Content available at: https://www.ipinnovative.com/open-access-journals

IP Journal of Nutrition, Metabolism and Health Science

Journal homepage: https://www.jnmhs.com/

Review Article

A review on usefulness of millets in current prospects

Shivam Dubey[1]*

[1]*Dept. of Nutrition, Govt. Science College, Jabalpur, Madhya Pradesh, India*

ARTICLE INFO

Article history:
Received 11-01-2024
Accepted 22-01-2024
Available online 15-02-2024

Keywords:
Millets
Antioxidants
Nutritional traits
Human wellbeing
Staples

ABSTRACT

An important food crop on a global scale, millets have a big economic impact on developing countries. Millets are a useful grain because they are a dry-spell and annoyance-causing obstruction grain. Millets are regarded as sustaining food types that produce a lot of energy and aid in reducing hunger. Foods made from millet are thought to include probiotics and prebiotics that might have future health benefits. They are consumed as a staple meal, especially in non-industrialized countries, are necessary for certain moderately developed countries' traditional diets, and are spreading around the globe. It is a crucial nutritional source of energy. Millet seeds have been scientifically shown to have several health-promoting characteristics in addition to their high caloric value.

1. Introduction

Millets are the normal little cultivated yearly grasses or grains having a place with the family Poaceae local to Ethiopia and effectively embraced by India, China, Australia, Africa, and a few districts of the US of America. Millets are impervious to sicknesses and can develop with next to no pesticide use.[1] Millets do not need fumigants and a few millets like; foxtail millets go about as an enemy of irritation in comparable capacity states of rice and heartbeats. Millets are pressure-lenient grains that can fill in bad-quality soil or with less wholesome prerequisites, are open-minded to temperature variances, and have an extraordinarily short development season.[2] These can fill in either waterlogged or wet regions to dry spell districts and can fill in parched and semi-bone-dry areas.[3] Significant millet harvests of India are pearl millet, proso millet, foxtail millet, and finger millet while different other millet assortments, for example, quinoa, kodo millet, farm millet, and little millet are likewise being used. In their developing region, millets give most of the energy and protein prerequisites to the populace. Millets contain an exceptionally high measure of dietary sugars 60-70%, dietary strands 10-12%, protein 6-9%, less measure of fat 1.5-5%, and a lot of minerals 2-4%.[4] In this audit, the creators zeroed in on the mixtures and nutraceutical properties of millets and accentuation on certain flavonoids, phenols, and other restoratively significant mixtures that make them Nutri-cereals. Millets are a plentiful wellspring of fundamental large-scale and micronutrients, starches, protein, dietary fiber, lipids, and phytochemicals. The supplement content and absorbability of millets are essentially impacted by the handling procedures. Even though India positions first in nutri-rich millet creation and second in rice and heartbeats across the globe, it likewise — tragically — positions second in kid-ailing health frequencies. India is home to more than 33% of the world's malnourished youngsters.[5] In actuality, the nation has likewise turned into a centre point for diabetic and overweight people, putting the country under a twofold weight of unhealthiness.[6] Perhaps millets were the principal

* *Corresponding author*.
E-mail address: shivamdubey20@gmail.com (S. Dubey).

https://doi.org/10.18231/j.ijnmhs.2023.026

referred grain to be utilized as food on the grounds that, in the Medieval times, Pauls and Romans were eating millets as porridge instead of rice.[7] Millets assume a critical part in the customary eating routine of many territories of India and its various assortments are consumed in numerous locales of India. In the ongoing milieu, India is standing up to both the pre- and post-progress stages and working in a dynamic way, and putting forth every conceivable attempt to get a created country tag. Pre-progress issues are the normal crucial issues, for example, the absence of solid food and particular inadequacies like Fe, Ca, and different supplements while post-progress issues are for instance weight, diabetes, cardiovascular infection, and so on.[8]

According to the World Health Organisation, unhealthiness alludes to lack, excess, or abnormality in an individual's admission of energy and sustenance.[9] The speed of weak solid youths, adolescents, and pregnant and lactating ladies is high in India. It impacts infant kids in more than one way including frail safe frameworks, ongoing ailment, endurance, appropriate organ arrangement, and so on. The most recent United Nations Children's Emergency Fund report-2019 uncovers that in India infant death rate is 8.8% and lack of healthy sustenance caused 69% of passings of children quite a while back.[10] Other than that; India has turned into a significant nation adding to the development of the diabetic populace. Because of the persistent upsurge in diabetes patients, India is known as the diabetic capital of the world. Diabetes has complexly extended the risk of kicking the container from respiratory disappointment appeared differently in relation to non-diabetic. Worldwide Heart Drive-WHO has shown that more than 80% of cardiovascular sickness passing happen in developing as well as under-developed countries.[11]

