Article: RT0471

Biotica Research Today

Vol 3:1 014/016
2021

Nutricereals: A Super Food

Mubeena P.*, Deepthi C., Navya M. V. and Usha C. Thomas

AICRP on Forage Crops & Utilization, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala (695 522), India

Open Access

Corresponding Author

Mubeena P.

e-mail: mubeenap94@gmail.com

Keywords

Malnutrition, Millet, Nutricereals, Phytochemicals

How to cite this article?

Mubeena *et al*., 2021. Nutricereals: A Super Food. Biotica Research Today 3(1): 014-016.

Abstract

Malnutrition and climate change have become burning issues that we are facing today. Global Hunger Index of 2019 puts India at 102 out of 117 countries and 9.3 million children in India are severely malnourished and half of the total women in the age between15-45 are suffering from anemia. These issues are pointing towards the future of ever increasing population of India. Millets can be a solution for these problems to a greater extent as it is a nutrient rich hardy crop. Millets are staple food source that is not only rich in protein, minerals, fibres, phytochemicals and antioxidants but also provide number of health benefits since it has low glycemic index and gluten free. Therefore, formulation and implementation of policies for the popularization and adoption of millets among the farmers on a larger scale will ultimately pave the way for a hunger free, nutrient rich, healthy and resilient world.

Introduction

India, bestowed with a total of 1.3 billion of total population has 1.3 percent annual growth rate. In order to feed this ever increasing population, currently we have a total of 373 million tonnes of total food grain. Global Hunger Index (GHI) of 2019 puts India at 102 out of 117 countries and India is at the 10th spot among countries with the highest number of underweight children and at the 17th spot for the highest number of stunted children in the world. About 69 percent of deaths of children below 5 years are due to malnutrition.

Malnutrition is a burning issue that we are facing nowadays. 9.3 million Children in India are severely malnourished and half of the total women in the age between 15 to 45 years are suffering with anemia. Apart from this, by 2100, global temperature is expected to increase by 2-5 °C which will adversely affect the crop production. These issues are pointing finger towards the future of ever increasing population of India. In other hand, a lion share of the total population in India is depending on major food grain such as rice and wheat for their nutritional requirement by keeping aside various crops which are nutritionally superior but have become increasingly irrelevant, neglected and underutilized crops from national food basket. Millets are one such crop which are rich in various nutrients and minerals thus it is also known as nutricereals.

Millets are small-grained cereals and are the staple food for millions inhabiting in the arid and semiarid tropics of the world. They are distributed in most of the Asian and African countries and parts of Europe. Millets have been cultivated for around 3,000 years making them an integral part of the culture and history of India. Millets are grown mainly under rain fed conditions in India. Many studies indicate that rainfed agriculture development in India will be the linchpin for inclusive growth of the nation, as large part of the poor rural households live in rainfed agriculture regions.

Millets are staple food source that is not only providing

Article History

Received in 5th January 2021

Received in revised form 8th January 2021

Accepted in final form 9th January 2021

E-mail: *bioticapublications@gmail.com*

major nutrients like protein, carbohydrates, fats etc., but also provide ample vitamins and minerals; they are easily available and cheap in cost. The productivity in rainfed systems have remained low because of frequent drought due to high variability in both the amount and distribution of rainfall in the growing season, poor soil quality and low use of plant nutrients. To harness the potential of millet in emerging uses of supply-side constraints should be overcome through generation and diffusion of appropriate technologies for different production environment.

Millets Production Scenario: World and India

India leads in the production of many kinds of millets, which are often referred as coarse cereals. However, realizing the nutrient richness of these grains they are now considered as nutricereals. Small millets, as a group includes several grain crops namely finger millet (ragi), kodo millet (varagu), little millet (panivaragu) and proso millet. Though they occupy relatively a lower position among feed crops in Indian agriculture, they are quite important from the point of food. Small millets can be grown even in poor soil and climatic conditions. They have short growing season and can be very well fitted into multiple cropping systems both under irrigated as well as dry farming conditions. They can provide nutritious grain and fodder in a short span of time. Their long storability under ordinary conditions has made them "famine reserves". This aspect is very important as Indian agriculture suffers from extreme climate events. Minor millets or small millets as opposed to major millets (Maize, Jowar & Bajra) may be defined as millets cultivated for their small grains which are borne on short, slender grassy plants. In other words they refer to a group of small seeded cereal crops. The most important minor millets cultivated in India are: finger millet (ragi), proso millet, barnyard millet, Italian millet, kodo millet, little millet and job's tears.

Globally India leads the world in millet production, followed by the African countries of Nigeria and Niger. Millets contribute 10 percent to the country's food grain basket and are grown on about 15 mha of total area with annual production of 17 mt. Bajra stands first in area and production whereas finger millet leads in yield. There is a drastic decline in millet area from 37 mha in 1965-66, prior to the pre-green revolution era. This decline was largely due to change in dietary habits, low-yield of millets, and conversion of irrigated area towards rice and wheat.

