Cookie Formulation: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S228.

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Int J Nutr Sci 2025;10(1-Supplement):S229.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Health-Promoting Effect of Dried Fruit and Vegetable Powder as Bioactive Compounds in Biscuits: A Review

Nazdar Shojaei*

Food Technology, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Bioactive compounds
Cereal products
Antioxidant properties
Agricultural waste
Drying

**Corresponding author:*
Nazdar Shojaei, MSc;
Food Technology, Department of Food Science, College of Agriculture, University of Tabriz, Tabriz, Iran.
Email: Nazshojaei.1993@gmail.com

ABSTRACT

Today, due to lifestyle changes and increased awareness, developing and advanced societies pay special attention to enriching foods with bioactive compounds. In this regard, food fortification with vitamins, natural colors, phenolic compounds, and bioactive peptides can be an effective way to improve consumers' health. Some agricultural products have high nutritional value and can be used as functional ingredients in the food industry. In the present article, the health-promoting effects of dried fruit and vegetable powders such as mango, apple, carrot, pumpkin, pomegranate, blueberry, grape, orange, and mushroom on the rheological, physicochemical, and quality characteristics of biscuits have been investigated. Google Scholar, PubMed, Scopus and Web of Science were searched using related keywords. An increase in fiber content and nutritional value of fortified biscuits was shown. Dried blueberry is a rich source of phenols, minerals, and dietary fiber. Dried carrot and pumpkin powders can also enrich biscuits with beta-carotene and dietary fiber. Adding dried fruit and vegetable powders to biscuit formulations contributes to higher content of vitamins, minerals, phenolic compounds, and dietary fiber. Considering the nature of fruit and vegetable fiber, functionally, fibers have properties such as increased adhesion and water retention, thickening, and gelling. Finally, it can be concluded that the physicochemical and textural properties of biscuits are improved by the addition of these dried fruit and vegetable powders.

Please cite this article as: Shojaei N. Health-Promoting Effect of Dried Fruit and Vegetable Powder as Bioactive Compounds in Biscuits: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S229.

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Int J Nutr Sci 2025;10(1-Supplement):S230.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Use of Lecithin in Flour and Bread: A Review

Samira Beikzadeh[1], Zahra Sohrabi[2]*, Ghazaleh Mohammad Rezaei[2]

1. Department of Food Science and Nutrition, Maragheh University of Medical Science, Maragheh, Iran
2. Student Research Committee, Maragheh University of Medical Sciences, Maragheh, Iran

ARTICLE INFO

Keywords:
Lecithin
Bread
Rheological behavior
Sensory characteristics
Quality

**Corresponding author:*
Zahra Sohrabi, BSc;
Student Research Committee,
Maragheh University of Medical
Sciences, Maragheh, Iran.
Email: Zhrashraby120@gmail.com

ABSTRACT

Emulsifiers are widely used in the bakery industry as dough enhancers and bread texture softeners. Lecithin, which is a natural surfactant that can help improve the rheological behavior of dough, the quality characteristics and the sensory properties of bread that has been evaluated in flour and bread in this review. Articles were selected from Science Direct, Google scholar and PubMed from 2000 to 2024 using related keywords. Adding a certain amount of lecithin to bread dough improves qualitative characteristics such as volume, porosity, elasticity, and sensory characteristics such as appearance, crust, softness and taste of bread. It affects allogram properties by increasing dough strength, baking power, P/L configuration ratio, and decreasing dough elasticity and swelling index. The percentage of water absorption with addition of surfactants such as lecithin significantly increases and delays the rate of bread staleness, which results in a reduced waste. The compressibility of bread is improved by adding lecithin to its dough and results in softer bread. Lecithin improves the shelf life of bread by slowing down the rate at which it goes stale, so bread stays fresh and tasty for longer time. It can be concluded that the use of lecithin in the bakery industry helps improve the quality and characteristics of bread and flour and increase the shelf life and freshness of the products. It plays an important role in production of high quality bread by improving the rheological behavior of the dough, increasing the volume and porosity of the bread, and improving the sensory characteristics such as the appearance, crust, softness and taste of the bread.

Please cite this article as: Beikzadeh S, Sohrabi Z, Mohammad Rezaei G. The Use of Lecithin in Flour and Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S230.

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Int J Nutr Sci 2025;10(1-Supplement):S231.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Application of Gluten-Free Products; Harms and Benefits: A Review

Seyede Hanieh Sadati[1], Pedram Meshkinghalam[1], Zahra Sohrabi[2*]

1. Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Celiac disease
Nutrition
Deficiency
Health-promoting

**Corresponding author:*
Zahra Sohrabi, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Zahra_2043@yahoo.com

ABSTRACT

Celiac Disease (CD) is a life-long intolerance to gluten proteins (the seed storage proteins) found in grains such as rye, wheat, and barley. Consuming gluten-containing cereals cause a chronic inflammatory process that leads to lesions in the small intestine and impaired nutrient absorption. This review assessed application of gluten-free products and evaluated their harms and benefits searching Google Scholar utilizing appropriate keywords. Typical clinical manifestations of CD include chronic diarrhea, weight loss and anemia, mainly due to malabsorption, as a direct consequence of intestinal villous atrophy. The only safe and efficacious treatment for people with celiac disease is the long-life avoidance of gluten from the diet. Gluten-free products can be associated with nutrient imbalances. In addition to the high glycemic index and caloric density of cereal-based gluten-free foods, these products were also associated with poor micronutrients such as B vitamins and minerals such as calcium, zinc, iron and magnesium. People who regularly consume gluten-free cereal-based products are known to have a higher sugar and fat intake, which can lead to obesity and other health problems. Grains that are gluten-free such as maize, rice, sorghum, Millet, and teff, as well as pseudo-cereals such as buckwheat, and quinoa have many potential health benefits that can be used to improve current nutritional deficiencies. It can be concluded that gluten-free cereals are initially made for consumers who suffer from gluten related diseases such as wheat allergies, gluten ataxia, non-celiac gluten sensitivity, wheat dependent, exercise-induced anaphylaxis (WDEIA) and the most well-known one named celiac disease.

