



Role of millets in ensuring nutritional security in India

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Abstract

Millets are among the oldest foods known to humankind, but their importance and cultivation gradually declined with the large-scale production of rice and wheat, driven by urbanization and industrialization. In recent times, however, millets have re-emerged as vital crops with significant agricultural and nutritional value at the global level. Today, the world is seeking sustainable, climate-resilient, and nutritious alternatives to ensure long-term food security, and millets are increasingly recognized as one such option. With the rising prevalence of lifestyle-related diseases, particularly in urban areas, millet-based products are gaining popularity among health-conscious consumers. This makes it crucial to explore solutions that address these emerging health and nutrition challenges. The article highlights the different types of millets, and their immense potential in improving human health and combating malnutrition.

Keywords: Millets, ancient grains, nutri cereals, life style disorders, malnutrition, micronutrients

Introduction

Millets are considered nutrient-rich cereals and serve as a staple food for millions of people living in impoverished conditions. Although they are highly nutritious, millet consumption in India has declined over the years. However, in recent times, they have regained popularity due to increased health awareness, leading to the launch of several high-quality millet-based products in the market. With growing awareness among both rural and urban consumers about the nutritional benefits of millets, there is a pressing need to boost their production and enhance processing facilities to make millet products more easily accessible.

As climate-resilient crops suited to dryland farming, millets offer a sustainable option for agriculture. Millets refer to small-grained cereal crops such as sorghum, pearl millet, foxtail millet, little millet, kodo millet, finger millet, proso millet, barnyard millet, and brown top millet. Among the oldest cultivated foods, millets are small-seeded, hardy plants capable of thriving in dry climates and in areas with poor soil quality and low rainfall. They belong to the Poaceae family, commonly known as the grass family. Millets were among the first crops to be domesticated. Archaeological evidence suggests that people in the Indus Valley were consuming millets as early as 3000 BC, and many varieties that are cultivated around the world today originated in India. Native varieties are also grown in West Africa, China, and Japan. Due to their short growing season, millets are well-suited to a variety of cropping systems, including both irrigated and dryland farming.

Millets are a staple food in many developing countries across Asia and Africa. Although technically seeds, they share a nutritional profile similar to sorghum and other cereals. In recent years, their popularity has grown in Western countries due to their gluten-free nature and rich nutritional value, offering high levels of protein, fiber, and antioxidants. Regular consumption of millets can help increase hemoglobin levels and reduce iron deficiency. Urban consumers are increasingly recognizing them as a nutritional powerhouse that supports the management of

diabetes, obesity, and cardiovascular diseases. Compared to other common grains, millets are not only resource-efficient but also nutritionally superior, earning them the reputation of being “nutricereals” or “superfoods.”

These multiple layers of alienation have significantly affected the way of life, agricultural practices, and food habits of the tribal population. Sustaining crop production and productivity, while safeguarding natural resources and the environment, has therefore become one of the greatest challenges for tribal farming in Kerala today.

Nutritional Value and Health Benefits of Millets

There are nearly 20 different types of millets are grown in the world and they are classified into mainly two groups named as 1) major millets and 2) minor millets. Pearl millet and sorghum are included in major millets and minor millets contains finger millet, foxtail millet, proso millet, little millet and barnyard millet. Although all types of food provide nutrition in different ways, millets remain one of the most underrated. However, recent studies highlighting their rich nutritional value have encouraged policymakers and the business community to promote millets as a mainstream food choice. Often referred to as *Smart Food* and *Super Food*, millets offer multiple health benefits and can play a significant role in ensuring nutrition security. In this discussion, we will explore the nutritional value and health benefits of a few key millets.

Nutritional values of various types of millets						
Millet/grain	Protein (%)	Fat (%)	Minerals (%)	Carbs (%)	Fibre (TDF)	Energy (Kcal)
Sorghum	9.97	1.73	1.39	67.7	10.2	334
Pearl millet	10.96	5.43	1.37	61.8	11.5	347
Finger millet	7.16	1.92	2.04	66.8	11.2	320
Foxtail	12.3	4.30	2.6	60.1	10.7	331
Little millet	10.13	3.89	1.34	65.5	7.7	346
Proso millet	11.5	3.5	2.7	64.5	9.6	341
Kodo	8.92	2.55	1.72	66.2	6.4	331
Barnyard	6.2	2.20	1.3	65.5	12.6	307
Rice, raw, milled	7.9	0.52	0.56	78.24	2.81	356
Wheat, whole	10.59	1.47	1.42	64.72	11.2	321

Ragi, also known as finger millet, is considered an excellent alternative to rice and wheat. It is a rich source of proteins and essential amino acids, as well as calcium and other vital minerals. Including ragi in the diet can be highly beneficial, especially for managing diabetes.

