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HEALTH BENEFITS OF MILLETS

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Millets are a group of highly variable small-seeded grasses, which were widely grown around the world as cereal crops. Millets are tiny in size and round in shape, and it can be multi-colour like white, grey, yellow or red. Millets are highly nutritious. The millets are three to five times nutritionally superior to rice and wheat in terms of proteins, minerals and vitamins. Millets are rich in vitamin B, calcium, iron, potassium, magnesium, zinc, also gluten-free and has low GI (Glycemic index) thus millets are suitable for people allergies/intolerance of wheat and diabetic. Worldwide, millets are regarded as a Nutri-cereals, however, they are the least exploited. Millet grain is copious in nutrients and health-beneficial phenolic compounds, making it suitable as food and feed. For thousands of years, millets has been growing such as Pearlmillet, Barnyard millet, Sorghum, Foxtail millet, Little millet, Kodo millet, Proso millet and now ANI (Millet Network of India) promotes millets as Nutri-cereals instead of Coarse Cereals. The Millet Network of India supports millet farmers. It was created by one hundred women who realized the qualities and benefits of the traditional crops. The group have helped village farmers to grow millet with low water usage and organic fertilizer while highlighting the injustice of government subsidies which encourage competitor crops like rice.

Nutritional Profile of Millets

Millets are high in nutrition and dietary fibre. They serve as good source of protein, micronutrients and phytochemicals. The millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. The essential amino acid profile of the millet protein is better than various cereals such as rice and maize.

Antioxidant Properties of Millet

Millets are rich in phenolic compounds, especially ferulic acid and catechins. These molecules act as antioxidants to protect human body from harmful oxidative stress. The generous content of phenolic compounds in millethas made it a potent source of antioxidants (Dykes and Rooney 2006). Milletgrains contained several natural occurring phenoliccompounds which include phenolic acids, flavonoids, andtannins, in addition to xylo-oligosaccharides (XOs), insolublefibres and peptides (Liang and Liang 2019). Certain lipophilic antioxidants, including vitamin E and carotenoids were extensively distributed among varieties.

Table 1

Name of the compound	Major types	Mechanism of action
Phenolic acids	Kodo millet, Finger millet, Foxtail millet, Proso millet, Little millet and Pearl millet	Free radical scavenging, anti-inflammatory activity
Flavonoids	Kodo millet, Finger millet, Foxtail millet, Proso millet, Little millet and Pearl millet	Inhibition of α-glucosidase and α-amylase activities. Reduction of postprandial hyperglycemia
Tannins	Finger millet	Formation of reactive oxygen species through futile redox cycling
Xylo-oligosaccharides	Finger millet	Strong antioxidant activity to the polysaccharides
Insoluble fibers	Foxtail millet	It could be attributed in part to their unique phytochemical composition
Protein and peptides	Pearl millet and Foxtail millet	Inactivate reactive oxygen species, Free radical scavenging, chelates pro-oxidative transition metals and reduce hydro-peroxides
Carotenoid	Finger millet, Foxtail millet, Proso millet and Little millet	Quenching of single oxygen and free radicals
Vitamin E	Finger millet, Foxtail millet, Proso millet, Little millet	Inhibiting lipid peroxidation in biological membranes

Finger Millet (Ragi)

Finger Millet is popularly known as Ragi. It is commonly consumed by fitness enthusiasts as a healthier alternative to rice or wheat. It is a gluten-free variant of Millet, rich

in proteins and amino acids. It is also high in calcium and has healthy concentrations of iron and other minerals as well. Ragi also has a good number of essential amino acids essential for the human body in the antioxidant activity of traditional Indian foods.

Foxtail Millet

It is rich in carbohydrates that help in balancing blood sugar levels in the body. These millets have a high Iron content. Foxtail Millet can improve overall humans immunity.

Sorghum Millet (Jowar)

Sorghum is a rich source of iron, protein, and fibre and, because of the presence of policosanols, can help lower cholesterol levels. People with wheat allergies can have Jowar as a healthier alternative. It also has more antioxidants than blueberries and pomegranates and is rich in calories and macronutrients. It helps to increase metabolism.