Please cite this article as: Sadati SH, Meshkinghalam P, Sohrabi Z. Application of Gluten-Free Products; Harms and Benefits: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S231.

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Int J Nutr Sci 2025;10(1-Supplement):S232.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Health-Promoting Effects of Whole Grain Components: A Review

Seyede Hanieh Sadati[1], Zahra Sohrabi[2*], Marzie Akbarzadeh[2]

1. Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grain
Phenolic compounds
Bran
Endosperm
Health

**Corresponding author:*
Zahra Sohrabi, PhD;
Nutrition Research Center, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Zahra_2043@yahoo.com

ABSTRACT

Dietary whole grain consumption has beneficial health-promoting effects on decreasing the risk of type 2 diabetes, cardiovascular diseases, colorectal cancer, and obesity. It can reduce total serum cholesterol and low-density lipoprotein (LDL). These effects root from the potentially healthful ingredients of whole grains. This review investigated health-promoting effects of whole grain components searching Google Scholar database using the related keywords. A whole grain kernel contains the endosperm, germ, and bran. The bran's outer coating is rich in fiber and the inner germ contains vitamins, minerals, lignans, and phytochemicals. The phytosterols found in the whole grains can reduce cholesterol absorption and also increase its excretion. Moreover, it contains soluble fiber which can potentially lower serum LDL cholesterol and total serum cholesterol and decrease the rate of glucose absorption. Whole grain phytochemical constituents can influence the vascular endothelium directly by promoting vasodilation, which leads to a reduction in the blood pressure. It may involve the antioxidant actions of whole grain's phenolics and vitamin E, which scavenge free radicals and thereby prevent oxidation damage to DNA bases. Trace minerals found in the whole grains, such as selenium, zinc, copper, and manganese, are cofactors for enzymes that conduct antioxidant functions such as glutathione peroxidase and superoxide dismutase. People who consume more whole grains are likely to have a healthier lifestyle because they exercise more and have lower fat and higher dietary fiber intakes. In conclusion, whole grains can be recommended in the diet in most countries focusing on their health-promoting effects due to their potentially healthful ingredients.

Please cite this article as: Sadati SH, Sohrabi Z, Akbarzadeh M. Health-Promoting Effects of Whole Grain Components: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S232.

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Int J Nutr Sci 2025;10(1-Supplement):S233.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Sensory Evaluation of Kerman Traditional Kerenon Bread in Kerman, Iran

Najmeh Soleimani*, Fatemeh Derijani

Agricultural and Natural Resources Research and Education Center, Kerman Agricultural Research and Education Organization, Kerman, Iran

ARTICLE INFO

Keywords:
Barbari bread
Kerenon bread
Sangak bread
Sourdough
Sensory evaluation

ABSTRACT

Background: Kornoon bread is cooked in Shahrbabak city of Kerman province and its surrounding villages. This bread has a long shelf life and excellent taste. Natural and organic local dough is used to prepare this bread. The native sourdough used in the production of this bread hass more than 300 years history, and contains millions of useful microorganisms. The presence of these microorganisms can lead to the complete decomposition of the dough, and result in an easy digestion for the bread. Sensory evaluation of this bread was done with the aim of comparing the acceptability of Kornoon bread against two traditional Berber and Sangak breads.

Methods: To evaluate and compare the sensory characteristics of Kerenon bread, Kerenon, Sangak, and Barbari bread types were transferred from the wheat bread production unit to the food industry laboratory of the Agricultural Research Center in Kerman at a specified time. The sensory attributes of these breads (staleness, aroma, taste, flavor, color, appearance, burning, texture, chewability, and overall acceptance) were assessed by ten previously trained evaluators through a questionnaire in the early hours after baking, one day and three days after baking.

Results: It was shown that Kerenon bread had a better texture, taste, and flavor compared to Sangak and Barbari bread types. The high score of flavor and taste of Kerenon bread can be due to its special baking method in the oven and the absence of direct flame during baking, which allows gradual cooking, improves the crumb and ensures to be well-baked. Additionally, this bread staled more slowly and had a higher chewability compared to Sangak and Barbari bread types. The use of traditional local sourdough could contribute to the freshness and reduced staling of this bread. Following Kerenon bread chewability and overall acceptance, Sangak bread ranked the next chewability and overall acceptance, while the staling and chewability of Barbari bread showed a greater increase over time.

Conclusion: The sourdough used in the preparation of Kerenon bread is a type of indigenous sourdough that has been utilized for several hundred years as the main factor contributing to the desirable sensory and quality characteristics of this bread. The fermentation of sourdough is associated with antifungal and antibacterial properties, which can enhance the shelf life, quality, and organoleptic characteristics of this bread. From a microbiological perspective, sourdough is a specific and stressful ecosystem characterized by a low pH and a high carbohydrate content, which can be determined by comparing the number of bacterial cells to the number of yeasts. Therefore, there is a need for comprehensive research on the microflora and quality of traditional Kerenon sourdough.

*Corresponding author:
Najmeh Soleimani, MSc;
Agricultural and Natural Resources Research and Education Center,
Kerman Agricultural Research and Education Organization,
Kerman, Iran.
Email: najme.59.soleimani@gmail.com

Please cite this article as: Soleimani N, Derijani F. Sensory Evaluation of Kerman Traditional Kerenon Bread in Kerman, Iran. Int J Nutr Sci. 2025;10(1-Supplement):S233.

