

A Review: Small Millets and its Significant Important in Nutrient Balance

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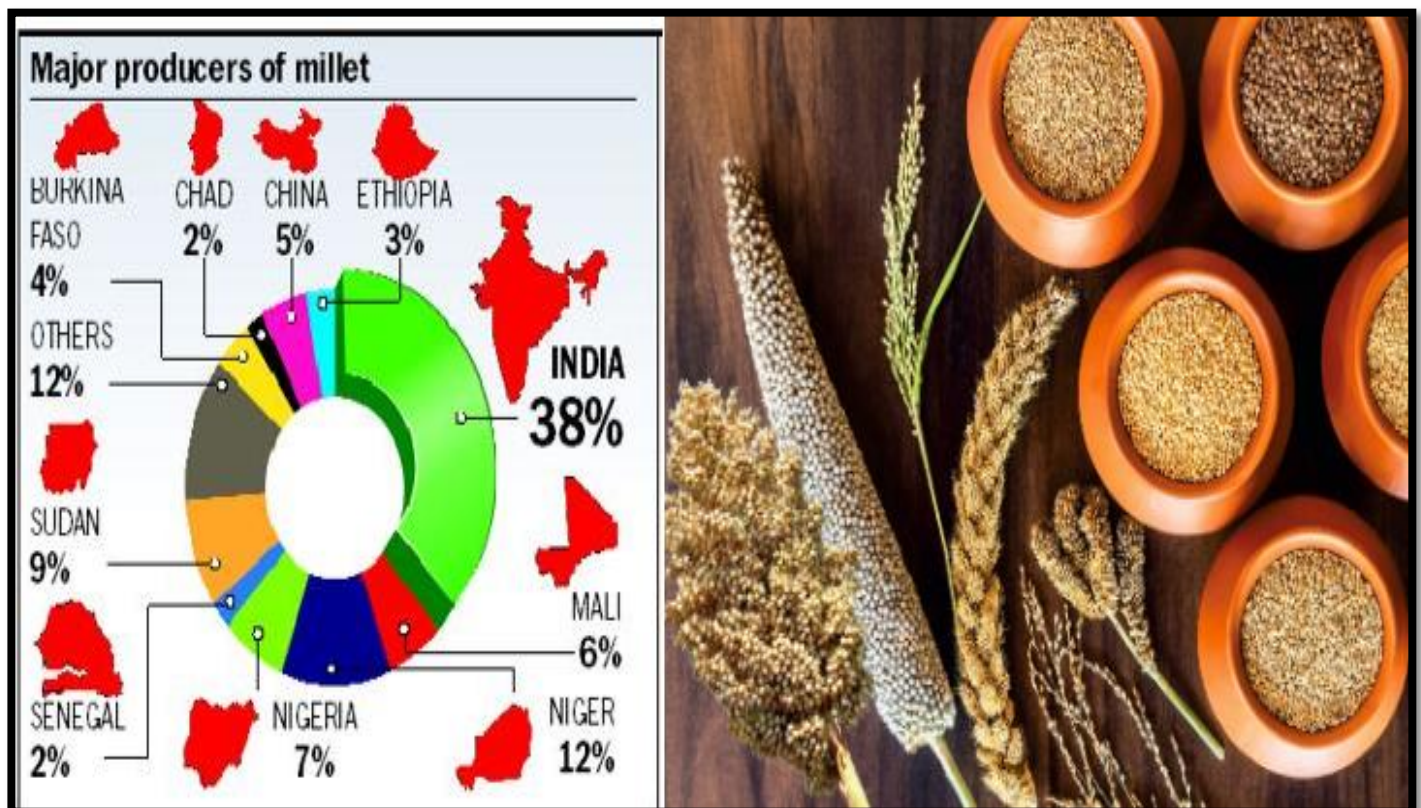
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SUMMARY

A collection of six crops known as small millets includes finger grain, kodo millet, little millet, foxtail millet, barnyard millet, and proso millet. They are regarded as nutrient-dense cereals and serve as a source of food, hay, and fodder. The crops are produced in various agro-ecological contexts, such as plains, coasts, and hills, as well as in a range of soil types and rainfall levels. They are well renowned for their adaptability, ability to withstand drought, and relative lack of susceptibility to serious pests and diseases. Millets are distinctive among cereals because of their high calcium, dietary fibre, polyphenol, and protein concentrations. In general, millets contain higher levels of fat than rice and maize and also show considerable amounts of amino acids like methionine and cystine. Millets offer antioxidant characteristics that protect human health from deterioration, such as lowering blood pressure, reducing the risk of heart disease, preventing cancer and cardiovascular illnesses, diabetes, and decreasing the incidence of tumours, among other things. Millet grain is currently attracting more research from food scientists, technologists, and nutritionists because to its contribution to national food security and potential health advantages.