2. Discussion

According to the perceptions, most millets are three to multiple times more nutritious than most cereals with regards to nutrients, fiber, proteins, and minerals (calcium and iron) and are sans gluten; subsequently, they are known as "superfoods".[12] Contrasted with cereals, millets are a decent wellspring of protein-and sulphur-containing amino acids (methionine and cysteine) and have a superior unsaturated fat profile.[13,14] Nonetheless, millets contain a restricted measure of lysine and tryptophan, which changes with the cultivar. Millets are plentiful in vitamin B and vitamin E and also in minerals like potassium, manganese, phosphorus, magnesium, calcium, and iron.[15,16] The plentiful supplements of millets give various advantages like lessening the rate of malignant growth[17,18] heftiness and diabetes,[19] cardiovascular sicknesses[20,21] gastrointestinal issues,[22] headache, and asthma.[15,23] The utilization of millets oversees hyperglycaemia due to their lente starch and high dietary fiber content, subsequently making millets an ideal nourishment for diabetic people.[5,23] Consequently, millets assume a significant part in the cutting-edge diet as an expected wellspring of fundamental supplements, particularly in immature and emerging nations.[24]

Millets differ from each other by their grain type, appearance, development, morphological elements, and so on. On the hazier side, these are underutilized and disregarded crops because of their lower cooking quality and not set in stone by riches, longer time, and endeavours associated with the handling of the millets. On the off chance that these issues could be settled, their high nutritive worth can make them significantly more important as nourishment for ranchers and a potential pay source.[25] Improvements in efficiency upgrade and handling of rice, wheat, maize, and a few other predominant yields have prompted the restricting food propensities which have made numerous different harvests underutilized.[26] The healthful substance of food is significant calculate the support of the human body's digestion and well-being. The healthful substance is basic for creating and amplifying the human hereditary potential. Millet's nourishment is practically identical to significant staple oats (rice, wheat, and maize) since they are a plentiful wellspring of sugars, protein, dietary fiber, micronutrients, nutrients, and phytochemicals. Millets have a bigger extent of non-bland polysaccharides and dietary fiber contrasted with staple oats and include 65-75% starches. Millets with high dietary fiber give various medical advantages, for example, working on gastrointestinal well-being, blood lipid profile, and blood glucose leeway. Millets with insignificant gluten and low glycaemic file are solid choices for celiac turmoil and diabetes.[27] Millets are additionally wealthy in well-being-advancing phytochemicals, for example, phytosterols, polyphenols, phytocyanins, lignins, and phytoestrogens. These phytochemicals go about as cell reinforcements, immunological modulators, and detoxifying specialists, forestalling age-related degenerative sicknesses like cardiovascular illnesses, type-2 diabetes, and malignant growth.[15] It has been revealed that millets contain around 50 different phenolic gatherings and their subordinates with intense cell reinforcement limits, like flavones, flavonols, and ferulic corrosive.[28] Countless phenolic parts, which are significant cancer prevention agents in millets, are tracked down in limited structure in proso and finger millet and in free structure in pearl millet.[29] One more review reasoned that proso millet involves different phytochemicals, for example, syringic acid, chlorogenic acid, ferulic acid, caffeic acid, and p-coumaric.[30] It has additionally been accounted for that practically 65% of the phenolics are available in the bound portion. The presence of these phytochemicals and significant cancer prevention agents demonstrates the expected advantages of millets to human well-being. Millets have an energy esteem like staple oats. Furthermore, they give huge medical advantages because of their high

fiber, minerals, nutrients, full scale and micronutrients, and phytochemicals and can assist with combatting persistent problems.