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Int J Nutr Sci 2025;10(1-Supplement):S234.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Gluten-Free Diet and Technology of Bakery Products: A Review

Sahar Sabahi[1], Reihaneh Sorourian[2*]

1. Department of Nutrition, School of Allied Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
2. Department of Food Science and Technology, North Tehran Branch, Islamic Azad University, Tehran, Iran

ARTICLE INFO

Keywords:
Bakery products
Celiac disease
Gluten-free diet
Dough
Hydrocolloid

**Corresponding author:*
Reihaneh Sorourian, PhD;
Department of Food Science and Technology, North Tehran Branch, Islamic Azad University, Tehran, Iran.
Email: rsorourian@yahoo.com

ABSTRACT

Celiac disease is a genetic autoimmune disturbance determined by sensitivity to gluten. The only treatment for the person with celiac disease is a lifelong gluten-free diet. However, strict adherence to a gluten-free diet is challenging due to the poor nutritional quality, taste, and quality of gluten-free products. Gluten is the main constituent of flour and is responsible for the dough's cohesion, softness, and elasticity properties. Gluten contributes to the structure of the crumb and the appearance of many baked products, and its removal creates major problems for bakers. So this review was conducted to assess gluten-free diet and technology of bakery products searching Google Scholar database using related keywords. For this purpose, proteins with similar features of gluten (prolamins) in other species of cereal such as avenins in oats, secalins in rye, and hordeins in barley can be applied in dough preparation. Also, since the capability to gelatine starch plays a key role in the preparation of bread, the removal of wheat flour can endanger the quality of the leavened dough. To overcome this problem, new types of gluten-free wheat starch (acetylated, hydroxypropylated, and cross-linked starches) can be used to increase water-binding and dough volume. In addition, Hydrocolloids such as xanthan gum and guar gum can be considered a great alternative to gluten because of their capability to bind water, form polymer structures, and form films and networks that improve the texture of gluten-free products without any flavor change. In conclusion, since these foods are designed for daily consumption, long-term impact studies and clinical tests are essential to evaluate the safety and efficacy of these flours.

Please cite this article as: Sabahi S, Sorourian R. Gluten-Free Diet and Technology of Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S234.

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Int J Nutr Sci 2025;10(1-Supplement):S235.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Valorization of Bread Waste and Their Application: A Review

Parisa Ahmadi[1], Azam Ahmadi[2], Mahnaz Tabibiazar[2]*

1. Food Safety and Hygiene, Department of Food Sciences and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran
2. Food Safety and Hygiene, Department of Food Sciences and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

ARTICLE INFO

Keywords:
Bread waste
Breadcrumb extrudates
Valorization
Value-added products

**Corresponding author:*
Mahnaz Tabibiazar, PhD;
Department of Food Sciences and Technology, Faculty of Nutrition and Food Sciences, Tabriz University of Medical Sciences, Tabriz, Iran.
Email: Mahnaz_tabibiazar@yahoo.com

ABSTRACT

Excessive production of food, coupled with wasteful consumer behavior, has led to mass production of food waste globally that results in environmental pollution, substantial economic losses and posing a major challenge to resource efficiency. Valorization of bread waste was reviewed in this study searching Google Scholar database using proper keywords. Food waste management and provision of added value from these wastes gained attention. The main strategy for recycling bread waste is solid-state fermentation. Due to the richness of bread waste in high-quality and fermentable sugars, proteins and other nutrients, they serve as an ideal substrate for microorganisms such as bacteria, fungi, and yeasts. So simple sugars like glucose are released from polysaccharides with the help of enzymes from these microorganisms. By extending the fermentation stage, bread hydrolysates is converted into new products of bioethanol, biohydrogen, lactic acid, succinic acid, acetic acid, xanthan gum, proteins, pigments (carotenoids, aromatic compounds, terpenes), and enzymes (alpha-amylase and protease). Carbon dots derived from bread waste demonstrated antimicrobial, antioxidant, and fluorescent properties, making them suitable for applications in food packaging and sensors. In baking industry for valorizing of low-quality bread is their reprocessing. Breadcrumbs have high potential for use as low-cost raw materials in extrusion cooking. Breadcrumb extrudates exhibit higher expansion values and better textural properties (lower hardness and higher crispness) and a higher total dietary fiber content. In conclusion, the use of these wastes in beverage industries as a malt substitute can reduce bakery wastes. The potential applications of bread waste for producing various chemicals, biofuels, bioplastics, and other renewable products through microbial fermentation and the production of new food items using innovative technologies like extrusion demonstrate the high potential of bread waste in creating value-added products and reducing food waste.

Please cite this article as: Ahmadi P, Ahmadi A, Tabibiazar M. Valorization of Bread Waste and Their Application: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S235.

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Int J Nutr Sci 2025;10(1-Supplement):S236.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Investigating Bread Core Properties Based on Image Processing Method Affected by Replacement of White Quinoa Flour in Formulation

Hesam Aldin Akhoondzadeh, Masoud Taghizadeh*

Department of Food Science and Technology, Ferdowsi University of Mashhad, Mashhad, Iran

ARTICLE INFO

Keywords:
Bread
Quinoa
Image processing
Bread structure

ABSTRACT

Background: Bread accounts for approximately 30% of the world's food consumption as offers a high protein, energy, and affordability. It has sensory and textural characteristics that are influenced by raw materials and production and storage processes. Quinoa, scientifically known as *Chenopodium quinoa* wild, is a dicotyledonous plant belonging to the *Chenopodiaceae* family and by Food and Agriculture Organization is introduced a functional food. In this study, bread core properties based on image processing method affected by replacement of white quinoa flour in formulation were investigated

Methods: The effect of quinoa flour (25%, 50%, 75%, and 100%) along with wheat flour, with and without addition of an improver was assessed on color parameters and image texture (energy, entropy, contrast, and homogeneity).

Results: It was shown that with increasing the percentage of quinoa flour, the L parameter (lightness) and a parameter of the samples increased, while the b* parameter decreased. Also, with increasing the percentage of quinoa flour, the energy, entropy, and homogeneity of the samples increased, while the contrast of the samples decreased.

Conclusion: Due to irregular and complex morphological structure of bread, fractal theory is used to examine the effect of processes and compounds. Image texture analysis can express changes in crumb texture of bread and based on textural parameters (contrast, homogeneity, entropy, and energy), these changes can be evaluated. It was shown that the sample containing 50% quinoa flour along with an improver revealed better textural properties.

*Corresponding author:
Masoud Taghizadeh, PhD;
Department of Food Science and Technology, Ferdowsi University of Mashhad, Mashhad, Iran.
Email: mtaghizadeh@um.ac.ir

Please cite this article as: Akhoondzadeh HA, Taghizadeh M. Investigating Bread Core Properties Based on Image Processing Method Affected by Replacement of White Quinoa Flour in Formulation. Int J Nutr Sci. 2025;10(1-Supplement):S236.

