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Potential Role of Rice-Based Products in Disease Healing: A Nutritional and Functional Perspective

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ABSTRACT

Rice is seed of a swamp grass. It is one of the most common staple food cultivated in developing countries like India, Africa ,China , Japan. Rice is a cereal which is rich source of carbohydrates, calories and many more nutritious factors. Rice based products show a wide variety like -boiled rice, parboiled, flattened rice, parched or puffed rice ,rice bran, rice water, fermented rice or soaked rice. Rice based oral rehydration solutions have shown significant potential in disease prevention and management. Rice based products always were in focus as it is rich in bioactive compounds, dietary fibre, antioxidants, probiotics. These components have potential health promoting effects. This review aims to explore the versatile role of rice based products in managing disorders like Gastrointestinal problems , malnutrition, Gluten intolerance . The study also discusses mechanism of action, limitations, future research directions. The findings suggest that different rice based products should be used to experience better health outcomes due to its wider nutritional and functional properties.

1. Introduction

Rice is consumed as a staple food scientifically named as *Oryza sativa* (Asian Rice) or *Oryza glabberima* (African rice).(1). More than half of the population fed upon this. Findings suggest that from the ancient

age rice is known for its role in protecting food insecurity. Crossbred strain IR8 took part in Green revolution prohibiting the aggressive famine in world. (2)The warm countries produce rice mostly like India, China, Japan, Africa, Bangladesh, South and North America, Australia, North Italy .

The kernel of harvested Rice is named as Paddy or Rice . This kernel is enclosed in the husk which is termed as 'Bran'. The 'husk' and 'bran' are usually removed through milling process . When only husk is removed it is termed as 'Brown rice'. 'Parboiling' is a mechanical process where whole rice including husk and bran firstly soaked in hot or cold water, secondly steamed and lastly dried in sun. Parboiling is done before milling to retain more vitamins and minerals. Soaking up to 30-35% allows the moisture to enter. Then steaming is done to Gelatinize the kernel. This makes it more harder reducing the tendency of breaking rice . The vitamins and minerals enter from husk and bran part to inner part endosperm .Hence parboiled rice is proven to have an extended shelf life and more rich in nutrients. When rice is sun dried and milling is done excluding parboiling it is called sunned rice .So 'Sunned rice' lacks some water soluble vitamins and minerals.

'Fermented rice ' is the left over rice soaked in water for 12-24 hours .As a result a natural fermentation takes place allowing the increase in bioavailability of the nutrients. 'Rice water' or 'rice kanji' is a popular source of probiotics prepared by soaking or fermenting the leftover rice for 12-24 hours. This drink is sometimes consumed adding curd or a little lemon juice for betterment of taste and nutrition. 'Flattened Rice' is prepared by rolling the dehusked , parboiled rice in roller machine. The flakes can be eaten in dry or moist form. This is easily digestible as well as nutritious. Little salt and water mixed with parboiled rice then heated in machine or in a large sized earthen pot. It is very popular as snacks and breakfast item because of its light weight and crispy texture . 'Rice bran oil ' is produced from rice husk and germ .It is a light oil with very mild flavour. Rice bran oil is refined but it is better than other refined oil as it contains antioxidants and proven to have high smoke point.

These have varying nutritional quality and health promoting roles. Bioactive compounds in rice like vitamins, minerals, phytochemicals, antioxidants are proved to have therapeutic potential .

In recent years the interest of study has been shifted from refined to whole and minimally processed rice forms.Functiolnal properties and therapeutic roles are being focused more nowadays.

So rice is affordable due to its lower cost. Besides it is easy digestible and it's versatility in culinary practices made it dietary backbone of millions of people. Rice provides the main source of energy .This

paper aims to examine the potential role of rice-based products in disease healing, supported by recent scientific evidence, and to explore their application in clinical and public health nutrition.

2. Literature Review

Rice is acceptable in all eta due to its versatility in culinary practices but the less refined and unconventional forms are in limelight lately. New research works are emerging the therapeutic potential and functional properties of different by products of rice.

A study conducted by Ryan et al (2023) reveals that the rice bran is a good source of insoluble fibre and y-oryzanol tocopherols, phenolic compounds. These have been proved to have antioxidantal and anti-inflammatory properties. Using processed rice bran as functional food or incorporating them in different food items. Insoluble fibres reduces the glycemic load allowing benefits for the type 2 Diabetic patients .It also improves the cardiac and gut health reducing bad cholesterol and preventing colon cancer.