Millet is a yield with dry season-safe qualities, easy to process; it contains a high proportion of lecithin and is great for supporting the tactile framework. Millets are copious in nutrients; and contain nutrients A, B, D, and E, especially B3, B6, and B9, like the minerals; calcium, iron, and numerous different minerals. Legitimate millet use can help us effectively to conquer numerous pre and post-progress sicknesses and can establish a sound and illness-free climate in our country. Be that as it may, bio-stronghold and the improvement of a few utilitarian food sources (rolls, cuts of bread, pasta, noodles, drink powder, and so on) can likewise be a possible other option. They contain tannins, phenolic blends, flavonoids, and other significant amino and unsaturated fats. These are palatable and rich in β-carotenoids and lecithin so practical food can be ready as pasta, noodles, rolls multigrain floor, and so forth, these assist in holding down cholesterol with preferring LDL, VLDL, fatty oils, and so on, to defend us from hypertension. Millets likewise decline the possibility of getting various dangerous developments and cardiovascular infections. Every one of the supplements gives energy to the body for development, upkeep, propagation, and playing out all the body's capabilities. Millets as high-energy nutritious food whenever used appropriately can battle hunger, heftiness, diabetes, cardiovascular sickness, protein-energy lack of healthy sustenance, celiac infection, and so forth, as liberated from gluten.

3. Conclusion

Throughout the ten years, environmental change, populace development, and financial log jam have affected food security. Numerous nations are confronting the test of both undernutrition and overnutrition. In this way, there is a need to change the food framework to accomplish food and nourishment security. A few explore, surveys, and reports are exhibiting that India is experiencing significant change mode so defying the two issues. Global Hunger Index has given us very low legitimacy while then again, the pace of hunger, corpulence, and cardiovascular sicknesses are additionally raising alarmingly.[31] Making millet a piece of a standard eating routine can give a reasonable, complete, and good dinner. It was seen that during the germination and aging of millets, the dietary fiber, mineral, and nutrient substance of most millets got to the next level. Straightforward handling methods like splashing, germination/malting, and maturation can assist with handling the issue of protein-energy ailing health by further developing protein edibility and the bioavailability of the minerals. In any case, it was seen that decortication, dehulling, processing, and expulsion brought about a decrease of all-out proteins, complete dietary fiber, and micronutrients. Millets are exceptionally nutritive, non-corrosive framing, without gluten, and have dietary properties. Even though millets are exceptionally nutritious, their utilization is yet restricted to the customary and unfortunate populace because of an absence of consciousness of their dietary benefits. There is an absence of handling advances, absence of food sponsorships, and bother in food arrangements which makes millets elder. The supplement-rich millets are a feasible answer for lessening the rising occurrences of illness and metabolic problems and can upgrade the nourishment and food security of the country.

4. Source of Funding

None.

5. Conflict of Interest

None.

References

1. Thakur M, Tiwari P. Millets: the untapped and underutilized nutritious functional foods. *Plant Arch*. 2019;19(1):875–83.
2. Malathi B, Appaji C, Reddy GR, Dattatri K, Sudhakar N. Growth pattern of millets in India. *Indian J Agric Res*. 2016;50(4):382–6.
3. Michaelraj P, Shanmugam A. A study on millets based cultivation and consumption in India. *Int J Mark Financ Serv Manag Res*. 2013;2(4):49–58.
4. Annor GA, Tyl C, Marcone M, Ragaee S. Why do millets have slower Starch and protein digestibility than other cereals? *Trends Food Sci Technol*. 2017;66:73–83.
5. Nainwal K. Conservation of minor millets for sustaining agricultural biodiversity and nutritional security. *J Pharmacogn Phytochem*. 2018;1:1576–80.
6. Dutta M, Selvamani Y, Singh P, Prashad L. The double burden of malnutrition among adults in India: Evidence from the national family health survey-4 (2015-16). *Epidemiol Health*. 2019;41:e2019050. doi:10.4178/epih.e2019050.
7. Ambati K, Sucharitha KV. Millets- review on nutritional profiles and health benefits. *Int J Recent Sci Res*. 2019;10(7):33943–8.
8. Omram AR. The epidemiologic transition: a theory of the epidemiology of population change. *Bull World Health Organ*. 2001;79:161–70.
9. WHO. Levels, and trends in child malnutrition; 2019. Available from: https://www.who.int/nutgrowthdb/jme-2019-key-findings.pdf?ua=1.
10. UNICEF (2019) For Every Child, Reimagine. UNICEF Annual Report 2019. United Nations Children's Fund (UNICEF), New York; 2019. Available from: https://www.unicef.org/sites/default/files/2020-06/UNICEF-annual-report-2019_1.pdf.
11. Working Together to Beat Cardiovascular Disease; 2019. Available from: https://www.who.int/health-topics/cardiovascular-diseases#tab=tab_1.https://www.cdc.gov/globalhealth/healthprotection/resources/pdf/HEARTS_Infographic.pdf.
12. Ashoka P, Gangaiah B, Sunitha N. Millets-foods of twenty first century. *Int J Curr Microbiol Appl Sci*. 2020;9(12):2404–10.
13. Nithiyanantham S, Kalaiselvi P, Mahomoodally MF, Zengin G, Abirami A, Srinivasan G, et al. Nutritional and functional roles of millets-A review. *J Food Biochem*. 2019;43(7):1–10.
14. Anitha S, Govindaraj M, Potaka JK. Balanced amino acid and higher micronutrients in millets complements legumes for improved human dietary nutrition. *Cereal Chem*. 2020;97(1):74–84.
15. Rao DB, Malleshi NG, Annor GA, Patil JV. Millets Value Chain for Nutritional Security: A Replicable Success Model from India. Indian