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Int J Nutr Sci 2025;10(1-Supplement):S237.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Effect of Gas Nano-Bubbles of Wheat Flour Doughs on Bread Quality: A Review

Fateme Asadi Touranlou*, Mohammad Hashemi

Department of Nutrition, Faculty of Medicine, University of Medical Sciences, Mashhad, Iran

ARTICLE INFO

Keywords:
Bread
Wheat flour doughs
Quality
Gas nano-bubbles

*Corresponding author:
Fateme Asadi Touranlou, MSc;
Department of Nutrition, Faculty of Medicine, University of Medical Sciences, Mashhad, Iran.
Email: asadif4002@mums.ac.ir

ABSTRACT

The quality of bread is influenced by various factors, including the physical and chemical properties of the dough. Recently, addition of gas nano-bubbles also known as nano-bubbles to wheat flour doughs was shown to improve bread quality. This review aims to summarize the current knowledge on the effect of gas nano-bubbles in wheat flour doughs on bread quality. A systematic search of relevant literature was conducted using databases of Scopus, Web of Science, and PubMed using the correlated keywords. A total of 15 articles were selected for this review. The results of this review indicate that the addition of gas nano-bubbles to wheat flour doughs could significantly improve bread quality by increasing its volume, softness, and crumb texture. Gas nano-bubbles could also enhance the shelf life of bread by reducing staling and increasing its resistance to moisture. Furthermore, the incorporation of gas nano-bubbles could improve the sensory characteristics of bread, such as its aroma and taste. In conclusion, the addition of gas nano-bubbles to wheat flour doughs was shown to positively impact bread quality. The results of this review suggest that gas nano-bubbles can be used as a novel tool to improve the texture, structure, and shelf life of bread. Future research should focus on optimizing the incorporation of gas nano-bubbles into dough and investigating their effects on different types of bread.

Please cite this article as: Asadi Touranlou F, Hashemi M. Effect of Gas Nano-Bubbles of Wheat Flour Doughs on Bread Quality: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S237.

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Int J Nutr Sci 2025;10(1-Supplement):S238.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Use of Rice Bran Proteins in Gluten-Free Products: A Review

Farzaneh Vaseghi*, Zohreh Ahmadi, Seyed Ali Askarpour

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Gluten-free
Rice bran proteins
Bioactive peptides
Celiac disease

ABSTRACT

Following a gluten-free diet for life is an effective way to control symptoms and improve the quality of life of celiac patients. Rice bran, a by-product of the rice milling processes, contains significant amounts of bioactive peptides, which has been considered as a valuable resource in the food industry, especially gluten-free foods. Use of rice bran proteins in gluten-free products was evaluated in this review. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords of gluten-free, bioactive peptides, Rice bran proteins, Celiac disease. Rice bran peptides can strongly affect the rheological properties and relative elasticity, improve the texture and consistency of gluten-free products due to their emulsifying and stabilizing properties, and help maintain moisture in gluten-free baked products and prevent drying and prevent them from becoming brittle. Rice bran peptides can also improve the flavor profile of gluten-free products, potentially masking off-flavors that may arise from alternative flours or other gluten substitutes. These peptides have been used in the formulation of pasta and gluten-free snacks in order to increase the protein content and improve the overall texture and elasticity of the product. Rice bran peptides are a valuable ingredient in the gluten-free food industry. With their unique properties, these peptides have a promising future in improving the quality and nutritional value of gluten-free products. In conclusion, the bioactive properties of these peptides, along with their rich protein content and positive effect on tissue, make them an ideal option to meet the growing consumer demand for healthy, plant-based alternatives. Due to this potential, rice bran peptides can play a key role in the formulation of gluten-free products.

*Corresponding author:
Farzaneh Vaseghi, PhD student;
Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: vaseghifarzane75@gmail.com

Please cite this article as: Vaseghi F, Ahmadi Z, Askarpour SA. Use of Rice Bran Proteins in Gluten-Free Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S238.

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Int J Nutr Sci 2025;10(1-Supplement):S239.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Extraction Methods of Bran Bioactive Peptides from By-Products Produced during Rice Milling Processes: A Review

Farzaneh Vaseghi*, Zohreh Ahmadi, Seyed Ali Askarpour

Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Extraction
Bioactive peptides
Rice bran proteins
Milling

**Corresponding author:*
Farzaneh Vaseghi, PhD student; Department of Food Hygiene and Quality Control, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: vaseghifarzane75@gmail.com

ABSTRACT

Rice bran is one of the by-products produced through rice milling processes, which is a valuable source of bioactive peptides with antioxidant, anti-inflammatory, anti-blood pressure, antimicrobial, cholesterol reduction and anti-obesity effects. This review determined extraction methods of bran bioactive peptides from by-products produced during rice milling processes. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords of extraction, bioactive peptides, and rice bran proteins. The protein content of rice bran as well as its chemical composition varies according to the place of growth, irrigation, fertilization, environmental factors and pre-processing conditions. The main protein part of rice bran includes albumin, globulin, glutelin and prolamin. In order to extract bioactive peptides from rice bran, various methods such as chemical, enzymatic and physical extraction methods have been used. The main physical methods used to extract protein from rice bran are ultrasound, subcritical water, and microwave. In this study, the advantages and disadvantages of the mentioned extraction methods were investigated. Among the extraction methods of bioactive peptides from rice bran, the alkaline method is popular due to its low cost, but it requires a long time and a large volume of chemical solvents and can negatively affect the protein quality. The enzyme method causes less destruction of amino acids and environmental effects, but it is more expensive. In conclusion, the favorite extraction method of the food industry is the physical extraction method such as ultrasound, microwave, and subcritical water. These methods are effective in laboratory scale, but their implementation in industrial scale is challenging and expensive.

Please cite this article as: Vaseghi F, Ahmadi Z, Askarpour SA. Extraction Methods of Bran Bioactive Peptides from By-Products Produced during Rice Milling Processes: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S239.