Pearl Millet (Bajra)

Bajra includes iron, fibre, protein, and minerals such as magnesium and calcium. It can be perfect for your well-being to practice regular pearl millet intake, such as helping to battle with type II diabetes.

Buckwheat Millet

It is diabetic-friendly and helps in reducing blood pressure. It is helpful for good cardiovascular health, and for weight loss. Buckwheat also fight against cancer of the breast, asthma in children, and gallstones.

Amaranth Millet

This Millet is rich in protein and dietary fibre. It is great for a healthy diet. This Millet also helps in fighting greying, hair loss, lowers cholesterol levels and cardiovascular disease risk. It is rich in calcium, vitamins, and other minerals.

Little Millet

It is loaded with vitamin B and essential minerals such as Calcium, Iron, Zinc, and Potassium. Little Millet is largely used in Southern states of India in numerous traditional dishes. It is a healthier alternative to rice.

Barnyard Millet

It is stacked with high amounts of dietary fibres that help improve bowel movement and aiding weight loss. It is rich in calcium and phosphorus, which can strengthen bone density.

Broomcorn Millet

It helps balance blood sugar levels as it has a low glycemic index. It is a good option for diabetics to be incorporated into a daily diet.

Kodo Millet

It has a significant effect on strengthening the nervous system. Kodo is a good source of B vitamins, especially niacin, B6, and folic acid. It contains calcium, iron, potassium, magnesium, and zinc minerals. It can relieve cardiovascular disorders such as high blood pressure and cholesterol levels when eaten regularly by postmenopausal women.

Table 2: Millets Nutrition Facts per 100gms

Crop / Nutrient	Protein(g)	Fat (g)	Fiber(g)	Minerals(g)	Iron(mg)	Calcium(mg)	Calories (kcal)
Pearl Millet	10.6	4.8	1.3	2.3	16.9	38	378
Finger Millet	7.3	1.5	3.6	2.7	3.9	344	336
Foxtail Millet	12.3	4	8	3.3	2.8	31	473
Kodo Millet	8.3	3.6	9	2.6	0.5	27	309
Little Millet	7.7	5.2	7.6	1.5	9.3	17	207
Barnyard Millet	11.2	3.9	10.1	4.4	15.2	11	342
Sorghum	10.4	3.1	2	1.6	5.4	25	329
Proso Millet	12.5	2.9	2.2	1.9	0.8	14	356
Rice	6.8	2.7	0.2	0.6	0.7	10	362
Wheat	11.8	2	1.2	1.5	5.3	41	348

Health Benefits of Millets

Millets are good sources of energy. They provide protein, fatty acids, minerals, vitamins, dietary fibre and polyphenols. Typical millet protein contains high quantity of

essential amino acids especially the sulphur containing amino acids (Methionine and cysteine). Millets have potential health benefits and epidemiological studies have showed that consumption of millets reduces risk of heart disease, protects from diabetes, improves digestive system, lowers the risk of cancer, detoxifies the body, increases immunity in respiratory health, increases energy levels and improves muscular and neural systems and are protective against several degenerative diseases such as metabolic syndrome and Parkinson's disease (Chandrasekara and Shahidi, 2012). The important nutrients present in millets include resistant starch, oligosaccharides, lipids, antioxidants such as phenolic acids, avenanthramides, flavonoids, lignans and phytosterols which are believed to be responsible for many health benefits (Edge *et al.*, 2005).

Conclusion

In a world where health and wellness have become a supreme lifestyle, nutrition-oriented food items like Millets and other cereals are gaining popularity. Every dietician and nutritionist is vouching for the remarkable benefits that Millets have on human health. Apart from being gluten-free, they can enhance your health and promote weight loss. Including Millets in diet is one of the best decisions to mitigate lifestyle related diseases. Hence the consumption of these nutrient rich millets can reduce the risk of lifestyle related diseases like cardiovascular diseases, type II diabetes, Gastrointestinal Disorders and cancer *etc.*

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