Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 45 No. 4 (2024)

The Benefits of Traditional Medicine and Ancient Writings Review: A Nutritional Security Perspective

[1]Dr. P. Chennakrishnan,[2] Mr. R. Vijayakumar, [3]Mis. S. Durga, [4]Mr. K Nagaraja,

[1]Associate Professor, Department of Economics, Thiruvalluvar University, Serkkadu, Vellore -632 115.

[2]Research Scholar, Department of Economics, Thiruvalluvar University, Serkkadu, Vellore -632 115.

[3]Research Scholar, Department of Economics, Thiruvalluvar University, Serkkadu, Vellore -632 115.

[4] Research Scholar, Department of Economics, Thiruvalluvar University, Serkkadu, Vellore -632 115.

Abstract

A grain that resists drought and requires little upkeep is millet. This grain protects heart health and aids in maintaining a healthy weight, among other health benefits. For thousands of years, people have profited from millet's nutritional qualities. It is mentioned in the Bible's Old Testament as well as writings from classical Greece and Rome. When compared to rice and wheat, millet matures in nearly half the time due to its rapid growth. The benefits of Millet currently ranked as the sixth most significant cereal grain worldwide is millet.

Key words: The Benefits, Traditional Medicine, Ancient Writings Nutritional Security Perspective, v source of protein, minerals, fiber.

Introduction

Millet is a good source of protein, minerals, fiber, and essential vitamins. Among the many possible health advantages of millet include its ability to safeguard cardiovascular health, delay the onset of diabetes, assist individuals in reaching and maintaining a healthy weight, and reduce intestinal inflammation.

Cultivated for thousands of years throughout Africa and Southeast Asia, millet is one of the oldest grains in the world. It is currently one of the most significant grains available and a staple crop for both people and animals. Because the small spherical grains are resistant to insects and easy to store for years at a time, they are extremely significant. In the United States, one can find kinds such as sorghum, proso, finger, and pearl that are abundant in vitamins and minerals.

Millets is extremely diverse set of small seeded grasses, broadly full-fledged around the world as cereal crops for fodder and social food. Most species mostly referred to as millets belong to Pinaceae community, but some millets also belong to various other taxa.

In case of nutritional composition of various types of Millets serve as decent source of protein, micronutrients and phytochemicals. It encompasses 65-75% carbohydrates, 2-5% fat, 15-20% dietary fibre and 7-12% protein. The essential amino acid profile of the millet protein is healthier than various cereals such as maize. Millets contain fewer cross-linked prolamins, which may be an additional factor contributing to higher digestibility of the millet proteins. Similar to cereal proteins, the millet proteins are poor sources of lysine, but they complement well with lysine rich vegetables (leguminous) and animal proteins which form nutritionally balanced composites of high biological value. Millets are more nutritious compared to fine cereals. Small millets are good source of phosphorous and iron. Millets contributes to antioxidant activity with phytates, polyphenols, tannins,

anthocyanins, phytosterols and pinacosanols present in it having important role in aging and metabolic diseases. All millets possess high antioxidant activities.

Major Millets: Important traits about Millets

Pearl Millet (Bajra) Pearl millet contains considerably high proportion of proteins (12-16%) as well as lipids (4-6%). It contains 11.5% of dietary fiber. For the reduce risk of inflammatory bowel disease needs to be rises transit time of food in the gut. The niacin content in pearl millet is higher than all other cereals. It also contains folicate, magnesium, iron, copper, zinc and vitamins E and B- complex. It has high energy content compared to other millets. It is also rich in calcium and unsaturated fats which are good for health.

Finger Millet (Ragi) Finger millet is the richest source of calcium (300-350 mg/100g) Ragi has the highest mineral content. It contains lower levels of protein (6-8%) and fat (1.5-2%) Finger millet proteins are unique because of the sulphur rich amino acid contents. The grains have excellent malting properties and are widely known for its use as weaning foods. It has high antioxidant activity.

Sorghum (Jowar) Major portion of sorghum protein is prolamin (kaffirin) which has a unique feature of lowering digestibility upon cooking which might be a health benefit for certain dietary groups. Sorghum proteins upon cooking are significantly less digestible than other cereal proteins, which might be a health benefit for certain dietary groups. It is rich in protein, fibre, thiamine, riboflavin, folic acid, and carotene. It is rich in potassium, phosphorus and calcium with sufficient amounts of iron, zinc and sodium.

Foxtail Millet (Kakum) It is high in carbohydrates. It has double quantity of protein content compared to rice. It contains minerals such as copper & iron. It provides a host of nutrients, has a sweet nutty flavour and is considered to be one of the most digestible and non-allergic grains.