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Int J Nutr Sci 2025;10(1-Supplement):S240.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Use of Pulsed Flour (Legume Flour) in Bakery Products: A Review

Fatemeh Yazdani*, Seyed Hadi PeyghambarDoost, Majid JafariNia

Food Science and Engineering, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

ARTICLE INFO

Keywords:
Pulsed flour
Legume flour
Bakery

**Corresponding author:*
Fatemeh Yazdani, MSc;
Food Science and Engineering,
Faculty of Agriculture, University of
Tabriz, Tabriz, Iran.
Email: ftm.yazdanii@gmail.com

ABSTRACT

Legumes are a rich source of protein, fiber, and minerals. Numerous studies have shown that their consumption is beneficial for health. Consequently, in recent years, the use of legume flour in baked goods has increased. However, due to their strong flavors, the use of legume flour in high amounts has been limited. Sweet flavors can mask these undesirable tastes, making sweet baked goods like cookies and cakes suitable options for enrichment with legume flour. This review discusses the impact of using legume flour in these products, considering the percentage of incorporation and the characteristics of the flour, such as protein content and particle size, as well as potential methods for reducing unpleasant flavors. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. The impact of enrichment with legume protein concentrates or isolates, the replacement of eggs in cakes with these materials, and the application of aquafaba (the water resulting from cooking legumes) are also examined. Enriching sweet baked goods with pulse flour (legume flour) is an innovative and effective approach to enhance the nutritional value of these products. Pulse flour, derived from legumes like chickpeas, beans, lentils, and peas, is rich in protein, fiber, and minerals, which can improve the nutritional content of bread, cakes, and other baked goods. By adding pulse flour to sweet baked products, not only is the nutritional quality enhanced, but it can also contribute to reducing wheat flour consumption, which is significantly important from a food sustainability and environmental perspective. In conclusion, this process can assist in the development of products suitable for individuals with specific nutritional needs, such as those with gluten sensitivity or those seeking healthier alternatives to traditional baked goods.

Please cite this article as: Yazdani F, PeyghambarDoost SH, JafariNia M. Use of Pulsed Flour (Legume Flour) in Bakery Products: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S240.

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Int J Nutr Sci 2025;10(1-Supplement):S241.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

Mill, Durability, Nutritional Value, Nutrition and Health Benefits of Whole Meal Bread

Ali Yousefi*

Faradane Starch Factory, Mohsen Keshtkaran Factory, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole meal flour
Dietary fiber
Mill
Durability
Nutrition

ABSTRACT

Background: Whole meal flour faces more challenges during cooking and storage due to its higher amount of lipids, antioxidants and enzyme activities as most of the lipids are broken down by lipid enzymes and lipoxygenases. The durability of wheat flour depends on conditions of wheat production, storage, milling, temperature and humidity, but in whole flour, due to the presence of bran, the shelf life is longer. Mill, durability, nutritional value, nutrition and health benefits of whole meal bread were assessed in this study.

Methods: Mill, durability, nutritional value, nutrition and health benefits of whole meal bread were assessed including Sirvan, Chamran 2, durum and foreign wheat in bakeries using ascorbic acid, and potassium bromate.

Results: An increase in bran flour and quality and rheology of dough, increase in water absorption, reduction in development time and stability of dough, reduction in peak viscosity and final viscosity, reduction in resistance of dough to expansion, reduction in gluten network; reduction in gas bubbles and the size of the bubbles can lead to a decrease in the volume of bread. Whole flour has fiber with high nutritional value increases water absorption and satiety, accelerates intestinal peristalsis, eliminates intestinal toxins, and controls body weight. A high fiber in flour increases the absorption of free estrogen that can further reduce risk of breast cancer. Whole flour has more nutrients than other flours, including protein, calcium, fiber, magnesium, zinc, potassium and vitamins A, E and K. The most suitable granulation of whole flour with medium particles on average 180 sieve µ was 20-25%. Among all flours, whole meal flour had the highest nutritional value, but in terms of cooking quality and storage time, the quality was lower and it became stale in a faster period of time.

Conclusion: Cultivating the use of bread produced with whole meal flour can solve the lack of nutrients in society to an acceptable extent and has the ability to prevent many diseases.

**Corresponding author:*
Ali Yousefi, BSc;
Faradane Starch Factory, Mohsen Keshtkaran Factory, Shiraz, Iran.
Email: ali.yousefi7192@gmail.com

Please cite this article as: Yousefi A. Mill, Durability, Nutritional Value, Nutrition and Health Benefits of Whole Meal Bread. Int J Nutr Sci. 2025;10(1-Supplement):S241.

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Int J Nutr Sci 2025;10(1-Supplement):S242.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Bread Containing Synbiotics on Complications of Type 2 Diabetes: A Review

Samaneh Zaboli Nejad[1]*, Arefeh Sedighnia[2]

1. Nutrition Sciences Department, Zahedan University of Medical Sciences, Zahedan, Iran
2. Biochemistry Department, Zahedan University of Medical Sciences, Zahedan, Iran

ARTICLE INFO

Keywords:
Bread
Synbiotics
Diabetes
Diet

*Corresponding author:
Samaneh Zaboli Nejad, BSc;
Nutrition Sciences Department,
Zahedan University of Medical
Sciences, Zahedan, Iran.
Email: ali.samane.3161400@gmail.
com

ABSTRACT

Bread contains micronutrients and macronutrients needed by the human body. Synbiotic refers to the combination of probiotics and prebiotics, which causes positive changes in intestinal microbes. In recent years, the use of substances Food containing synbiotics has been increased to manage diseases, one of which is type 2 diabetes. Synbiotics reduce the complications of type 2 diabetes in these patients by increasing the intestinal microbiome. In this study, the effect of bread containing synbiotics on the complications of type 2 diabetes has been investigated. PubMed database was searched using keywords of bread, synbiotics, diabetes, and diet. All keywords were MeSH. Articles were extracted by combining the words synbiotics and diabetes (135 items), synbiotics and diet (347 items), and synbiotic and bread (11 items). From the 493 articles extracted in the initial search, 30 articles were finally reviewed. The above studies investigated the effect of synbiotic bread on lipid profile (VLDL, HDL and cholesterol), insulin metabolism, the effect of gut microbiota on type 2 diabetes and diabetes control, the effect of synbiotic on type 2 diabetes complications and human health. Consuming breads containing synbiotics is a way to increase the intestinal microbiome and improves the complications of type 2 diabetes and effects such as reducing insulin resistance, improving lipid profile, reducing oxidative stress and increasing immunity in these patients. In conclusion, it is recommended to increase the industrial production of synbiotic breads in order to raise the health level of the society.

