

Health benefits

of millets

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Milletts were widely cultivated across Asia and Africa before green revolution and were the staple food grains for humans. The stover from millets was an important component of livestock feed in integrated farming systems. Lack of diversity in food grains and excessive processing of rice and wheat has caused double burden of lifestyle diseases and malnutrition. Micronutrient deficiency is being manifested as 'hidden hunger' in many developing countries to which millets seem to be a probable salution. Millets like sorghum, pearl millet and finger millet are consumed as whole grains and are rich source of vitamins, minerals, and dietary fibre. Small millets like foxtail, proso, little, barnyard and kodo millets are also good source of nutrients when moderately polished after dehulling. Finger millet is a very rich source of calcium for growing children, pregnant women and elderly for maintaining bone health. Therefore, regular consumption of millets helps in diversification of diets and imparts many health benefits along with battling hidden hunger.

Keywords: Calcium, Dietary fibre, Micronutrients, Minerals, Vitamins

MILLETS are a diverse group of tiny-grained annual grasses cultivated widely in arid and semi-arid regions of the world. Millets were among the most widely consumed cereals across many parts of Asia and Africa since 8000 BC. However, wheat, rice and maize have dominated cultivation after green revolution while, millets have been neglected. These days, millets are important forage crops in many parts of the world. Moreover, millets exhibit superior agronomic benefits, viz. shorter growing periods, ability to grow in marginal lands with low inputs, resistance to drought etc as compared to most other cereals. Millet grain is commonly used for human food and animal feed, and straw for animal feed. Also, millet grains are resistant to pests and diseases. Millets are now considered as 'smart foods' and 'nutri-cereals' as they contribute for food, health, and feed in a sustainable manner.

Millets for nutritional security

When our country achieved sustainable food production for combating hunger through green revolution, we attained food security. However, the lack of important nutrients such as proteins and micronutrients such as vitamins and minerals in daily food intake continued to cause 'hidden hunger' or nutrient deficiency in the population. Nutritional insecurity is a major threat to populations that are based

on a cereal based staple diet as cereals are generally considered deficient in micronutrients. Millets are nutritionally diverse and offer a range of micronutrients for consumption. The balanced nutrient content of millet grains is contributed by carbohydrates (60–70%), proteins (7–12%), fats (1.5–5.5%) and dietary fibres (6–11.5%). Millets are gluten-free and are safe for people suffering from celiac disease. Proso millet has the highest amount of protein among grains (~12.5%) and barnyard millet is an excellent source of fibre. Further, millet grains are abundant sources of minerals and B-complex vitamins.

Altogether, millets offer a broad spectrum of micronutrients and other important nutritional components, and thereby paving way for nutritional security of the population. Even though millets are referred to as a single unit, each of them has their unique features in terms of nutrient profile.

Health benefits of millets

Sorghum (Jowar): Sorghum grain is consumed in different forms. Sorghum-based beverages are popular in African countries. In India, traditionally, sorghum is consumed as roti/chapati (unleavened flat bread) and as cooked rice. Sorghum based composite flour can be made into bread and other delicacies. Sorghum is well known for its slowest starch digestibility, and is also a

good source of fibre and B vitamins including thiamine, riboflavin, folic acid etc. The grains contain good amount of potassium, phosphorus, calcium and sufficient amounts of iron and zinc. Consumption of sorghum is associated with a number of health benefits including prevention of chronic lifestyle disorders. Sorghum, being rich in resistant starch, helps in maintaining colon health and also prevents obesity and related complications. Sorghum phytochemicals are known to impart potential beneficial effects including reduction in certain types of cancer, promotion of cardiovascular health as well as protection against diabetic complications.

Pearl millet (Bajra): Pearl millet is consumed as cooked grains after removing seed coat or unleavened bread made from flour. In combination with legumes, it is used to prepare weaning foods in many parts of the world. In India, it is mainly consumed as bajra roti and in Africa, fermented or unfermented pearl millet porridges are widely used. Nutritionally, pearl millet has high fat content, hence is energy-rich. It is a good source of protein that is relatively high in the amino acid lysine compared to other millets. Besides, they are good sources of vitamins and minerals. Pearl millet is relatively rich in iron content compared to all cereals and millets. Moreover, iron rich pearl millet Dhanshakti (iron >70 ppm) was also released for cultivation. Pearl millet contains slow-releasing sugars and hence its consumption would be helpful for people suffering from diabetes. The high iron and zinc content of pearl millet grains makes it ideal for inclusion in the diets of anaemic subjects and also for pregnant and lactating women. The phytonutrients are known to exhibit anti-cancerous activity and antioxidant activity, thus reducing the risk of cardiovascular diseases.