Kodo Millet It has high protein content (11%), low fat (4.2%) and very high fibre content (14.3%).Kodo millet is rich in B vitamins especially niacin, pyridoxin and folic acid as well as the minerals such as calcium, iron, potassium, magnesium and zinc. It contains a high amount of lecithin and is an excellent for strengthening the nervous system.

Why one should eat millets?

Millets are gluten-free, highly nutritious and rich in dietary fibre. They are rich in micronutrients, including calcium, iron, phosphorus, etc. They are low in Glycemic Index (GI) as such don't cause huge spike in blood sugar. Millets should ideally be an integral part of our daily diet. Dietary fibre in millets has water absorbing and bulking property. It increases transit time of food in the gut which helps in reducing risk of inflammatory bowel disease and acts as detoxifying agent in the body.

What are the Health Benefits of Millets?

Millets are anti-acidic and gluten free, it helps to prevent type 2 diabetes Its effective in reducing blood pressure. Reduces risk of gastrointestinal conditions like gastric ulcers or colon cancer. Eliminate problems like constipation, excess gas, bloating and cramping. Millet act as a probiotic feeding micro flora in our inner ecosystem.5 fact important related to millet.

Powerhouse of nutrition: Millet's rich in minerals and plant-built nutrients type phyto-nutrients. Essential phytonutrient as lignans present in millets which helps lessen the peril of heart diseases. Pearl millets are rich in insoluble fibre and aid in better digestion, and are also known for their anti-cancer properties. Foxtail millets are not just rich in magnesium that assists to regulate blood pressure levels, they are also high in iron and calcium that help boost immunity levels. Sorghum, on the other hand, is a gluten-free variant of millets that is beneficial for those suffering from celiac disease. Overall, millets are tiny power-packed nutrient foods and are a must for a healthy lifestyle.

Defences as of Diseases

By swelling cases of obesity, diabetes and early heart strokes, there is a sudden rise in health consciousness among people. There is a need to make healthy diet choices, and for those who are aware, millets are making quite an impact Millets are gaining ground as healthy options for those suffering from lifestyle diseases, be it diabetes, cardiovascular diseases, intestinal disorders or allergies towards gluten.

Resilience towards climate change

Millets are also resistant to the cold, drought and salinity and thus, are suitable for cultivation on dry and arid land. The prevalence of stress conditions and their consequences are circumvented by several traits such as short stature, small leaf area, thickened cell walls, and the capability to form dense root system Also, the C4 photosynthetic trait is highly advantageous to millets. In the C4 system, carbon dioxide (CO2) is concentrated around ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO), which in turn suppresses ribulose 1,5-bisphosphate (RuBP) oxygenous (RuBisCO), which in turn suppresses ribulose 1,5-bisphosphate (RuBP) oxygenation and photorespiration.

Here are 10 health benefits of incorporating millets into your diet:

1. **High Nutritional Value** - Millets are a rich source of nutrients, including protein, fiber, and micronutrients like magnesium, potassium, and zinc. It also has a low glycemic index, which means it doesn't cause a rapid spike in blood sugar levels. This makes it an ideal food for people with diabetes or anyone looking to maintain stable blood sugar levels.

2. **Gluten-Free** - Millet is naturally gluten-free, making it an excellent choice for those with celiac disease or gluten intolerance. It's also a great alternative to wheat for people looking to reduce their gluten intake.

3. **Promotes Digestive Health** - The high fiber content in millet makes it an excellent food for promoting digestive health. It can help to prevent constipation and reduce the risk of colon cancer. Additionally, millet contains prebiotics, which promote the growth of beneficial bacteria in the gut, improving overall gut health.

4. **Aids Weight Loss** - Millets have a low calorie count, and they are an excellent food product for weight loss. They help to maintain energy levels throughout the day, preventing the need for constant snacking and overeating. Millets also keep you satiated for longer than other carbohydrates, as they take time to get digested and absorbed into your body.

5. **Keeps Your Blood Sugar Levels Low** - Millets have a low glycemic index, which makes them an excellent food for regulating blood sugar levels. Consuming millets regularly can lower your risk of developing diabetes.

6. **Boosts Your Immunity -** Millets provide a great source of protein and can help develop and strengthen your immunity. A stronger immune system means fewer chances of you catching diseases.

7. **Reduces Cardiovascular Risks -** The essential fats found in millets provide our bodies with good fats which prevent excess fat storage, effectively lowering the risk of high cholesterol, strokes, and other heart complaints. The potassium content in millets regulates your blood pressure and optimizes your circulatory system.

8. **Prevents Asthma -** The magnesium content in millets can reduce the frequency and severity of migraines and asthma complaints. Unlike wheat, they do not contain the allergens that lead to asthma and wheezing.

9. **Helps Your Digestion -** Millets are a rich fiber source that benefits digestion by alleviating bloating, gas, cramping, and constipation. Good digestion keeps issues like gastric/colon cancer and kidney/liver complaints away.

