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Nutricereals: Millets and their Nutritional Excellence for Health Benefits

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INTRODUCTION

Millets are often referred to as "Nutri-cereals" due to their capacity to supply a wide range of essential nutrients necessary for the normal functioning of the human body. Millets, the resilient cereal grains cultivated on the Indian subcontinent for over five millennia, have played a central role in human nutrition. These warm-climate cereals, including sorghum, pearl millet, finger millet, foxtail millet, little millet, kodo millet, proso millet, and barnyard millet, are characterized by their hardy, rain-fed nature, and outstanding adaptability to drought and adverse environmental conditions (Fig.1). Despite not belonging to the Poaceae family, millets, often referred to as pseudo grains, have emerged as nutritionally potent alternatives. Nutrient-dense, non-glutinous, and acid-free, millets offer remarkable health benefits, largely attributed to their high fiber content. In this article, we delve into the nutritional properties and health advantages of these key millet varieties, while also elucidating the scientific underpinnings of their value in human nutrition.



Fig.1: Major and minor millets



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Sorghum (Sorghum bicolor): A Major Millet with Nutritional Distinction stands out for its notable nutritional profile. This cereal is particularly renowned for its rich protein content, accounting for a substantial portion of its seed composition. Apart from protein, sorghum exhibits significant levels of fiber, thiamine, riboflavin, folic acid, and carotene, making it a nutritionally substantial choice. Furthermore, sorghum contains abundant minerals. including essential potassium. phosphorus, and calcium, alongside acceptable quantities of iron, zinc, and sodium. Sorghum proteins possess a unique attribute. significantly characterized by reduced digestibility after cooking. This distinct feature may hold potential benefits for specific dietary requirements and populations.

Pearl Millet (Pennisetum glaucum): Nutrient-Rich and Versatile pearl millet, a leading millet variety, offers a nutrient-rich alternative to other grains. Notably, pearl millet contains a higher fat and protein content, making it a favorable nutritional choice. This cereal excels in niacin content. claiming the highest levels among all cereals. In addition to niacin, pearl millet contains vitamins E and B-complex, along with folate, magnesium, iron, copper, zinc, and folate. It also serves as a notable source of energy, offering a substantial quantity of unsaturated fats. The dietary fiber content in pearl millet, approximately 11.5%, results in slower food transit through the gastrointestinal tract, reducing the risk of inflammatory bowel diseases (Saini et al., 2021).

Finger Millet (*Eleusine coracana*): A Nutritional Powerhouse with Unique Proteins, finger millet, popularly known as ragi, emerges as a nutritional powerhouse, particularly rich in calcium. With calcium levels ranging from 300 to 350 mg per 100 grams, finger millet leads as the richest mineral source among millets. Furthermore, it exhibits significant antioxidant activity. While finger millet contains relatively lower levels of protein (6-8%) and fat (1.5-2%), it distinguishes itself with the presence of sulfurrich amino acids. This unique amino acid composition contributes to its nutritional distinction (Ambre et al., 2020).

Foxtail Millet (*Setaria italica*): Abundant Carbohydrates and Nutrient Richness, foxtail millet, celebrated for its carbohydrate content, delivers a spectrum of nutrients. This grain, recognized for its easy digestibility, hypoallergenic nature, and delightful sweet, nutty flavor, is twice as rich in protein as rice. Minerals such as iron and copper are present in foxtail millet, contributing to its nutritional value.

Kodo and Proso Millet: Dietary Fiber and Essential Nutrients, Kodo millet and proso millet, often overlooked but nutritionally significant, offer remarkable dietary attributes. Kodo millet features a significant fiber content, slightly lower fat levels (4.2% less), 11% more protein compared and to conventional foods (14.3 percent). This higher fiber content contributes to a slower transit time in the intestines, reducing the risk of inflammatory bowel diseases. Both kodo millet and proso millet contain notable levels of vitamins such as niacin, pyridoxine, and folic acid, alongside essential minerals such as calcium, iron, potassium, magnesium, and zinc. Kodo millet, in particular, boasts the highest protein content among millets (12.5%) and significant calcium levels, which are crucial for bone maintenance and growth. These millets also serve as cost-effective sources of manganese, thereby aiding in cholesterol reduction and diminishing the risk of heart disease.

Millets for Health Benefits:

- 1. **Nutrient-Dense and Gluten-Free**: Millets are celebrated for being nutrient-dense and free from gluten, making them a valuable addition to the diet.
- 2. Abundant Micronutrients: Millets are rich sources of essential micronutrients,



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including calcium, iron, and phosphorus, contributing to their nutritional value.

- 3. Low Glycemic Index (GI): Millets have a low Glycemic Index, which means they result in minimal blood sugar fluctuations. This makes them an excellent choice for individuals seeking to manage their blood sugar levels.
- 4. Dietary Fiber for Gut Health: The dietary fiber in millets not only acts as a cleansing agent for the body but also prolongs the transit time of food through the gastrointestinal tract. This property reduces the risk of inflammatory bowel diseases, further emphasizing the health benefits of millets.

CONCLUSION

In summary, millets, with their diverse nutritional profiles and exceptional health

benefits, present a compelling opportunity for enhancing human nutrition and well-being. These ancient cereals provide an invaluable means to address the dietary and health challenges facing diverse populations, holding the potential to revolutionize dietary choices and promote long-term health.

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