Millet as a Solution to Nutritional Challenges

1. Nutritional Importance of Millet

Rice eater is weightless like a bird, the one who eats jowar is strong like a wolf, one who eats Ragi remains 'nirogi'(illness free) throughout his life - an old Kannada saying. It clearly shows the nutritious quality of millet. When we are discussing nutrition, millets are not only rich in protein, but they are also rich in vitamin B, folic acid, phosphorus, iron and potassium. Since millets are gluten-free and easy to digest, suitable for people suffering with gluten allergy, stomach ulcers or high cholesterol levels. Because of its low glycemic index, it will release glucose very slowly to blood and that is a boon for diabetes patients. Millets are a great source of antioxidants and might have anti carcinogenic properties.

Millets are rich in minerals like iron, magnesium, phosphorous and potassium. Finger millet is the richest in calcium content, about 30 times that of rice or wheat. It has been reported that millets are rich source of nutrients and contain 60–70 percent dietary carbohydrates, 6–19 percent protein, 1.5–5 percent fat, 12–20 percent dietary fibre, 2–4 percent minerals, and several other phytochemicals.

2. Millet - The Nutricereals

Millets are nutrient rich, non-glutinous and non acid forming foods. Millets have many nutraceutical and health promoting properties especially the high fibre content and millets are gluten free and can be a substitute for wheat or gluten containing grains for celiac patients.

- 30 times more calcium than rice.
- 3 times calcium than milk.
- Highest folic acid content than other cereals.
- 10 times more dietary fiber than rice.
- Rich source of zinc.
- 1 kg of pearl millet contains about 75 mg of iron.
- Every single millet is three to five times nutritionally superior to rice and wheat.

Millets contain 60-70 percent carbohydrates, 7-11 percent proteins, 1.5-5 percent fat, and 2-7 percent crude fibre and are also rich in vitamins and minerals. They are excellent source of vitamin B, magnesium, and antioxidants. Millets are rich with essential amino acids except lysine and threonine but are relatively high in sulphur containing amino acids methionine and cysteine (Kavitha *et al*., 2011). Moreover, some essential fatty acids like linoleic, oleic and palmitic acids found in free form and monogalactosul, diacylglycerols, digalactosyl diacylglycerols, phosphatidyl ethanolamine, phosphatdyl serine and phosphatidyl choline in the bound form present in millets. Millet oil is a good source of linoleic acid and tocopherols. Millets are alkaline forming grains that are gluten-free. Vitamin B such as niacin, riboflavin, and thiamine are present in millets that play a key role in energy synthesis in the body (Hegde *et al*., 2005).

3. Health Benefits of Millets

Major health benefits of millets are as follows:

- Help to protect against heart diseases.
- Help to prevent gall stone.
- Prevent type 2 diabetes.
- Improve digestive system health.
- Prevent cancer.

4. Phytochemicals in Millet

Millets are very rich source of various phytochemicals like tannins, phenolic acids, anthocyanins, phytosterols and pinacosanols. All millet grain and especially sorghum fractions possess high antioxidant activity in vitro relative to other cereals and fruits. The main polyphenols are phenolic acids and tannins, while flavonoids are present in small quantities; they act as antioxidant and play many roles in the body immune system.

5. Anti-nutritional Factors in Millet

Millet has great potential of providing nutritional security and is well comparable and even superior to many cereals in terms of mineral and micro nutrient contents, at the same time certain anti- nutritional factors are also observed in millet. Phytate and goitrogens present in pearl millet, tannin, a polyphenolic compound (grain) and dhurrin (shoot) of sorghum, tannin and phytic acid present in minor millets are some of the important anti nutritional factors in millets.

6. Value Addition in Millet

Millets is not a ready to cook grains and need some kind of processing invariably for human consumption. Processing technologies employed, improve the edible, nutritional and sensory properties of millet (Shobana and Malleshi, 2012). Parboiling, decortication, popping, extrusion, roasting, pressure cooking, autoclaving, germination and fermentation are some processing techniques used for millets.

Reasons for the Preference of Millet over Other Food Grains

- Thrive on non-chemical agronomic practices.
- Less incidence of pest and diseases.
- Eco-friendly.
- Home to agro-biodiversity.
- Less irrigation.
- Grow on poor soils.
- Multiple securities.
- Can withstand a certain level of soil acidity and alkalinity.
- Long storability.
- Short duration.
- Year round crop.

Conclusion

Millet is a good-old grain, packed with nutrition, is back as a super food. They are climate resilient smart crops which can withstand various climate vagaries and also a solution for different challenges of farmers like poor soil fertility and quality, water and climate crisis, capital scarcity and also offer livelihood security. Millets are staple food source that is not only rich in protein, minerals, fibres, phytochemicals and antioxidants but also provide number of health benefits since it has low glycemic index and gluten free. Formulation and implementation of policies for the popularization and adoption of millets among the farmers on a larger scale will ultimately pave the way for a hunger free, nutrient rich healthy and resilient world.

References

Hegde, P.S., Rajasekaran, N.S., Chandra, T.S., 2005. Effects of the antioxidant properties of millet species on oxidative stress and glycemic status in alloxan-induced rats. *Nutrition Research* 25, 1109-1120.

Kavitha, P., Easwaran, P., Mageshwari, U.S., 2011. Effect of different methods of cooking on the dietary fibre content of wheat and wheat products and their hypoglycemic effect on NIDDM patients. *Indian Journal of Nutrition and Dietetics* 38(6), 173-181.

Shobana, S., Malleshi, N.G., 2012. Preparation and functional properties of decorticated finger millet (*Eleusine coracana). Journal of Food Engineering* 79(2), 529-538.