10. **Acts as an Antioxidant -** Millets help your body detox because of their antioxidant properties. Quercetin, curcumin, ellagic acid, and other valuable catechins flush out toxins from your body and neutralize the enzymatic actions of your organs.

Variety of Millets in India

Table -1: Variety of Millets in India

Millet Type	Other Names	Nutritional Benefits	Health Benefits
Finger Millet	**Ragi**	Rich in calcium, iron, and fiber. Supports bone health, hemoglobin production, and digestive health.	Aids in bone health, hemoglobin production, and digestive health.
Pearl Millet	**Bajra**	Good source of energy, B-vitamins, and iron. Helps in maintaining cardiovascular health and managing blood sugar levels.	Supports cardiovascular health and blood sugar management.
Sorghum	**Jowar**	High antioxidant content. Gluten-free and beneficial for heart health and diabetes management.	Provides protection against chronic diseases and supports heart health and diabetes management.
Little Millet	**Kutki**	Powerhouse of nutrients like B-vitamins, minerals, and antioxidants. Supports metabolism, aids in weight management, and boosts immunity.	Supports metabolism, aids in weight management, and boosts immunity.
Foxtail Millet	**Kangni / Kakum**	Rich in dietary fiber, protein, iron, and magnesium. Supports digestive health and blood sugar management.	Promotes digestive health, satiety, and helps in managing blood sugar levels.
Proso Millet	**Cheena**	Good source of protein, B-vitamins, and antioxidants. Aids in muscle repair and growth, supports brain health, and provides energy.	Supports muscle repair, brain health, and provides energy for daily activities.

Kodo Millet	**Kodra / Kodri**	High in fiber and antioxidants. Beneficial for digestive health, weight management, and maintaining healthy blood sugar levels.	Supports digestive health, weight management, and healthy blood sugar levels.
Barnyard Millet	**Jhangora / Jhingora**	Rich in fiber, protein, iron, and calcium. Promotes satiety, aids in weight management, and supports bone and muscle health.	Promotes satiety, aids in weight management, and supports bone and muscle health.

These millets offer a wide range of health benefits, making them valuable additions to a balanced diet. Incorporating a variety of millets in your meals can contribute to overall well-being and provide a nutritious alternative to regular grains.

Table- 1: Nutritional composition of 8 different types of millets in comparison to rice and wheat/100 gm.

Nutrient	Finger Millet	Foxtail Millet	Pearl Millet	Barnyard Millet	Kodo Millet	Little Millet	Proso Millet	Brown Top Millet	Rice	Wheat
Protein (g)	7.3	12.3	11.6	6.2	8.3	7.7	12.5	8.98	6.4	11.8
Fiber (g)	3.6	8	1.3	10.1	9.3	7.6	2.5	7.3	0.3	2
Calcium (mg)	344	31	42	20	27	17	14	28	2	29
Iron (mg)	3.9	1.1	2.8	15	0.6	9.3	3.8	7.72	0.6	3.9
Zinc (mg)	2.8	1.1	1.7	0.4	1.2	1.2	1.7	2.5	0.9	2.7
Phosphorus (mg)	283	258	285	293	189	207	277	276	52	288
Thiamine (mg)	0.42	0.59	0.27	0.33	0.15	0.3	0.41	–	0.4	0.24
Niacin (mg)	1.1	3.2	0.89	4.2	2.1	3.2	4.6	–	1.6	5.5
Riboflavin (mg)	0.19	0.11	0.15	0.11	0.09	0.09	0.28	–	0.03	0.13

The nutritional values will change depending on the growth climate and the species being used (16, 20–22).

Table- 2: Dietary Fiber composition of eight different types of millets.

Millet variety	Fiber content (g/100g)	Fiber type and composition (approximate g/100g)		References
		Soluble DF*	**Insoluble DF ****	
Finger Millet	15.00	1.40	15.70	(52)
Foxtail Millet	8.00	5.87	11.06	(140)

Millet variety	Fiber content (g/100g)	Fiber type and composition (approximate g/100g)		References
Pearl Millet	8.00	1.91	9.85	(141)
Barnyard Millet	6.00	4.15	8.19	(142)
Kodo Millet	9.00	3.85	13.13	(52)
Little Millet	7.00	5.65	8.57	(141)
Proso Millet	3.00	2.05	9.48	(141)
Brown Top Millet	9.00	–	–	(21)

The nutritional values will change depending on the growth climate and the species being used.

