



Health Benefits of Foxtail millets

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Abstract:

Millets are a traditional staple meal in arid terrain regions around the world. These are nutri-cereals, which are well-known for having a high quantity of nutrients, including minerals like calcium, iron, zinc, potassium, and magnesium, dietary fiber, important fatty acids, and protein. Foxtail millet is one of the first crops to be farmed, (*Setaria italica* L.) is widely grown in arid and semi-arid regions of Asia and Africa, as well as in certain other economically developed nations worldwide. It is extremely adaptable to abiotic stressors, particularly dryness and poor soil. As one of the easiest grains to digest and least allergic food. Foxtail millet is high in vital amino acids, fatty acids, and minerals, making it one of the most digestible and non-allergenic grains available. It is also extremely beneficial to human health. Millet has also been reported to have hypolipidemic and antioxidant properties. Its low glycemic index makes it appropriate for people with diabetes mellitus. It is a cereal appropriate for addressing food and nutrition security due to its high yielding capacity in drought and low-resource situations, as well as its ability to produce food products with considerable health benefits.

Keywords: Nutri-cereals, bio-active, glycemic index, abiotic stress, health benefits

Introduction:

Millets are round grain seeds that come in a range of colors and sizes. Millets, like maize and sorghum, belong to the *Poaceae* family of plants. The millet plant family grows natively in dry and semi-arid regions such as Central Africa and Asia (Saleh *et al.*, 2013). The most

common types of millet are pearl millet (*Pennisetum glaucum*), which accounts for about 40% of global production across all producing locations. Other common varieties include proso (or white) millet (*Panicum miliaceum*), finger millet (*Eleusine coracana*), and foxtail millet (*Setaria italica*). Other varieties of millets include Kodo millet, tiny millet, and barnyard millet. Millets are small seeded grasses that are divided into major and minor millets based on their global cultivation and consumption (Sharma *et al.*, 2017). Foxtail millet (*Setaria italica*) is currently the second most produced millet in the world, grown in 26 countries. Kangni, Kang, and Kakum are native terms for foxtail millets, magical millets, or miracle grains. These tiny seeds come in a light yellow-brownish color and are encased in a thin, crispy hull. Foxtail millets (*Setalica italia*) were first cultivated in China 8700 BC. In India, they are abundantly grown in Karnataka, Andhra Pradesh, Maharashtra, and Tamil Nadu. The market offers three or four different types of foxtail namely, Moharia, Maxima, Nana, and Indica. Through traditional production procedures that do not use pesticides, making it easy to identify as a product generated from organic farming. It is considered as economically significant in the semi-arid tropics and can be harvested 75–90 days after planting (Sheahan *et al.*, 2014).

Foxtail millet grains, like other millet grains, have husk and bran layers. The husk accounts for 13.5% of the grain (w/w), while the bran and germ account for only 1.5-2% (w/w) (Dharmaraj *et al.*, 2016). It has a quick generation period of 5-8 weeks from planting to blooming, 8-15 weeks from planting to seed maturity, and can yield hundreds of seeds per inflorescence (Doust *et al.*, 2019).

Foxtail millets have a sweet and nutty flavor and are used in fast foods, ready-to-eat items, rice flour, and more. Aside from its culinary applications, it is a farmer-friendly and health-friendly crop, making it "good for health" (because to its nutritional worth) and "good for the world" (since it requires less water and other variables for growing) (Singh, 2023). Foxtail millet contains an appropriate amount of nutritious components, namely carbohydrates, protein, vitamins, and minerals. Because of the coarse texture of foxtail millet grains, the digestible portion accounts for around 79% of the grain, while the remaining undigestible portion includes

relatively high levels of fiber as well as some antinutritional components. Foxtail millet, like most millets, is high in crude fiber, which aids in digestion and causes bowel movement, resulting in a laxative effect that is advantageous to a healthy digestive system (Bernard *et al.*, 1996). Since foxtail millet has so many nutritional benefits, it is widely used in Chinese cooking for making noodles, nutritious gruel or soup, brewing alcoholic beverages, cereal porridges, and pancakes (Yang *et al.*, 2013). Apart from its nutritional attributes, research indicates that foxtail millet has other health advantages, such as cancer prevention, hypoglycemic, and hypolipidemic effects (Zhang *et al.*, 2013).

Benefits of Foxtail Millet

Owing to their high nutritional value, foxtail millets have become an emerging star in the nutrition world, catching the interest of dietitians as a possible dietary option for leading a healthy lifestyle.

1. Promotes Heart Health

According to a survey conducted by the Food Safety and Standards Authority of India (FSSAI), foxtail millets are beneficial for heart health. It contributes to the formation of the neurotransmitter acetylcholine, which helps interact between muscles and neurons and shields our heart against a number of illnesses. It is an excellent alternative to be included to our diet for a healthy heart because it is high in vitamin B₁₂, potassium and proteins while being low in carbs.

2. Tracks the Blood Sugar Level

Whole grains take longer to digest, so they do not raise blood sugar levels as quickly as refined carbohydrates. Foxtail millet is a full grain and an excellent substitute for rice that will keep us:

- Longer-lasting
- Prevents hunger pangs and elevated blood sugar levels.

Because of its low glycaemic index, it lowers blood sugar and glycosylated hemoglobin levels.



3. Helps in Weight Reduction

Foxtail millet has a high fiber content but low glycemic and calorie content, making it an excellent choice for people looking to reduce weight. It contains tryptophan, an amino acid that inhibits the desire to eat and is believed to reduce fat, particularly around the stomach.

4. Beneficial for Gut Health

An individual's overall health depends on having a healthy stomach.

If we have digestive disorders such as constipation, diarrhea, or Irritable Bowel Syndrome, one should adjust the diet. For healthy bowel motions, eat plenty of veggies along with foxtail millet.

5. Strengthens Immunity

Rich in nutrients, foxtail millets are believed to:

- Boost immunity;
- Boost stamina; and
- Fight infections.

They are high in antioxidants and minerals, and have been shown to enhance immunity. If we are prone to viral or bacterial illnesses, it is recommended that we should incorporate them into our diet.

6. Strengthening Bones

Due to their high phosphorus and magnesium content, foxtail millets support bone health. Along with other essential elements like iron, vitamin C, and vitamin A, 100 g of foxtail millet provides 31 mg of calcium and 81 mg of magnesium, which naturally strengthen bones and reduce the incidence of internal bone injuries. Foxtail millets boost our health and bring us closer to a more balanced way of living while adding flavor to our meals.

7. Foxtail Millets and Conception

Foxtail millets' high iron level and folic acid content are advantageous

High Iron content and folic acid presence in foxtail millets are beneficial for fetal development and prevention of anemia. Pregnant women can consume it by adding this versatile grain into their diet.



Conclusion:

Foxtail millet is well-known for its adaptability and high nutritional content, as well as its versatility and importance as a food source with enough quantities of all necessary essential components. Due to its ability to yield in arid and unfavorable conditions, this cereal is appropriate for addressing issues related to food and nutrition security. It has the ability to generate foods with considerable health benefits. There have been alarming reports about the nutritional makeup of foxtail millet. Due to its numerous health advantages, foxtail millet is a beneficial supplement to any diet. This nutrient-dense grain improves blood sugar regulation, promotes bone health, aids in digestion, and benefits skin and hair health. It is particularly advantageous for weight management due to its high fiber content and low glycemic index beneficial for diabetic control.

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