Bajra – also known as Pearl Millet – is often called the "miracle millet." It is rich in protein, fiber, calcium, and magnesium, and its iron content is nearly eight times higher than that of rice. Including bajra in your diet can help prevent constipation and improve digestion.

Jowar (Sorghum) – Jowar is a nutrient-rich grain, packed with calcium, protein, iron, and dietary fibre. Including jowar in your diet may help lower cholesterol levels, support weight management and overall health benefits.

Foxtail millet is a rich source of dietary fibre and essential minerals such as iron and copper. It contains smart carbohydrates that help prevent sudden spikes in blood sugar levels. In addition, it supports immunity and helps reduce bad cholesterol.

Barnyard Millet – Known for its impressive nutritional profile, barnyard millet is a valuable addition to a healthy diet. It is rich in antioxidants and essential minerals such as calcium and phosphorus, which support strong bones and overall body development. With six times more fiber than wheat, it promotes a feeling of fullness, aids digestion, and makes an excellent choice for weight management.

Kodo millet is a highly digestible grain, rich in antioxidants and phytochemicals that help combat lifestyle-related health issues. It is known to support the reduction of joint pain and may also help regulate the menstrual cycle in women.

Little Millet – Despite its name, little millet is packed with nutrition. It is a rich source of B vitamins and essential minerals such as iron, calcium, zinc, and potassium. It is also high in dietary fibre and provides healthy fats that help in maintaining optimal body weight.

Millets are rich in essential nutrients such as calcium, carbohydrates, protein, iron, magnesium, potassium, and phosphorus. They are also a good source of vitamins including folic acid, vitamin B6, β -carotene, and niacin, making them a healthier alternative to many cereal grains. In addition, millets contain several bioactive phytochemicals such as feraxans, lignans, β -glucan, inulin, resistant starch, sterols, and phenolic compounds (e.g., ferulic acid, caffeic acid, and quercetin). Research has shown that the polyphenols present in millets exhibit antioxidant, anticancer, anti-inflammatory, antiviral, and neuroprotective properties. These benefits make millets effective in reducing the risk of various chronic conditions, including cancer, cardiovascular diseases, diabetes, hypertension, high cholesterol, inflammatory disorders, metabolic syndrome, and Parkinson's disease. Malnutrition in India—whether under-nutrition caused by deficiencies of vitamins, minerals, and proteins, or over-nutrition leading to obesity, metabolic syndrome, and other lifestyle diseases—highlights the urgent need for healthier, accessible, and affordable food options. Millets are an ideal solution as they are nutrient-dense, rich in protein, essential fatty acids, dietary fiber, and B vitamins, while also being naturally gluten-free.

These grains play a vital role in preventing lifestyle disorders such as diabetes, hypertension, and cardiovascular diseases, thereby contributing significantly to improved nutrition and food security in India. A large proportion of millet grains consists of dietary fiber and non-starch polysaccharides, which aid in weight management. Their

high fiber content and slow glucose release make them an excellent choice for individuals with diabetes. Compared to rice and wheat, millets score much higher in terms of nutrients, fiber, and their low glycemic index. Once considered the "food of the poor," millets are now recognized as a "food to boost immunity" and a sustainable solution to the country's nutrition challenges.

Conclusion

Millets can thrive in arid lands with minimal inputs, making them resilient to climate change and a promising solution to global nutritional security challenges. They also serve as a sustainable alternative to major cereals. For many countries, millets present an opportunity to increase self-sufficiency and reduce dependence on imported grains. In India, millets hold particular importance not only for food security but also for nutritional security. Their hardy nature allows them to grow well in rain-fed areas with minimal agricultural inputs, while their nutrient richness surpasses that of most common cereals.

Millet cultivation plays a vital role in ensuring food and nutritional security, particularly in arid regions, due to its natural drought resistance and rich nutritional profile. Beyond its dietary benefits, millet farming contributes significantly to environmental sustainability by enhancing soil health, conserving water, and generating a lower carbon footprint compared to other cereal crops. Economically, millets offer farmers a resilient and cost-effective option, as they require minimal inputs while providing reliable yields. Altogether, millets represent a sustainable solution to global food and environmental challenges.

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