



## Millets for Nutrition

The global food system faces many complex challenges, including hunger, malnutrition and diet-related diseases, an ever-growing global population that needs sufficient and healthy food, the climate emergency and the depletion of natural resources. We need to unlock the great potential millets hold as an affordable nutritious food, a worthy component for global healthy diets, and a crop that can withstand climate change (FAO, 2023).

International Year of Millets 2023 is an opportunity to highlight the benefits of millets for Better production, Better Nutrition, a Better Environment and a Better Life. They can become a key crop within global food systems, with the potential to improve the livelihoods of smallholder farmers, nutrition and the environment (FAO, 2023).

Millets are often called “Nutri-Cereals” due to their high nutritional content compared to commonly grown cereals like wheat, rice or corn. They contribute to human and animal health, including that of mothers and their young. Millets encompass a diverse group of cereals including pearl, proso, foxtail, barnyard, little, kodo, browntop, finger and Guinea millets as well as fonio, sorghum (or great millet) and teff. They were among the first plants to be domesticated and serve as a traditional staple crop for

millions of farmers in Sub-Saharan Africa and Asia. Millets can grow on poor soils with little inputs, are resistant or tolerant to many crop diseases and pests and can survive adverse climatic conditions. The genetic diversity of millets offers opportunities for economic development through income generating activities in the food sector or in niche markets for specific professional applications (therapeutics, pharmaceuticals, specialty chemistry) (FAO, 2023).

**Sorghum** (Jonnalu) is one of the important major millets belonging to the family Gramineae. Sorghum has its origin in Africa. Prominent sorghum growing states in India are Maharashtra, Karnataka, Gujarat, Rajasthan, Madhya Pradesh, Andhra Pradesh and Tamil Nadu for grain sorghum and Uttar Pradesh, Uttarakhand, Haryana and Delhi for forage sorghum. Sorghum is rich in vitamins and minerals like B vitamins, magnesium, potassium, phosphorus, iron, and zinc. It's also an excellent source of fiber, antioxidants, and protein.

**Pearl millet** (Sajjalu/Bajra) is widely grown millet variety belonging to the family Gramineae. This grain has originated from Africa and India. Rajasthan accounts for major production of Pearl Millet (Bajra) followed by Uttar Pradesh, Haryana, Maharashtra and Gujarat in India. These millets are rich in

carbohydrates, essential amino acids, antioxidants, multiple vitamins like thiamine, riboflavin, folic acid, niacin, beta carotene, and minerals like iron, phosphorus, magnesium, and zinc.

**Finger millet** (Ragi/Ragulu) is one of the important minor millets belonging to the family Gramineae. Finger millet has its origin from Africa and Asia. The major finger millet growing states in India are Karnataka, Uttarkhand Tamil Nadu, Andhra Pradesh, Orissa, Jharkhand and Maharashtra. Finger millet is an excellent source of natural calcium which helps in strengthening bones for growing children and aging people. Its grains are also rich in minerals, dietary fibre, polyphenols. Regular consumption of finger millet is good for bone health and keeps diseases such as osteoporosis at bay and could reduce risk of fracture.

**Kodo millet** (Varagu) is a well-known minor millet belonging to the family Gramineae, originating from India. Kodo Millet is largely grown in the states of Madhya Pradesh, Chattisgarh, Maharashtra, Tamilnadu and Karnataka. Kodo millet is rich in fibre and helps to reduce problems like constipation, flatulence, bloating and stomach cramping. It is also a good source of magnesium which helps to promote hearth health and reduce blood pressure. Kodo millet is a good substitute to rice or wheat and it can be cooked just like rice or ground into flour. It provides balanced nutrition, unlike polished white rice.

**Foxtail millet** (Korra/Korralu/Kangni/Kang/Kakum) is a well-known minor millet variety belonging to the family Gramineae. Foxtail millets, originated in China. In India, it is grown mainly in Andhra Pradesh, Karnataka, Telangana, Rajasthan, Maharashtra, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, and in a small extent in the northeast states of India. These are tiny seeds covered in a thin, crispy hull and are available in a light yellow-brownish colour. Foxtail Millet is rich in Vitamin B12 which is essential for maintaining a healthy heart, smooth functioning of the nervous system, and in general good for skin and hair growth.

**Proso millet** (Varagu/Varigalu) is a common and important minor millet belonging to the family Gramineae. The origin of proso millet is thought to be in China. Proso millet is grown throughout India in more than half a million hectare mainly in the states of Tamil Nadu, Karnataka, Andhra Pradesh and Uttarakhand. Proso millet is rich in minerals, dietary fibre,

polyphenols, vitamins and proteins. Proso millet contains high lecithin which supports the neural health system. It is rich in vitamins (niacin, B-complex vitamins, folic acid), minerals (P, Ca, Zn, Fe) and essential amino acids (methionine and cysteine). If you want to increase your protein intake, adding proso millet to your diet is a great way to do so. It is known to be the highest in protein compared to any other millet in the market.