Please cite this article as: Zaboli Nejad S, Sedighnia A. The Effect of Bread Containing Synbiotics on Complications of Type 2 Diabetes: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S242.

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Int J Nutr Sci 2025;10(1-Supplement):S243.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Impact of Whole Meal Bread and Cereal Products on Nutrition and Health Status: A Review

Soghara Zahdi*

Department of Food Sciences and Industries, Gouchan Unit, Islamic Azad University, Gouchan, Iran

ARTICLE INFO

Keywords:
Wheat
Bread
Cereal products
Nutrition
Health

ABSTRACT

Considering the country's regional, cultural, economic and social characteristics, cereals and especially bread are the main sources of people's daily food patterns and provide a major part of the body's energy and protein needs. Bread, as a fermented product, is mainly produced from white wheat flour, water, yeast, and salt. It includes the processes of mixing, kneading, fermentation, shaping, and baking. This review investigates the impact of whole meal bread and cereal products on nutrition and health status. So Scholar Google, PubMed and Scopus data bases were searched using the related keywords. Substituting whole grains instead of refined grains is considered as a way to maintain weight in a normal range; because the feeling of early satiety slows down the digestion and absorption of starch, reduces the absorption of sugars and fats, and decreases the oxidation of lipids. The health of the people of a society depends on the lifestyle and food used in that society. Bread, especially traditional bread, is considered as the most consumed food item in Iran, which provides an average of 63% of the daily energy of each person. Therefore, the nutritional value of bread directly affects people's health, and if healthy bread is not available for people, health problems would happen in the form of various diseases. It can be concluded that the most perfect bread is prepared with wholemeal flour (containing bran and germ) as such a perfect bread has high amounts of proteins, calcium, iron and all kinds of vitamins needed by the body.

*Corresponding author:
Soghara Zahdi, PhD student;
Department of Food Sciences and Industries, Gouchan Unit, Islamic Azad University, Gouchan, Iran.
Email: szohdi1@gmail.com

Please cite this article as: Zahdi S. The Impact of Whole Meal Bread and Cereal Products on Nutrition and Health Status: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S243.

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Int J Nutr Sci 2025;10(1-Supplement):S244.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Effect of Solid State Fermentation of Wheat Bran with Lactic Acid Bacteria and Yeasts on Nutritional, Physical and Sensory Characteristics of Whole Meal Bread: A Review

Haniyeh Bagheri Kia, Elham Zamani*

Food Technology Unit, Department of Food Science and Technology, Tarbiat Modares University, Tehran, Iran

ARTICLE INFO

Keywords:
Solid state fermentation
Wheat bran
Lactic acid bacteria
Sensory characteristics

ABSTRACT

Raw wheat bran can cause negative effects on nutritional, rheological and sensory properties of bread. To solve the problems of adding bran to wheat flour, solid state fermentation technology can be used in which microorganisms grow in an environment without free water or with a very low content of free water on a solid substrate, and complex substances are converted into simpler forms, increasing the bioavailability of compounds. This review evaluated the effect of solid state fermentation of wheat bran with lactic acid bacteria and yeasts on nutritional, physical and sensory characteristics of whole meal bread. Google Scholar was searched using proper keywords. Low amount of water or absence of water in solid state fermentation has several advantages, including easy recovery of the product, low cost of entire production process, smaller size of the fermenter, as well as reducing the energy required for stirring and sterilization. The moisture of the prepared wheat bran is increased to 70% by adding water, and in the next step, it is sterilized by autoclave, then under sterile conditions, strains of lactic acid and baker's yeast are added to the wheat bran, and after three days of fermentation, the fermented wheat bran is used in the production of bread. In conclusion, fermentation of wheat bran by solid state fermentation method using lactic acid microorganisms and baker's yeast could increase the amount of total fiber and soluble fiber, which increases the water holding capacity and shelf life of bakery products. Also, due to the better degradation of phytic acid, it will improve the nutritional value of whole bread.

**Corresponding author:*
Elham Zamani, PhD Candidate;
Department of Food Science and Technology, Tarbiat Modares University, Tehran, Iran.
Email: emzamani@yahoo.com

Please cite this article as: Bagheri Kia H, Zamani E. The Effect of Solid State Fermentation of Wheat Bran with Lactic Acid Bacteria and Yeasts on Nutritional, Physical and Sensory Characteristics of Whole Meal Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S244.

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Int J Nutr Sci 2025;10(1-Supplement):S245.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Smart Packaging Methods and Storage Conditions on Quality and Shelf Life of Bread: A Review

Samira Zare[1*], Sahar Foshati[2]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, Faculty of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Smart packaging method
Storage
Quality
Shelf life
Bread

**Corresponding author:*
Samira Zare, MSc;
School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: samirazare9@gmail.com

ABSTRACT

Bread waste during storage arises from physical, chemical, and microbial changes. Innovative packaging is vital for enhancing quality and extending shelf life. This review investigates the effect of smart packaging methods on bread quality and shelf life. Articles were searched in SID and Google Scholar databases using keywords of modified atmosphere packaging (MAP). Smart packaging methods including gradual release of ethanol and MAP improve bread's shelf life and quality significantly. An ethanol release agent combined with an oxygen absorber can extend shelf life by 30 days without affecting taste. MAP which replaces air with carbon dioxide (CO_2) and nitrogen delays staleness for up to 14 days. However, high CO_2 level can harm taste and increase hardness, so it is recommended to keep CO_2 below 50%. It can be concluded that storing bread at 10°C and 75% relative humidity in low-permeability polyethylene triphthalate-aluminum-polyethylene packaging effectively reduces staleness and enhances shelf life.

