

Millets and Their Health Benefits

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Millets have numerous health benefits, including helping to lower blood sugar and cholesterol levels. They're also gluten-free, so people with celiac disease or gluten sensitivities can enjoy them.

Millets are a group of cereal grains that belong to the *Poaceae* family, commonly known as the grass family.

It's widely consumed in developing countries throughout Africa and Asia. While it may look like a seed, millet's nutritional profile is similar to that of sorghum and other cereals.

Millets have gained popularity in the West because they are gluten-free and boasts high protein, fiber, and antioxidant contents.



Fig 1: Different types of millets

Attributes and types of millet

Millets are a group of small, round whole grains grown in India, Nigeria, and other Asian and African countries. Considered an ancient grain, they are used both for human consumption, livestock and bird feed.

They have multiple advantages over other crops, including drought and pest resistance. They're also able to survive in harsh environments and less fertile soil. These benefits stem from their genetic composition and physical structure - for example, its small size and hardness.

Although all millet varieties belong to the *Poaceae* family, they differ in color, appearance and species.

This crop is also divided into two categories - large and small millets, with major millets being the most popular or commonly cultivated varieties.

Large millets include:

- Pearl
- Foxtail
- Proso
- finger (or Ragi)

Small millets include:

- Kodo
- Barnyard
- Little
- Guinea
- Browntop
- Fonio
- Adlay (or Job's tears)

Pearl millet is the most widely produced variety intended for human consumption. Still, all types are renowned for their high nutritional value and health benefits.

Nutritional profile

Like most cereals, millets are starchy grains - meaning that they're rich in carbohydrates. Notably, they also pack several vitamins and minerals.

One cup (174 grams) of cooked millet packs:

- Calories: 207
- Carbohydrates: 41 grams
- Fiber: 2.2 grams
- Protein: 6 grams
- Fat: 1.7 grams
- Phosphorus: 25% of the Daily Value (DV)
- Magnesium: 19% of the DV
- Folate: 8% of the DV
- Iron: 6% of the DV

Millets provide more essential amino acids than most other cereals. These compounds are the building blocks of protein.

What's more, finger millet boasts the highest calcium content of all cereal grains, providing 13% of the DV per 1 cooked cup (100 grams).

Calcium is necessary to ensure bone health, blood vessel and muscular contractions and proper nerve function.

Benefits of millets

Millets are rich in nutrients and plant compounds. Therefore, they may offer multiple health benefits.

Rich in antioxidants

Millets are rich in phenolic compounds, especially ferulic acid and catechins. These molecules act as antioxidants to protect your body from harmful oxidative stress.

Studies in mice link ferulic acid to rapid wound healing, skin protection, and anti-inflammatory properties.

Meanwhile, catechins bind to heavy metals in your bloodstream to prevent metal poisoning.

While all millet varieties contain antioxidants, those with a darker color - such as finger, proso, and foxtail millet - have more than their white or yellow counterparts.

May help control blood sugar levels

Millets are rich in fiber and non-starchy polysaccharides, two types of undigestible carbohydrates that help control blood sugar levels.

This cereal also has a low glycemic index (GI), meaning that it's unlikely to spike your blood sugar levels. Thus, millets are considered an ideal grain for people with diabetes. For instance, a study in 105 people with type-2 diabetes determined that replacing a rice-based breakfast with a millet-based one lowered blood sugar levels after the meal.

A 12-week study in 64 people with prediabetes gave similar results. After eating 1/3 cup (50 grams) of foxtail millet per day, they experienced a slight reduction in fasting and post-meal blood sugar levels, as well as a decrease in insulin resistance. Insulin

resistance is a marker for type 2 diabetes. It occurs when your body stops responding to the hormone insulin, which helps regulate blood sugar. What's more, in a 6-week study in rats with diabetes, a diet containing 20% finger millet led to lower fasting blood sugar levels and a drop in triglyceride and cholesterol levels.

May help lower cholesterol

Millets contain soluble fiber, which produces a viscous substance in your gut. In turn, this traps fats and helps reduce cholesterol levels. One study in 24 rats found that those fed foxtail and proso millet had significantly reduced triglyceride levels, compared with the control group. Additionally, millet protein may help lower cholesterol.

A study in mice with type-2 diabetes fed them a high fat diet with millet protein concentrate. This led to a decrease in triglyceride levels and significant increase in adiponectin and HDL (good) cholesterol levels, compared with the control group. Adiponectin is a hormone with an anti-inflammatory effect that supports heart health and stimulates fatty acid oxidation. Its levels are usually lower in people with obesity and type-2 diabetes.

Fits a gluten-free diet

Millets are a gluten-free grain, making them a viable choice for people with celiac disease or those following a gluten-free diet. Gluten is a protein that occurs naturally in grains like wheat, barley, and rye. People with celiac disease or non-celiac gluten sensitivity must avoid it because it triggers harmful digestive symptoms, such as diarrhea and nutrient malabsorption. When shopping for millets, you should still look for a label that certifies it gluten-free to ensure it hasn't been contaminated with any gluten-containing ingredients.

Potential downsides

Despite millets' multiple health benefits, they also contain antinutrients - compounds that block or reduce your body's absorption of other nutrients and may lead to deficiencies. One of these compounds - phytic acid - interferes with potassium, calcium, iron, zinc, and magnesium uptake. However, a person with a balanced diet isn't likely to experience adverse effects. Other antinutrients called goitrogenic

polyphenols may impair thyroid function, causing goiter - an enlargement of your thyroid gland that results in neck swelling.

Nevertheless, this effect is associated only with excess polyphenol intake. For example, one study determined that goiter was significantly more prevalent when millet provided 74% of a person's daily calories, compared with only 37% of their daily calories. Furthermore, you can lower millet's antinutrient content significantly by soaking it overnight at room temperature, then draining and rinsing it before cooking. Plus, sprouting reduces antinutrient content. Certain health food stores sell sprouted millet, though you can also germinate it on your own. To do so, place-soaked millet in a glass jar and cover it with a cloth that's secured with a rubber band.

Turn the jar upside down, rinsing and draining the millet every 8–12 hours. You'll notice small sprouts beginning to form after 2–3 days. Drain the sprouts and enjoy them right away. If you choose to sprout your millet, be mindful that sprouts have a short shelf life and are more prone to foodborne illness. To ensure safety:

- keep your sprouting container clean
- use filtered or bottled water (NOT tap water)

- rinse sprouts frequently
- empty any remaining water from your sprouts before storing
- store sprouts in a cool, dry location
- wait 8 to 12 hours before refrigerating to ensure they are cool and dry

How to prepare and eat millets

Millets are a versatile ingredient that makes a good rice replacement when cooked whole. To prepare it, just add 2 cups (480 mL) of water or broth per 1 cup (174 grams) of raw millet. Bring it to a boil, then simmer it for 20 minutes. Remember to soak it overnight before cooking to lower its antinutrient content. You may also toast it in a pan before cooking to enhance its nutty taste. Millets are also sold as a flour. In fact, research suggests that making baked goods with millet flour significantly enhances their nutritional profile by increasing their antioxidant content.

Additionally, this grain is processed to make snacks, pasta, and nondairy probiotic beverages. In fact, fermented millet acts as a natural probiotic by providing live microorganisms that benefit your health. You can enjoy millets as a breakfast porridge, side dish, salad add-in, or cookie or cake ingredient.

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