**Little millet** (Sama/Samalu) belongs to the family Gramineae, originating from India. India is the leading producer of little millet, accounting for around 50% of the world's production. It is widely grown in Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana. Little millet is a low glycemic index food that is also rich in dietary fiber. It is useful for diabetics who must control the rapid rise and fall of blood glucose levels. Little millet is high in magnesium, which helps to improve heart health. It is also high in Niacin, which aids in the reduction of cholesterol. Little Millet is also rich in tannins, flavonoids which helps against diseases like diabetes, cardiovascular diseases, cataract, cancer, inflammation, Gastrointestinal problems and delay ageing too.

**Barnyard millet** (Udalu) is an important minor millet grown in India. This millet has its origin in Japan. In India, the cultivation of barnyard millet is mainly confined to Tamil Nadu, Andhra Pradesh, Karnataka and Uttarakhand. The Barnyard millet or Sanwa rice as it is popularly known has high levels of protein, calcium, iron, minerals, and vitamin B complex. It contains a rich source of protein, carbohydrates, fiber, and, most notably, micronutrients like iron (Fe) and zinc (Zn) that are related to numerous health benefits.

**Browntop Millet** (Andu Korralu) is a millet. Browntop millet is an introduced grass that originated in Southeast Asia. Brown top millets are cultivated abundantly in dry regions of Karnataka, Andhra Pradesh, and parts of north-central India. These millets can be grown on hard soil with very little amount of water. They are drought and heat tolerant crops and their shadow tolerant nature makes them unique from other crops. Brown Top millet is a nourishing and energising food that provides numerous nutrients to help you feel your best. Including this millet in your diet is an excellent way to avoid wellness diseases such as diabetes, joint pain, obesity, and heart disease.



Sorghum / Jowar



Pearl millet / Bajra



Finger millet / Ragi



Foxtail millet / Kangn



Barnyard millet / Sawan



Proso millet / Cheena



Little millet / Sama



Kodo millet / Kodon



Browntop millet / Korale

## Facts on Millets

Millets are...

- A diverse group of **small-grained dryland cereals**
- **Climate resilient**, tolerant of poor soils, drought and harsh growing conditions
- **Adaptable** to different production environments, without high fertilizer and pesticide needs
- **Integral to ancestral traditions**, cultures and indigenous knowledge
- **Nutritious** “nutri-cereals” that provide dietary fibre, antioxidants, protein and minerals, including iron
- Good for **human and animal health** (through food and feed)
- **Gluten free** with a **low glycaemic index** to address intolerances and diabetes
- **Diverse in taste** and the products and recipes they are based on
- **A source of income** for marginal production areas in rural, urban, regional and international trade
- **A way to create decent jobs** for women and youth through innovative processing and marketing opportunities
- **A way to transform local agrifood systems** for better production, better nutrition, a better environment, and a better life, leaving no one behind.

Source: FAO, 2022

### Nutritional composition of millets in comparison with cereals (per 100 grams)

Grains	Energy (kcal)	Protein (g)	Carbohydrate (g)	Starch (g)	Fat (g)	Dietary Fiber (g)	Minerals (g)	Ca (mg)	P (mg)
Sorghum	334	10.4	67.6	59	1.9	10.2	1.6	27	222
Pearl millet	363	11.6	61.7	55	5.0	11.4	2.3	27	296
Finger millet	320	7.3	66.8	62	1.3	11.1	2.7	364	283
Proso millet	341	12.5	70.0	-	1.1	-	1.9	14	206
Foxtail millet	331	12.3	60.0	-	4.3	-	3.3	31	290
Kodo millet	353	8.3	66.1	64	1.4	6.3	2.6	15	188
Little millet	329	8.7	65.5	56	5.3	6.3	1.7	17	220
Barnyard millet	307	11.6	65.5	-	5.8	-	4.7	14	121
Maize	334	11.5	64.7	59	3.6	12.2	1.5	8.9	348
wheat	321	11.8	64.7	56	1.5	11.2	1.5	39	306
Rice	353	6.8	74.8	71	0.5	4.4	0.6	10	160

Source: Indian Food Composition Tables and Nutritive Value of Indian Foods, 2017

### References:

**FAO. 2023.** IYM2023 Communications handbook and toolkit.

**Longvah T, Anantan I, Bhaskarachary K & Venkaiah, K. (2017).** Indian food composition tables (pp. 2-58). Hyderabad: National Institute of Nutrition, Indian Council of Medical Research.

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