Gul et al. (2025) conducted a comprehensive study focussing upon thae rice bran plays a crucial role in reducing oxidative stress and improving lipid metabolism. The study also suggested that regular consumption of rice bran may help prevent chronic diseases such as cardiovascular disorders and certain types of cancer.

Similarly, Sharma et al. (2025) reported that rice bran supplementation improves glycemic control and reduces insulin resistance, making it beneficial for individuals with diabetes and metabolic syndrome. A meta-analysis published in the International Journal of Molecular Sciences (2025) further supported these findings, indicating that rice bran significantly improves lipid profiles and reduces cardiovascular risk factors.

Rice bran oil has also been identified as a heart-healthy oil due to its high content of unsaturated fatty acids and phytosterols. Tufail et al. (2024) reported that rice bran oil helps lower serum cholesterol levels and provides antioxidant protection . A further study by Punia et al. (2021) Supported this findings and added that Vit E in two forms namingly tocopherols , tocotrienols , phenolic compound like ferulic acid are present in it.It is better than many refined oil as shows a high smoke point (almost 232°C).It should not be used as a whole as it undergoes refining process but along with other virgin oil it can be used .Many cosmetics and skin care products containing rice bran oil using its anti-inflammatory effects .

Processing techniques such as extrusion have been shown to enhance the nutritional quality of rice-based products. Yadav et al. (2024) demonstrated that extrusion improves the bioavailability of nutrients and functional properties of rice bran, making it suitable for incorporation into value-added food products.

Fermented rice products, commonly consumed in traditional diets, have also been recognized for their probiotic properties. These products improve gut microbiota, enhance mineral absorption, and support immune function (Ryan et al., 2023).

Additionally, rice-based oral rehydration solutions have been widely recommended by the World Health Organization (2005) for the treatment of diarrhoea due to their effectiveness in improving fluid absorption and reducing stool output.

A study by RJ Priestly (1976) suggests that Raw rice or Sunned rice is very popular for its low cooking time. From ancient age this consumed by the sage or saints in India. Its delicate texture helps to prepare the pitha, rice roti , khichuri, rice cakes and many more . patients with problem with deglutition may prefer for its sticky, soft texture .A study by AA Damir (1985) supported the study by saying that if sunned rice is heated it shows a irreversible deformation of starch granules making is sticky and soft.

Overall, existing literature strongly supports the role of rice-based products as functional foods with significant potential in disease healing and health promotion.

3. Nutritional Profile of Rice and Its Products

The nutritional composition of rice varies depending on the type and processing method. White rice, which is the most commonly consumed form, is primarily composed of carbohydrates and provides quick energy. However, it undergoes milling and polishing processes that remove the bran and germ layers, resulting in the loss of essential nutrients.

Brown rice, on the other hand, retains its bran and germ layers, making it a richer source of dietary fiber, vitamins (especially B-complex vitamins), and minerals such as magnesium and iron. The presence of fiber in brown rice contributes to improved digestion and better glycemic control.

Rice bran, a by-product of rice milling, is highly nutritious and contains a concentrated amount of bioactive compounds. These include γ-oryzanol, tocopherols, and phytosterols, which have been associated with antioxidant and cholesterol-lowering effects (Gul et al., 2025).

Parboiled rice undergoes a heat treatment process that helps retain nutrients within the grain. This makes it nutritionally superior to polished white rice.

Overall, the nutritional diversity of rice and its products plays a crucial role in their therapeutic applications.

4. Therapeutic Role of Rice-Based Products

4.1 Rice Water

Rice water, the starchy liquid obtained after boiling rice, has been traditionally used as a remedy for gastrointestinal disorders. It is easily digestible and provides a quick source of energy. Rice water is particularly effective in managing diarrhea as it helps reduce stool frequency and prevents dehydration (WHO, 2005).

4.2 Brown Rice

Brown rice is a whole grain that offers numerous health benefits. Its high fiber content helps regulate blood sugar levels and improves digestion. Studies have shown that brown rice consumption is associated with a reduced risk of type 2 diabetes and cardiovascular diseases (Sharma et al., 2025).

4.3 Rice Bran

Rice bran is a potent functional food ingredient with multiple health benefits. It acts as an antioxidant, reduces inflammation, and improves lipid metabolism. Its role in preventing chronic diseases such as cancer and diabetes has been widely studied (Gul et al., 2025).

4.4 Fermented Rice

Fermented rice, such as traditional preparations like panta bhat, is rich in probiotics. These beneficial microorganisms improve gut health, enhance digestion, and boost immunity. Fermentation also increases the bioavailability of minerals such as iron and calcium (Ryan et al., 2023).

