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OVERVIEW ON MILLETS: A MINI REVIEW

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ABSTRACT

Millets offer nutritional security and there is a need for promoting millets as they are highly nutritious. These have been important food staples in human history, particularly in Asia and Africa. Sorghum and other millets consumption usage as direct food has significantly declined over the past three decades. The important nutrients present in millets include resistant starch, oligosaccharides, lipids, antioxidants such as phenolic acids, flavonoids, lignans and phytosterols which are believed to be responsible for many health benefits. The preparation and production of such products by households, entrepreneurs, self-help groups, small scale industries and large-scale industries can raise their income level by promoting the value-added products. By promotion of these value-added products can improve the socio- economic status and health status of the consumers. The synergic efforts resulted various nutritionally rich convenient sorghum product technologies were developed and successfully commercialized on pilot scale at Hyderabad. Scientific empirical studies conducted on various products have shown that the recipes such as idle, dosa, etc. with sorghum and other millets as that of rice, wheat etc. Implementation of effective promotional strategies and policy sensitization attracted entrepreneurs and policy makers to consider sorghum as priority.

KEYWORDS: Classification of millets; Nutrition Facts; Nutrient Composition;

INTRODUCTION

Millets are a group of highly variable small, seeded grasses, widely grown around the world as cereal crops or grains for fodder and human food. They do not form a taxonomic group, but rather a functional or agronomic one.[1] Millets are important crops in the semi-arid tropics of Asia and Africa (especially in India and Nigeria), with 97% of millet production in developing countries. The crop is favored due to its productivity and short growing season under dry, high-temperature conditions.[2,3] The most widely grown millet is pearl millet, which is an important crop in India and parts of Africa. Finger millet, Proso millet, and Foxtail millet are also important crop species.[4] In the developed world, millets are less important. For example, in the United States only Proso millet is significant, and it is mostly grown for bird seed. While millets are indigenous to many parts of the world, it is believed that they had an evolutionary origin in tropical western Africa.[5] Where the greatest number of both wild and cultivated forms exist. Millets have been important food staples in human history, particularly in Asia and Africa. They have been in cultivation in East Asia for the last 10,000 years.[6]

There are many different types of millet and all of them belong to the grass (*Poaceae*) family. The hardy crop is grown for animal feed and birdseed but is also a popular food for humans in many parts of the world because of its high nutritional value.[7] It can also be milled into flour and used to make gluten-free bread and other products.

Hulled pearl millet is the kind that you are most likely to see in American grocery stores. It has a nutty, mild, flavor that makes it a great addition to salads, soups, and other savory dishes.[4,8]

CLASSSIFICATION OF MILLETS

Millets are classified as Major Millets & Minor Millets

Major Millets: Sorghum (Jowar), Pearl millet and Finger millet.

Minor Millets: Little millet, Foxtail millet, Proso millet, Barnyard millets, Kodo millets, and Browntop millets.



Figure 1: Types of Millets.

Millet Nutrition Facts

The following nutrition information is provided by the United States Department of Agreculture for a one-cup serving (about 174 grams) of cooked millet.[9]

- **Calories: 207**
- **Fat: 1.7g**
- **Sodium: 3.5mg**
- **Carbs: 41.2g**
- **Fiber: 2.3g**
- **Sugars: 0.2g**
- **Protein: 6.1g**
- **Magnesium: 76.6mg**
- **Folate: 33.1mcg**

Millets contribute to antioxidant activity with phytates, polyphenols and tannins present in it having important role in aging and metabolic diseases.[10] The highest calcium content is present is finger millet with 344 mg/100g among the cereals; Also rich in phytates 0.48g/100g, polyphenols, tannins 0.61%.[11,12]

Sorghum

Sorghum (Sorghum bicolor (L.) Moench) is a warm season crop, intolerant of low temperatures but resistant to serious pests and diseases. It is known by a variety of names (such as great millet and guinea corn in West Africa, Asia, and parts of Middle East).[13] Most of the sorghum produced in North and Central America, South America and Oceania is used

for animal feed. The grain consists of naked caryopsis, made up of a pericarp, endosperm, and germ. Although there is a huge range of physical diversity, sorghum is classed into four groups: (1) grain sorghum, (2) forage sorghum glum; (3) grass sorghum; or (4) Sudan sorghums and broomcorn.[14,15]