Finger millet (Ragi/Mandua): Finger millet is an important weaning food, especially in India. It is also consumed in the form of ragi rotis, dosa and porridges. Its composite flour is widely employed for making bread. Finger millet is known to be rich in amino acid and methionine. It is also rich in dietary fibre as well as minerals especially calcium, iron and magnesium and is highly beneficial for pregnant and lactating women. In fact, finger millet has the highest calcium content as compared to most cereal grains (350 mg/100 g). Owing to its high calcium content, consumption of finger millet helps in strengthening of bones in growing children and elders. Consumption of finger millet is known to be beneficial for reducing fractures especially those related to osteoporosis. Further, the fibre, slow digestible carbohydrates and phenolics of finger millet are beneficial in reducing the risk of diabetes and also improve gut health.

Foxtail millet (Kakum/Kangani): Foxtail millet grains contain a thin layer of husk which needs to be removed before consumption. Foxtail millet is consumed as cooked rice, porridge and roti. Its composite flour is used in the preparation of puddings, breads, cakes and noodles. Foxtail millet is rich in protein as compared to rice. It is also rich in mineral matter content. Its low glycaemic index and high fibre content is highly

beneficial for the prevention of type II diabetes and cardiovascular diseases. Phytochemicals present in foxtail millet impart several health benefits owing to free-radical scavenging properties.

Little millet (Kutki): Little millet is mainly consumed as cooked rice and as other fermented products like idly, and dosa. Recently, multi grain flours are employed in making bread and bakery products including biscuits and cakes. Little millet is a good source of protein, fat and an excellent source of dietary fibre. Little millet is also rich in iron, magnesium and zinc. Little millet is known to be hypoglycaemic and hypolipidemic. Hence, its regular consumption is beneficial in the management of diabetes and cardiovascular diseases. Further, its grain has faecal bulking effect and hence alleviates constipation.

Proso millet (Chena/Bari): In India, dehulled grain of Proso millet is often consumed as cooked rice while, in some parts of the country it is grounded to make roti and consumed. Proso millet grains are well-acclaimed for their high protein content (up to 12.5%). Proso millet protein is known to be abundant in leucine, isoleucine and sulphur containing amino acids, such as methionine and cysteine. Its grains are a rich source of B-vitamins including niacin and folic acid. Further, it is a good source of minerals, viz. manganese, iron and potassium. As with other millets, proso millet is also rich in dietary fibre and polyphenols. Studies suggest that consumption of proso millet offers several health benefits including elevation of HDL levels, thereby regulating cholesterol metabolism, protection from liver injury and beneficial effects on type 2 diabetes and obesity. Further, consumption of proso millet is also known to impart neural health benefits owing to its high lecithin content.

Kodo millet (Kodon): Kodo millet is easy to digest and is traditionally consumed as rice. It is also used in the preparation of idly, dosa, roti, and soup. Kodo millet is rich in total dietary fibre and B-vitamins including niacin, pantothenic acid, biotin and folate. Because of its high folate content (39.5 mg/100 g), kodo millet is suitable for inclusion in the diet of people suffering from anaemia. Kodo millet is also a good source of minerals including calcium, iron, potassium, magnesium and zinc. It has high amount of lecithin and hence, is used as supplement for strengthening nervous system. Also, it houses numerous phenolic phytochemicals. The antioxidant activity of phenolic phytochemicals of kodo millet helps to impart beneficial effects on human health including reduction in the risk of cardiovascular diseases and hypertension.

Barnyard millet (Sanwa): Barnyard millet is dehulled, cooked and consumed as rice. Its porridge is famous in Himalayan regions while in the southern parts of India, its grain is mainly used in traditional preparations, viz. idly and dosa. Barnyard millet composite flour is nowadays widely employed in making bakery products such as biscuits, noodles and bread. Barnyard millet grains are excellent sources of protein, dietary fibre and mineral nutrients including magnesium, iron and

zinc. High iron and zinc content makes its grains a suitable diet for pregnant and lactating women. Also, high fibre content makes it a beneficial food for people suffering from type 2 diabetes and obesity. Further, the abundant phenolic phytochemicals present in its grain are known to impart several beneficial effects on human health including antioxidant, anti-carcinogenic, anti-inflammatory and antimicrobial properties.

SUMMARY

Millets like sorghum, pearl millet and finger millet are consumed as whole grains while other millets are subjected to dehulling and polishing before consumption. Whole grain millets and moderately polished millets are rich sources of micronutrients like vitamins and minerals. Moreover, they are also rich source of protein and dietary fibre. Proso millet is a rich

source of protein and foxtail millet is a rich source of dietary fibre. Dietary fibre helps in improving gut health and promotes slow digestion of carbohydrates which is beneficial for people with type 2 diabetes. Iron and folic acid play important role in preventing anaemia in children and pregnant women. Finger millet is very rich in calcium and is beneficial for improving bone health and prevention of osteoporosis in elderly. Apart from well known nutrients, millets are a rich source of phytochemicals like polyphenols and anthocyanins with antioxidant and anti-inflammatory properties useful for preventing chronic lifestyle disorders. Regular consumption of millets not only diversifies the diet but, also imparts many health benefits.

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