4.5 Rice-Based Oral Rehydration Therapy

Rice-based oral rehydration solutions are widely used in clinical settings for the treatment of diarrhea. They provide sustained glucose release and improve electrolyte absorption, making them more effective than conventional glucose-based solutions (WHO, 2005).

5. Role in Disease Management

5.1 Gastrointestinal Disorders

Rice is easily digestible and non-irritating, making it suitable for patients with gastrointestinal issues such as diarrhea, gastritis, and irritable bowel syndrome.

5.2 Diabetes Mellitus

Brown rice and other whole grain rice products help regulate blood sugar levels by slowing glucose absorption. This makes them beneficial for individuals with diabetes (Sharma et al., 2025).

5.3 Cardiovascular Diseases

Rice bran oil and whole grain rice products help reduce cholesterol levels and improve heart health due to their antioxidant and phytosterols content (Tufail et al., 2024).

5.4 Malnutrition and Recovery

Rice-based diets provide easily digestible energy and are suitable for individuals recovering from illness, as well as children and the elderly.

5.5 Gluten Intolerance

Rice is naturally gluten-free, making it an ideal dietary option for individuals with celiac disease or gluten intolerance.

6. Mechanisms of Action

The health promoting effects of rice-based products can be attributed to several mechanisms:

- Antioxidant activity reducing oxidative stress
- Preventing dehydration with probiotics rich drink and used as coolant.
- Dietary fibre improving gut health
- Probiotics enhancing microbiota balance
- Bioactive compounds regulating metabolism
- Unsaturated fatty acids lowering the Low Density Lipoprotein promoting heart health

7. Limitations

Despite of the functional properties and potential role in disease management refined form of white rice is known to have high glycemic load, low fibre. It is gluten free. Rice contains protein of superior quality but in low amount . Beside this proper preparation techniques to be maintained during cooking the rice as too much unnecessary washing leech out the water soluble vitamins . Therefore, balanced dietary practices are essential.

8. Future Scope

Future research should emerge in production of different rice based functional foods . We need to promote traditional rice-based products through conduction of thorough clinical trials and analysis.

9. Conclusion

Rice is a staple food consumed in different forms and expanding range of variety is present in the list of rice based products. They are easily available, digestible and offer significant effects on disease management as rice if free of Gluten and full of many bioactive compounds .Excess consumption of rice and rice based products can cause obesity and other metabolic or other health hazards though .More in-depth study need to be conducted in future to promote the conventional rice based functional foods.

10. References

1. https://en.wikipedia.org
2. Rowlatt, J.,(2016).BBC News.IR8.Tge miracle rice which saved millions of lives
3. World Health Organization. (2005). Oral rehydration salts: Production of the new ORS. WHO Press.
4. Gul, M. Z., Das, P. P., Babu, K. R., Juarez-Colunga, S., Weber, A. M., Yoosuf, B., … Ghazi, I. A. (2025). Rice bran: A comprehensive review of phytochemicals and bioactive components with therapeutic potential and health benefits. Nutrition Reviews.
5. Tufail, T., Ul Ain, H. B., Chen, J., Virk, M. S., Ahmed, Z., Ashraf, J., … Xu, B. (2024). Contemporary views of the extraction, health benefits, and industrial integration of rice bran oil: A prominent ingredient for holistic human health. Foods, 13(9), 1305.
6. Yadav, K. C., Mitchell, J., Bhandari, B., & Prakash, S. (2024). Unlocking the potential of rice bran through extrusion: A systematic review. Sustainable Food Technology, 2, 594–614.
7. Sharma, S., et al. (2025). Rice bran: Nutritional value, health benefits, and global implications for aflatoxin mitigation, cancer, diabetes, and diarrhea prevention. Food Chemistry, 464, 141749.

8. Anonymous/Various Authors. (2025). Rice bran: Nutritional value, health benefits, and implications for disease prevention.
9. (2025). Effects of rice bran supplementation on metabolic syndrome-related parameters: A systematic review and meta-analysis. International Journal of Molecular Sciences, 26(18), 9051.
10. Ryan, E. P., et al. (2023). Rice bran: From waste to nutritious food ingredients with health benefits. Nutrients, 15(11), 2503.
11. Punia ,S.,Kumar,M.,Siroha,A.K.,Purewal,S.S., Rice bran oil: An emerging source of functional oil , (2021),Rice science,28(3),217-232.
12. Damir, A.A.,(1985),Studies on parboiled rice: part 1—comparison of the characteristics of raw and parboiled rice, Food Chemistry,16(1),1-14
13. Priestly,R.J.,(1976), comparative studies on the physicochemical properties and micro structure of raw and parboiled rice.1(1),5-14.