Nutritional Importance of Millets

Sorghum and millets namely, Pearl millet, Finger millet, kodomillet, Proso millet, Foxtail millet, little millet, and Barnyard millet are important staples to millions of people world-wide. Generally, these are rain fed crops grown in areas with low rainfall and thus resume greater importance for sustained agriculture and food security.[4,16] Almost all the millets are used for human consumption in most of the developing countries, but their use has been primarily restricted to animal feed in developed countries. Millets are nutritionally comparable to major cereals and serve as good source of protein, micronutrients, and phytochemicals. Processing methods like soaking, malting, decortications, and cooking affect the antioxidant content and activity.[15,17]

Nutrient Composition

The millet grain contains about 65% carbohydrate, a high proportion of which is in the form of non-starchy polysaccharides and dietary fiber which help in prevention of constipation, lowering of blood cholesterol and slow release of glucose to the blood stream during digestion.[18] Lower incidence of cardiovascular diseases, duodenal ulcer and hyperglycemia (diabetes) are reported among regular millet consumers. Millet grains are also rich in important vitamins viz.[19] Thiamine, riboflavin, folic acid, and niacin. Millets are comparable to rice and wheat or rich in some of the minerals as well as fatty acids. Millets vary largely in composition of carbohydrates as proportion of amylose and amylopectin content vary from 16-28% and 72-84%, respectively.[20] The nutrient composition of Millet grain indicates that it is a good source of energy, protein, vitamins, and minerals including trace elements.[21] The edible component of millet kernel is the rich source of phytochemicals, such as dietary fiber and polyphenols (0.2-0.3%). Millets contribute to antioxidant activity with phytates, polyphenols and tannins present in it having important role in aging and metabolic diseases (Bravo, 1998). The highest calcium content is present is finger millet with 344 mg/100g among the cereals; Also rich in phytates 0.48g/100g, polyphenols, tannins 0.61%.[22]

Health Benefits

Like many whole grains, millet can provide certain health benefits. However, more studies investigating the benefits of whole grains exist rather than studies specifically investigating the health benefits of millet.[23]

It's important to note that studies involving millet may look at varieties of millet that are not commonly found in grocery stores. Also, many millet studies to date have been conducted on rodents.

SUMMARY AND CONCLUSION

Millets are an under-utilized yet highly promising food group. They offer rich nutrient profiles, low glycemic indices, high dietary fiber, and abundant bioactive compounds characteristics that make them particularly well-suited for dietary inclusion in individuals with diabetes and metabolic disorders. Despite growing awareness of millet's health benefits, significant challenges remain in transforming millets into standardized, consumer-ready products. Issues around palatability, nutritional consistency, bioavailability, and sensory acceptability continue to hinder their broader adoption. To fully leverage millets' nutraceutical potential and advance public health outcomes, dedicated research is needed. This includes optimizing processing techniques, improving nutrient bioavailability, and developing value-added formulations that resonate with consumers. Millets are a highly nutritious and versatile group of grains that offer several health benefits, making them an excellent addition to a balanced diet. They are rich in fiber, essential minerals (such as magnesium, iron, and calcium), and antioxidants, which can contribute to improved digestive health, enhanced heart health, and better blood sugar control. Millets are also naturally gluten-free, making them a suitable choice for individuals with celiac disease or gluten intolerance. Incorporating millets into your diet can help diversify your carbohydrate sources, supporting stable energy levels and preventing blood sugar spikes. They are also beneficial for weight management due to their high satiety factor. However, millets should ideally be consumed as part of a varied and balanced diet, as relying solely on them for nutrition may lead to deficiencies in certain nutrients. Additionally, due to their high phytate content, it's advisable to soak, ferment, or cook millets properly to enhance their digestibility and nutrient absorption.

In conclusion, millets are a nutritious, sustainable, and health-promoting food that can be a valuable addition to a well-rounded diet.

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CONFLICT OF INTEREST

Author has no conflict of interest to publish the article in this journal.