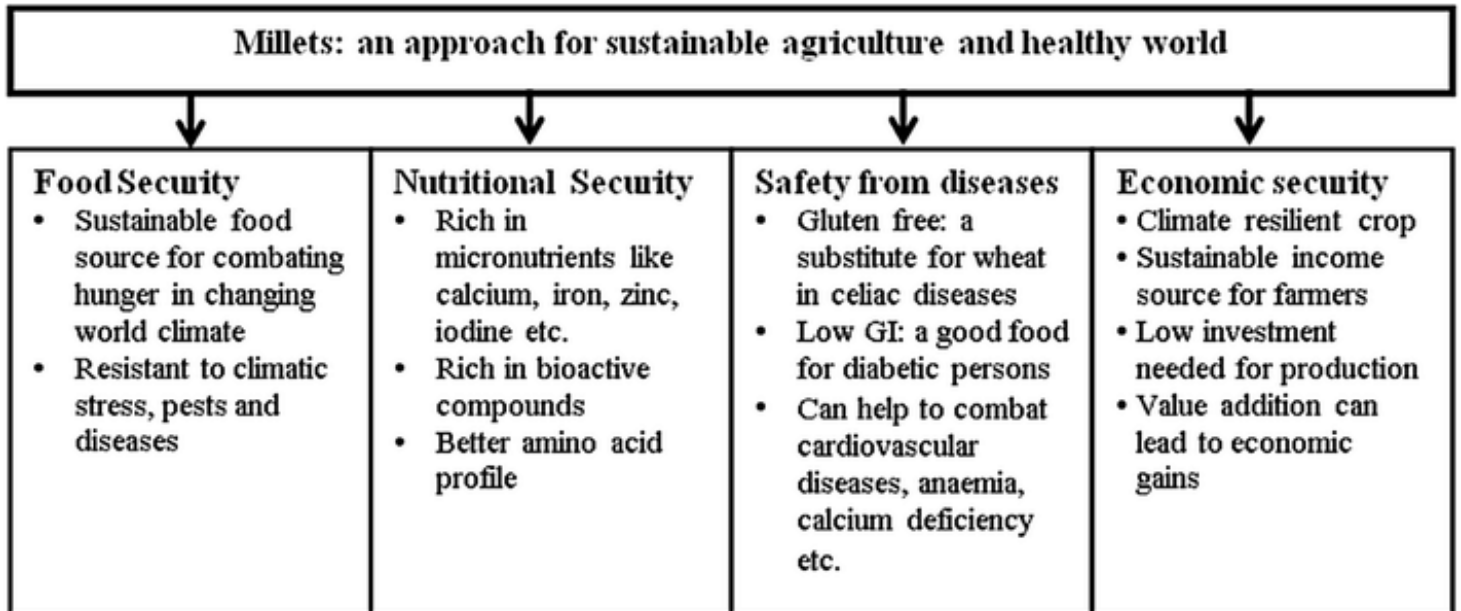
INTRODUCTION

Warm-season grains known as little millets are mostly farmed using rainfed farming techniques in semi-arid tropical regions of Asia and Africa. Foxtail millet (*Setaria italica*), little millet (*Panicum sumatrance*), proso millet (*Panicum miliaceum*), proso millet (*Paspalum scrobiculatum*), finger millet (*Eleusine coracana*), and barnyard millet are examples of small millets (*Echinochloa frumentacea*).



Little millets are referred to be "Nutri-cereals" because they are high in dietary energy, vitamins, a number of minerals (particularly micronutrients like iron, calcium, and zinc), insoluble dietary fibre, and phytochemicals with antioxidant qualities.

Millets are significant crops throughout Asia and Africa, particularly in India, Nigeria, and Niger, where 97% of millet is produced (McDonough et al., 2000). In human history, millets have been regarded as vital food staples. Over the past 10,000 years, East Asia has been cultivating them. India is the largest millet producer in the world (Lu H. et al., 2009). India has over 1.92 million hectares (ha) of tiny millets, of which 1.19 million hectares (ha) are devoted to finger millet. The area of small millets other than finger millet decreased steadily from 5.29 to 0.93 m ha over a five-year period, according to data analysis.