Please cite this article as: Zare S, Foshati S. The Effect of Smart Packaging Methods and Storage Conditions on Quality and Shelf Life of Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S245.

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Int J Nutr Sci 2025;10(1-Supplement):S246.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Impact of Sourdough on Acrylamide and Phytate Levels in Whole Wheat Bread: A Review

Samira Zare[1*], Sahar Foshati[2]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, Faculty of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Sourdough
Acrylamide
Phytate
Whole wheat
Bread

**Corresponding author:*
Samira Zare, MSc;
School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: samirazare9@gmail.com

ABSTRACT

Whole wheat bread, while nutritionally beneficial, has higher levels of phytic acid and acrylamide than white flour bread. This reviews evaluated sourdough's impact on acrylamide and phytate levels in whole wheat bread. Articles were searched in SID and Google Scholar databases using the correlated keywords. Breads high in phytic acid contain increased acrylamide levels. At elevated pH, phytic acid catalyzes the Maillard reaction, leading to greater acrylamide production. Sourdough fermentation with bacteria and yeasts can reduce phytic acid and acrylamide in whole wheat bread. A lower pH in sourdough is correlated with reduced acrylamide formation. Lactic acid bacteria also help decrease acrylamide through enzymatic activity and phytic acid breakdown. *Lactobacillus acidophilus* effectively lowers phytic acid, while *Lactobacillus plantarum* generates high acidity. Bread fermented with *Lactobacillus paracasei* exhibits the lowest acrylamide content and softest texture. It can be concluded that sourdough is an effective method to prepare whole wheat bread. By using suitable microbial strains, it can replace chemical and industrial processes, producing high-quality bread that boosts nutritional value.

Please cite this article as: Zare S, Foshati S. The Impact of Sourdough on Acrylamide and Phytate Levels in Whole Wheat Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S246.

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Int J Nutr Sci 2025;10(1-Supplement):S247.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Impact of Combining Sourdough and Various Enzymes on Volume and Staleness of Whole Wheat Bread: A Review

Samira Zare[1*], Sahar Foshati[2]

1. Department of Clinical Nutrition, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
2. Nutrition Research Center, Department of Clinical Nutrition, Faculty of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Sourdough
Lactic acid bacteria
Bread texture
Bread staleness
Enzyme

**Corresponding author:*
Samira Zare, MSc,
School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: samirazare9@gmail.com

ABSTRACT

Factors such as texture and staleness of whole grain bread affect its quality. This review investigated impact of combining sourdough and various enzymes on volume and staleness of whole wheat bread. SID and Google Scholar databases were searched using related keywords. Combining sourdough with an enzyme mixture is the most effective method to improve whole grain bread quality. Wheat sourdough combined with α-amylase, xylanase, and lipase enhances volume, texture, and shelf life. Incorporating fermented bran strengthens gluten network and affects water migration in starch, protein, and bran during storage. These enzymes increase volume and reduce starch crystallization, while sourdough and enzyme combination decreases starch retrogradation. Lactic acid bacteria during fermentation boost protease and amylase activity and produce metabolites that affect bread texture and staleness. It is concluded that incorporating sourdough with α-amylase, xylanase, and lipase in whole meal flour results in uniform air bubble distribution, improved rheological properties, increased volume, a better texture, and enhancement of product's appeal as food.

Please cite this article as: Zare S, Foshati S. The Impact of Combining Sourdough and Various Enzymes on Volume and Staleness of Whole Wheat Bread: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S247.

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Int J Nutr Sci 2025;10(1-Supplement):S248.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

Whole Grain Consumption and Risk of Chronic Diseases: A Review of Clinical Outcomes

Zahra Zare[1]*, Faride Sadat Jalali[2], Mohadeseh Ghanbari-Jahromi[3]

1. Health Care Management, Department of Health Care Management, School of Management and Medical Informatics, Shiraz University of Medical Science, Shiraz, Iran
2. Health Human Resources Research Center, School of Health Management and Information Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
3. Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran

ARTICLE INFO

Keywords:
Whole grains
Chronic diseases
Non-communicable diseases

*Corresponding author:
Zahra Zare, PhD Candidate; Health Care Management, Department of Health Care Management, School of Management and Medical Informatics, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: Zahra.zare1993@gmail.com

ABSTRACT

Whole grains are vital in reducing the risk of chronic diseases. This study analyzed whole grain consumption and risk of chronic diseases. Databases of Scopus, PubMed, WOS, and Cochrane were searched using relevant keywords up to August 2024. For descriptive quantitative analysis, Microsoft Power BI was utilized, while for qualitative thematic analysis MAXQDA was used. Out of 1,602 identified articles, 19 met the inclusion criteria. The qualitative thematic analysis revealed three main themes. First, the "Effect of Whole Grains on Chronic Diseases" showed that whole grain consumption significantly reduced the risk of various chronic diseases, including type 2 diabetes, several cancers, and cardiovascular diseases (CVD). The second theme, "Potential Mechanisms," linked these benefits to components such as dietary fiber, polyphenols, antioxidants, vitamins, and minerals. Lastly, the theme "Association with Mortality Rates" indicated that whole grain consumption was associated with lower overall mortality rates and reduced mortality from cancer and CVD. It can be concluded that promoting whole grain consumption can reduce the risk of chronic diseases and serve as a cost-effective strategy to lower disease burden and healthcare costs. Policymakers can enhance this effort by implementing educational programs and creating economic incentives for the production and consumption of whole grain products.

Please cite this article as: Zare Z, Jalali FS, Ghanbari-Jahromi M. Whole Grain Consumption and Risk of Chronic Diseases: A Review of Clinical Outcomes. Int J Nutr Sci. 2025;10(1-Supplement):S248.

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Int J Nutr Sci 2025;10(1-Supplement):S249.