REFERENCES

1. Obilana, A. B. & Manyasa, E. in *Pseudocereals and less common cereals: Grain properties and utilization potential* 177–217: (Springer, 2002).
2. Kheya, S. A. *et al.* Millets: The future crops for the tropics-Status, challenges and future prospects. *Heliyon*, 2023; **9**.
3. Serba, D. D. *et al.* in *Genomic designing of climate-smart cereal crops*, Springer, 2020; 221–286.
4. Jukanti, A., Gowda, C. L., Rai, K., Manga, V. K. & Bhatt, R. Crops that feed the world 11. Pearl Millet (Pennisetum glaucum L.): an important source of food security, nutrition and health in the arid and semi-arid tropics. *Food Security*, 2016; **8**, 307–329.
5. Das, S., Khound, R., Santra, M. & Santra, D. K. Beyond bird feed: Proso millet for human health and environment. *Agriculture*, 2019; **9:** 64.
6. Scott, A. (2015).
7. Sands, D. C., Morris, C. E., Dratz, E. A. & Pilgeram, A. L. Elevating optimal human nutrition to a central goal of plant breeding and production of plant-based foods. *Plant science*, 2009; **177:** 377–389.
8. Singh, D. & Prasanna, R. Potential of microbes in the biofortification of Zn and Fe in dietary food grains. A review. *Agronomy for Sustainable Development*, 2020; **40**; 15.
9. Srishti, L. R. V. K. S. *MILLET ON YOUR PLATE*. (BFC Publications, 2025).
10. Kumar, A. *et al.* Nutritional significance and antioxidant-mediated antiaging effects of finger millet: Molecular insights and prospects. *Frontiers in Sustainable Food Systems*, 2021; **5:** 684318.
11. Khan, T., Azad, A. A. & Islam, R. U. Millets: A comprehensive review of nutritional, antinutritional, health, and processing aspects. *Journal of Food Composition and Analysis*, 2025; **141:** 107364.
12. Malvey, S. & Kshirasagar, N. Development and Evaluation of floating pulsatile drug delivery system of meloxicam. *Chronicles of Pharmaceutical Science*, 2018; **2**: 474–492.

13. Ameen, M., Mahmood, A., Shahzad, A. N., Zia, M. A. & Javaid, M. M. Sorghum's potential unleashed: A comprehensive exploration of bio-energy production strategies and innovations. *Bioresource Technology Reports*, 2024; **27**: 101906.
14. Ratnavathi, C. in *Breeding sorghum for diverse end uses* 193–207 (Elsevier, 2019).
15. Kshirasagar, N. *et al.* Design and In Vitro Evaluation of Gastro Retentive Sustained Release Tablets of Ketorolac Tromethamine. *Journal of Pharma Science*, 2017; **2**: 01.
16. Singh, M. & Sood, S. *Millets and pseudo cereals: genetic resources and breeding advancements*. (Woodhead Publishing, 2020).
17. Borah, T. *et al.* A review of millet types, their nutritional composition and the effects of different processing methods on nutritional qualities. *Brazilian Journal of Biology*, 2025; **85**: e297458.
18. Jacob, J. *et al.* The nutrition and therapeutic potential of millets: an updated narrative review. *Frontiers in nutrition* **11**, 1346869 (2024).
19. Tanwar, R., Panghal, A., Chaudhary, G., Kumari, A. & Chhikara, N. Nutritional, phytochemical and functional potential of sorghum: A review. *Food Chemistry Advances*, 2023; **3**: 10050.
20. Annor, G. A. *Millet starches: structural characteristics and glycemic attributes*, University of Guelph, (2013).
21. Saleem, S. *et al.* Millets as smart future food with essential phytonutrients for promoting health. *Journal of Food Composition and Analysis*, 2023; **124**: 105669.
22. Kshirasagar, N., Puchchakayala, G. & Balamurugan, K. INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACEUTICAL SCIENCES. (2019).
23. Saleh, A. S., Zhang, Q., Chen, J. & Shen, Q. Millet grains: nutritional quality, processing, and potential health benefits. *Comprehensive reviews in food science and food safety*, 2013; **12:** 281–295.