Bioactive compounds in small millets:

In addition to the nourishment they offer, a number of the ingredients in cereals have biological activity. Little millets have grains that are abundant in phytochemicals. Tanning agents, phenolic acids, coumarins, flavonoids, and alkyl resorcinol are examples of phytochemicals.

Sorghum (Cholam)

- Improves metabolism
- Crop is also grown for hay and fodder
- Is resistant to drought and heat

WHY MILLET?

The crop is drought resistant; millets are easily available and easy to store

Millet is high in protein, vitamin B, iron, calcium and phytochemicals

Gluten-free, rich in antioxidants and easy to digest

Lowers the risk of cardiovascular diseases

Brings down the incidence of colon cancer, constipation and gastro-intentional complications

Kodo millet (Varagu)

- Rich in polyphenols, an antioxidant compound and fibre
- Good for diabetes

NUTRITIONAL VALUE OF MILLET (per 100g)

Calories 119	Protein 3.5gm
Fat 1.0gm	Calcium 3.0mg
Carbs 23.7gm	

Pearl millet (Cumbu)

- Widely grown variety of millet
- Helps in minimising type 2 diabetes

Barnyard millet (Kudiraivali)

- High in fibre, calcium and phosphorous
- Has low glycemic index and helps in type 2 diabetes

Little millet (Samai)

- High in iron content
- Beneficial in diabetes and stomach-related diseases

Foxtail millet (Thinai)

- Mostly grown in east Asia
- Controls blood sugar and cholesterol

MILLET VS RICE

- Rice contains 130 calories (per 100g) as against 119 calories in millet
- Rice is high in carbohydrates (28.7g) than millet (23.7g)
- Millet has a high calcium content (3mg) than rice (1mg)

Proso millet (Pani varagu)

- Extensively cultivated in India, Nepal, Russia, Ukraine and Turkey
- Is fit for dry-land and no-till farming

Finger millet (Ragi)

- Popular in south India
- Rich in calcium, protein and iron
- Has anti-oxidant and anti-diabetic properties

Plant foods' flavour, texture, colour, taste, and oxidative stability are all a result of phenols. They are typically found in bran and provide nutritional benefits. Millet is more than just an intriguing substitution for grains that are more often used. The grain is also abundant in phytochemicals, including as phytic acid, which may lower cholesterol, and phylate, which is linked to a lower risk of cancer.

Nutritional value of small millets: The following table shows the nutritional makeup of several of the major grains, including coarse cereals and millets, per 100g. Because millets contain higher levels of protein and a more balanced amino acid profile than major cereals like wheat and rice, they are nutritionally equivalent to or even better than those foods.

Some potential health benefits of millets

Diabetes and millet: Those who eat millet have been found to have lower occurrences of the disease. By partially blocking the enzymatic breakdown of complex carbs, millet phenolics prevent postprandial hyperglycemia, similar to alpha-glucosidase. Aldose reductase inhibitors, for example, decrease the buildup of sorbitol and lower the risk of diabetes-related chronic illnesses. Feeding diabetic animals finger millet for four weeks helped them control their blood sugar levels and boost their anti-oxidant status, which hastens the healing of cutaneous wounds. Banyard millet that has been dehulled and heated has been suggested to be helpful for Type II diabetes, with a low glycemic index (50.0) for dehulled millet that has been heated.

CONCLUSION

Millets are a dependable source of essential nutrients, including protein, carbs, lipids, and others, as well as a wealth of vitamins and minerals. Malnutrition and other health issues, such as obesity, diabetes, cardiovascular illnesses, cancer, and celiac disease, are particularly prevalent in underdeveloped nations due to insufficient nutrition availability. This is mostly the result of a lack of awareness and education among the populace on food selection, particularly for little millets. Millets are inexpensive and widely accessible. Millets are a rich source of both major and minor nutrients, including dietary fibre, vitamins, minerals, antioxidants, and phytochemicals in addition to carbs, protein, fat, and carbohydrates. The significance of this study is that it aims to raise awareness of and develop a specific agenda for these crops, which must be acknowledged as important foods. It also introduces millets as a nutrient-rich food to meet the nutritional needs of the global population and identifies effective ways to consume millets to combat malnutrition and other health issues. The study focused on the nutraceutical benefits of millets and how to use them as a cereal substitute, a potentially healthy ingredient in complicated therapeutic food items including diets high in protein and energy, diets for diabetes, and gluten-free diets. The research also demonstrated the utility of millets as "food medicine," as they are a strong source of antioxidants like phenolic acids.

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