Institute of Millets Research (IIMR). Hyderabad, India; 2017. p. 112.
16. Birania S, Rohilla P, Kumar R, Kumar N. Post harvest processing of millets: A review on value added products. *Int J Chem Stud*. 2020;8:1824–9.
17. Ramadoss DP, Sivalingam N. Vanillin extracted from Proso and Barnyard millets induce apoptotic cell death in HT-29 human colon cancer cell line. *Nutr Cancer*. 2020;72(8):1422–37.
18. Yang R, Shan S, Zhang C, Shi J, Li H, Li Z. Inhibitory Effects of Bound Polyphenol from Foxtail Millet Bran on Colitis-Associated Carcinogenesis by the Restoration of Gut Microbiota in a Mice Model. *ACS Appl Mater Interfaces*. 2020;68:3506–17.
19. Vedamanickam R, Anandan P, Bupesh G, Vasanth S. Study of millet and non-millet diet on diabetics and associated metabolic syndrome. *Biomedicine*. 2020;40(1):55–8.
20. Hegde PS, Rajasekaran NS, Chandra TS. Effects of the antioxidant properties of millet species on oxidative stress and glycemic status in alloxan-induced rats. *Nutr Res*. 2005;25(12):1109–20.
21. Ren X, Yin R, Hou D, Xue Y, Zhang M, Diao X, et al. The glucose-lowering effect of foxtail millet in subjects with impaired glucose tolerance: A self-controlled clinical trial. *Nutrients*. 2018;10:1509.
22. Chen Y, Xu J, Ren Q. The Effect of Millet Porridge on the Gastrointestinal Function in Mice. *J Food Nutr Res*. 2018;6:152–7.
23. Gowda NN, Taj F, Subramanya S, Ranganna B. Development a table top centrifugal dehuller for small millets. *AMA Agric Mech Asia Africa Latin Am*. 2020;51:72–8.
24. Anbukkani P, Balaji SJ, Nithyashree ML. Production and consumption of minor millets in India-a structural break analysis. *Ann Agric Res New Ser*. 2017;38:1–8.
25. Girish C, Meena RK, Mahima D, Mamta K. Nutritional properties of minor millets: neglected cereals with potentials to combat malnutrition. *Curr Sci*. 2014;107(7):1109–11.
26. Gupta A, Sood S, Agrawal PK, Bhatt JC. Under-utilized food crops of Himalayan region: Utilization and prospective. *Newer Approaches Biotechnol*. 2013;p. 101–20.
27. Sharma N, Niranjan K. Foxtail millet: Properties, processing, health benefits, and uses. *Food Rev Int*. 2018;34:329–63.
28. Azad MOK, Jeong DI, Adnan M, Salitxay T, Heo JW, Naznin MT, et al. Effect of different processing methods on the accumulation of the phenolic compounds and antioxidant profile of broomcorn millet. *Panicum Miliaceum L) Flour Foods*. 2019;8:230.
29. Chandrasekara A, Shahidi F. Content of insoluble bound phenolics in millets and their contribution to antioxidant capacity. *J Agric Food Chem*. 2010;58(11):6706–14.
30. Zhang L, Liu R, Niu W. Phytochemical and antiproliferative activity of proso millet. *PLoS ONE*. 2014;9(8):e104058.
31. Global Hunger Index (GHI) 2019: India; 2019. Available from: https://www.globalhungerindex.org/pdf/en/2019/India.pdf.

Author biography

Shivam Dubey, Research Scholar https://orcid.org/0000-0002-2704-4260

Cite this article: Dubey S. A review on usefulness of millets in current prospects. *IP J Nutr Metab Health Sci* 2023;6(4):157-160.