Consumption of millets helps in preventing the metabolic disorders and in correction of life style disorders. Since these are administered as food it becomes easy for consumption and the bioavailability will be more. Diet based trials with millet supplementation have shown encouraging results on health and performance. Trials on supplementation of diet with millets have been promising, showing improvement in health and performance including anemia). Regular supplementation of multi-millet health mix (kodo millet, little millet, foxtail millet, finger millet, and wheat with the inclusion of pulses) to primary school children in India showed a positive effect in increasing the anthropometric indices. Khader and Maheswari found that there was significant increase in weight of preschool children after supplementation of amylase-rich malted millet mixes for the period of 4 months. A randomized clinical trial program through food based approach using pearl millet *ladoo* (Indian sweet) showed a significant rise in mean hemoglobin (Hb) levels of adolescent girls. Dietary supplementation of adolescent school girls with finger millet porridge improved hemoglobin levels .

Conclusion

People have appreciated millet for thousands of years; it is an ancient grain. Furthermore, birds and cattle eat millet. Because it grows quickly, resists drought, and needs little maintenance, it is expanding in popularity. Protein, fiber, essential vitamins, and minerals can all be found in good amounts in millet. A healthy weight may be achieved and maintained, inflammation in the gut can be controlled, diabetes cannot start, and cardiovascular health is protected—these are only a few of the possible health advantages of millet. This grain, millet, is flexible. Celiac disease sufferers can easily incorporate this gluten-free grain into their meals because there are numerous easy methods to prepare it.

References

a. Sireesha Y, Kasetti RB, Swapna SAS, Apparao C. Anti hyperglycemic and hypolipidemic activities of Setaria italica seeds in STZ diabetic rats. Pathophysiology.2011; 18: 159-164.
b. Saleh ASM, Zhang Q, Chen J,Shen Q. Millet grains: Nutritional Quality, Processing, and Potential Health Benefits. Compr. Rev. Food Sci. Food Saf. 2013;12: 281-295.
c. ScalbertA, Manach C, Morand C, Remesy C, Jimenez L. Dietary polyphenols and the prevention of diseases. Crit. Rev. Food Sci. Nutr. 2005 ;45: 287-306.
d. Manach C, Mazur A, Scalbert A. Polyphenols and prevention of cardiovascular diseases. Curr. Opin. Lipidol. 2005;16: 77-84.
e. Chandrasekara A, Shahidi F. Bioaccessibility and antioxidant potential of millet grain phenolics as affected by simulated in vitro digestion and microbial fermentation. J. Funct. Foods.2012;4: 226-237.
f. Edge MS, Jones JM, Marquart L. A new life for whole grains. J. Am.Diet. Assoc. 2005;105: 1856-1860.
g. Miller G. Whole grain, fiber and antioxidants. In: Spiller, G.A. (ed). Handbook of dietary fiber in Human Nutrition. Boca Raton, FL: CRC Press.2001; 453-460.
h. World Health Organization. Noncommunicable diseases country profiles 2018.

i. Khetan A, Zullo M, Rani A, et al. Effect of a community health worker-based approach to integrated cardiovascular risk factor control in India. A cluster randomized controlled trial. Glob. Heart. 2019;14:355–365.
j. Amadou I, Gounga ME, Le GW. Millets: Nutritional composition, some health benefits and processing-A review. Emir. J. Food Agric.2013; 1:501-8.
k. Acharya kaiyadeva. Dhanyavarga. In: Prof priyavratsharma, Dr guru prasadasharma (eds.) Kaiyadeva Nighantu (Pathyaapthyavibhodika). Varanasi: Choukambha Orientalia; 1979: 301.
l. Dixit AA, Azar KM, Gardner CD, Palaniappan LP. Incorporation of whole, ancient grains into a modern Asian Indian diet to reduce the burden of chronic disease. Nutr. Rev. 2011 ;69:479- 88.
m. Tadele Z. Drought adaptation in millets. In.Tech; 2016;639- 632.
n. Das IK, Padmaja PG. Biotic Stress Resistance in Millets. 1st ed. Elsevier; 2017
o. Baker RD. Millet Production Guide. Cooperative Extension Service. College of Agriculture and Home Economics, New Mexico State University. A. 2003;414.
p. Amadou I, Gounga ME, Le GW. Millets: Nutritional composition, some health benefits and processing-A review. Emir. J. Food Agric.2013;501-8.
q. Sarita ES, Singh E. Potential of millets: nutrients composition and health benefits. J. Sci. Innov. Res.2016;5:46-50.
r. Taylor JR, Emmambux MN. Gluten-free foods and beverages from millets. InGluten-free cereal products and beverages. Academic Press. 2008;119-V.
s. Bora P, Ragaee S, Marcone M. Characterisation of several types of millets as functional food ingredients. Int. J. Food. Sci. Nutr. 2019 ;70:714-24.
t. Saleh AS, Zhang Q, Chen J, Shen Q. Millet grains: nutritional quality, processing, and potential health benefits. Compr. Rev. Food Sci. Food Saf. 2013;12:281-95.