International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

Poster

The Advantages of Fortified Foods for Military Soldiers' Health Status and Performance

Mehdi Yousefi, Negin Zarei*

Zist Khorak Elahieh, Shiraz, Iran

ARTICLE INFO

Keywords:
Soldier
Vitamin
Mineral
Deficiency
Health

ABSTRACT

The impact of fortified foods on health and performance of military soldiers has been examined in various studies. Fortified foods, enriched with essential vitamins and minerals, are crucial for maintaining soldiers' health, especially in demanding environments. Military personnel face unique nutritional challenges due to the physical and mental demands of their roles. Fortified foods provide a practical solution to address potential deficiencies and enhance soldiers' performance. This review determined advantages of fortified foods for military soldiers' health and performance. Google Scholar was searched using the proper keywords. Iron, vitamins like D, B12, B9 (folic acid), and zinc deficiencies can lead to various health issues. Iron deficiency can cause anemia, resulting in fatigue and impaired cognitive function. Vitamin D is critical for bone health and immune function. Soldiers are at risk of stress fractures and other bone-related injuries. Vitamin B12 and folic acid are essential for DNA synthesis and red blood cell formation. Deficiencies can lead to megaloblastic anemia, characterized by large, immature red blood cells. Zinc is vital for immune function, wound healing, and DNA synthesis. Zinc deficiency can impair immune response and increase susceptibility to infections. Fortified foods offer a convenient, low cost and effective way to address nutritional deficiencies in military populations. Fortified foods ensure soldiers receive adequate amounts of these vitamins and minerals, cognitive function, overall health, and reduce the risk of metabolic diseases like fatty liver and diabetes, enhancing physical performance and immune health, and maintaining optimal nutrient levels. The prevalence of vitamin and mineral deficiencies among soldiers in Iran is not well-documented, but it is known that vitamin D deficiency is quite common in the general population, with rates as high as 90% in some regions. In conclusion, given this high prevalence, it is likely that a significant portion of soldiers may also be affected by vitamin D deficiency.

*Corresponding author:
Negin Zarei, PhD;
Zist Khorak Elahieh, Shiraz, Iran.
Email: negin.zarei26@gmail.com

Please cite this article as: Yousefi M, Zarei N. The Advantages of Fortified Foods for Military Soldiers' Health Status and Performance. Int J Nutr Sci. 2025;10(1-Supplement):S249.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Impact of Fortified Foods on Labor Productivity: A Review

Mehdi Yousefi, Negin Zarei*

Zist Khorak Elahieh, Shiraz, Iran

ARTICLE INFO

Keywords:
Fortified foods
Malnutrition
Labor
Micronutrients
Productivity

ABSTRACT

Foods enriched with essential vitamins and minerals play an important role in eliminating nutritional deficiencies and significantly increasing the physical and cognitive performance of the working community. Malnutrition caused by the lack of micronutrients in society leads to complications such as increased healthcare costs and reduced economic growth (about 2-3% reduction in GDP and a decrease in the health workforce. This review assessed the impact of fortified foods on labor productivity. Google Scholar, PubMed, Web of Science and Scopus databases were searched using related keywords. Iron, vitamin D, vitamin B12, folic acid (vitamin B9), and zinc are among the most essential micronutrients. The prevalence of iron deficiency anemia among Iranian workers is approximately 16%. The physical and cognitive losses caused by iron deficiency in Iran result in a 0.81% decrease in the GDP (income) index from the gross domestic product, which is about 3.2 billion dollars in 2023, equivalent to the value of one month of oil sales to Iran. Generally, zinc deficiency is less common, with a rate of about 6% in Iranian society. Folic acid deficiency is very high among adults, but specific data are not available for the labor's population. There is also limited information on vitamin B12 deficiency, and its deficiency is generally less common than folic acid deficiency. Vitamin D deficiency in Iran is very high, affecting about 39% of men and 51% of women. In 1402, to consolidate national security, improve the health of food consumed by society, enhance the nutritional status of the population, and ensure nutritional security, especially for vulnerable groups, a national nutrition security and food security document was prepared in Iran. The aim of this plan is to reduce the prevalence of short stature and thinness in children younger than 5 years old, curb the increasing acceleration of overweight and obesity in all age groups, and prevent micronutrient deficiency in society. In conclusion, fortified foods provide a simple, safe, cost-effective, and high-efficiency way to improve nutritional quality. They make the workforce more dynamic and efficient, thereby increasing overall productivity.

*Corresponding author:
Negin Zarei, PhD;
Zist Khorak Elahieh, Shiraz, Iran.
Email: negin.zarei26@gmail.com

Please cite this article as: Yousefi M, Zarei N. The Impact of Fortified Foods on Labor Productivity: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S250.

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International Journal of Nutrition Sciences

Journal Home Page: ijns.sums.ac.ir

POSTER

The Effect of Whole Grains Consumption on Weight: A Review

Roxaneh Sadat Ziaee*

Department of Nutrition Science, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

ARTICLE INFO

Keywords:
Whole grains
Weight
Obesity
Dietary fiber

**Corresponding author:*
Roxaneh Sadat Ziaee, MSc;
Department of Nutrition Science, School of Nutrition and Food Sciences, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: ziaee.roxana989@gmail.com

ABSTRACT

The prevalence of obesity is increasing worldwide, and despite the awareness about high-fiber diets that are associated with health benefits such as weight loss; lack of dietary fiber is still visible in the diets of people. While higher intakes of fiber are linked to lower body weight, this study aimed to investigate the effect of whole grain on weight. Using the keywords of whole grains and weight in PubMed until November7, 2024, twenty-two articles were found. Based on titles, eight articles were removed and after studying their abstracts, six articles were excluded, and after examining their full texts, eight articles were also deleted from the list. Ultimately, only two articles were utilized for the current study. According to one of articles as Jackson's study, there were no varieties in anthropometric indices among participants. However, weight, body mass index (BMI) decreased at both 6 and 12 weeks intervals. In the second study of Christensen's study weight loss was observed in the refined grains group as -4.4±0.4 kg; whereas weight loss in the whole grains group was 5.0±0.4 kg. It can be concluded that the consumption of whole grains can be beneficial and effective for weight loss as individuals who followed whole grain diet had experienced weight loss; while the rest of participants who consumed refined grains had gained weight.

Please cite this article as: Ziaee RS. The Effect of Whole Grains Consumption on Weight: A Review. Int J Nutr Sci. 2025;10(1-Supplement):S251.

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1-2 January, 2025

Shiraz University of Medical Sciences