

Millet's New Era of Nutritional Security and Farmers Prosperity

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INTRODUCTION

Government of India has proposed to United Nations for declaring 2023 as International Year of Millets. The proposal of India was supported by 72 countries and United Nations. General Assembly declared 2023 as International Year of Millets on 5th March 2021 (IYOM-2023).

Now, Government of India has decided to celebrate an International Year of Millets 2023 to make it a people's movement, so that the Indian millets recipes, value added products are accepted globally.

National Year for Millets in 2018 was celebrated as Nutri-cereals. Such as Sorghums, Pearl millets, finger millets. Minor millets are Foxtail millets, Proso millets, Kodo millets, Barnyard millets, and little millets and 2 pseudo millets are Buck wheat and Amaranths. In 2018, several states launched mission on millets under National Food Security Mission and millets included under Poshan Mission Abhiyan by Ministry of Women and Child Development (<https://krishijagran.com>).

Nearly 100 nations cultivated sorghum which is used to make more than 60% of the world's millets. Most of the millets are substituted with Rice and wheat. Millets are different shapes, size and colours. It is good for the environment because they are commonly cultivated under rain-fed crops all over India. These millets do not attract pests. They can grow perfectly well without pesticides. Millets grow better in the absence of chemical fertilizers. They are useful in ensuring food safety. Millets can be cultivated in dry land, low rainfall areas and limited irrigation situations. Farmers get more income from their farm produce and can also increase their family health

status (<https://arricoop.mic.in>).

Millets are a collective group of small seeded grain crops. Widely grown around the world as cereal crops which are highly nutritious. In India, eight millets (Sorghum, Pearl millets, Finger millets, Foxtail millets, Kodo millets, Proso millets, Barnyard millets, and little millets). Millets are a powerhouse of nutrients. It is boosted to human health. Millets are coarse grains that are traditionally grown and consumed in the Indian culture (www.Millets.res.in). It is affordable to consume all income families. Millets are introduced as a new product then avoid excessive consumption in beginning slowly start and then increase the millets quantity. Millets can be consumed every day just like other whole grain, but consume in moderate amount otherwise it may cause obesity and may lead to excess weight gain. According to ICMR, the recommended consumption of Millets *i.e.*, 270 gm/day (www.healthifyme.com).

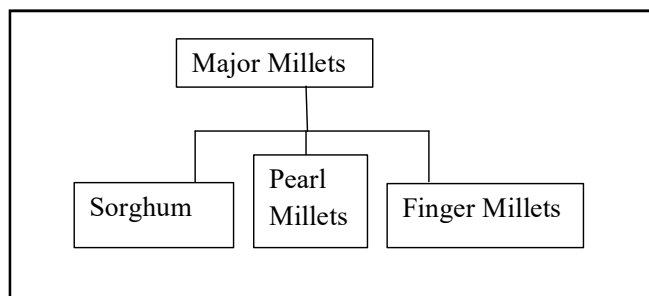
Millets are high in nutrition and dietary fibers. They are good source of protein, Micro nutrients, Phytochemical and antioxidants. Millets are gluten free and good for people who are gluten intolerant or Celiac disease. Millets are known as Nutri-cereals as they provide most of the nutrients which are required for functioning the human body (<https://skyroots.in>).

Types of Millets:

Major and minor types of millets are available in India. The major types of millet are : Sorghum (Jowar), Pearl millets (Bajra), Finger millets (Ragi) and the minor millets are : Foxtail millets (Kakum), Kodo millets (Kodon) (Pushplata Kumi, 2023).

Major Millets (Naked Grains):

These millets coat are difficult to remove, indigestible husk, namely: Sorghum (Jowar), Pearl millets (Bajra), Finger millets (Ragi). These millets don't require processing after their harvest. They can be consumed right after cleaning.

**Sorghum (jowar):**

It is a king of millets. Nearly 100 Nation cultivated sorghum which is used to make more than 60% of the world millets. It is used as a Roti or bhakri. For infant food make use of malted jowar. Jowar is richer in protein but the quality is not good as rice protein. Cereal and legume proteins are complementary to each other in the ratio of 70:30 will give nutritional value. It benefits those who are sensitive to wheat. Jowar is rich in carbohydrates, protein, dietary fibre, and B-complex vitamins. It helps to lower cholesterol level and lower plasma glucose level.

Pearl millets (Bajra):

It is the predominant crop in India. It is cooked in the same way as rice. Flour is made into bhakri. It is also suitable for the infant food as a malted. It has the same quality of protein as wheat. It is rich in Mineral such as calcium, iron, Magnesium, potassium and also rich in protein, fiber, and B-complex vitamins such as thiamin, riboflavin and niacin. It supports to heart health, which expands blood vessels and facilitates easier blood flow and to fight against type II diabetes (Srilakshmi, 2007).

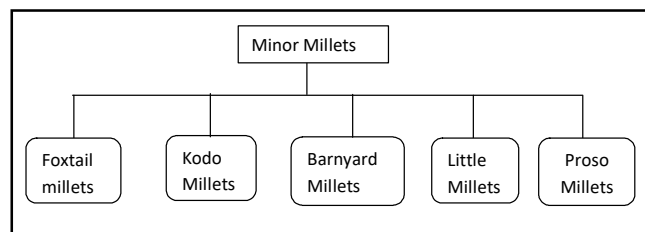
Finger Millets (Ragi):

It constitutes a little over 25% of the food grains grown in India. It is used as a cereal substitute for rice and wheat. It is widely consumed without any refining by the poorer section of the population. The malted ragi flour is used with green gram flour to prepare a infant food or weaning food for infant which is increase high calories and having excellent nutritional qualities. Also

prepare roti or dosa. Nutritionally it is almost as good as wheat and rice. It contains high in protein and presents all essential amino acids. It is gluten free. It is beneficial for brain development in growing children.

Minor Millets (Husked grains):

These types consist of an indigestible seed coat that has to be removed before consumption. The processing one done by hand and is now mechanical.

**Foxtail Millets:**

It is one of the world oldest cultivated crops. It ranks second in the total world production of millets. It is found as semolina. It contains healthy carbohydrate which helps for balancing blood sugar. It also helps to regulate the blood cholesterol and increase the HDL cholesterol level in body. It helps in improving the nervous system and lung function. It contains calcium and iron and strengthens immunity.

Kodo Millets:

It is indigenous cereal of India and is grown today in U.P, Kerala and Tamil nadu. It is simple to digest. It is rich in lecithin which is boosting for neurological system, act as a blood purifier. It's extremely helpful in immunity. They are abundant in minerals like calcium, iron, potassium, magnesium, zinc, and B-complex vitamins like Vitamin B3, vitamin B6 and folic acid. The tryptophan in millets increases the body serotonin level, which helps in lowering stress. It has strong antioxidant capacity, Prevent oxidative stress, regulate glucose level in type II diabetics, Asthma, migraines, high blood pressure, high cholesterol level, heart disease, and post menopausal symptoms in women can be treated with kodo millets.

Barnyard Millets:

It is multipurpose crop which is cultivated for food and fodder. Its acts on the spleen, gall bladder and other soft parts of the body. It is a great fasting food. Nutritionally it is good. It contain good source of protein

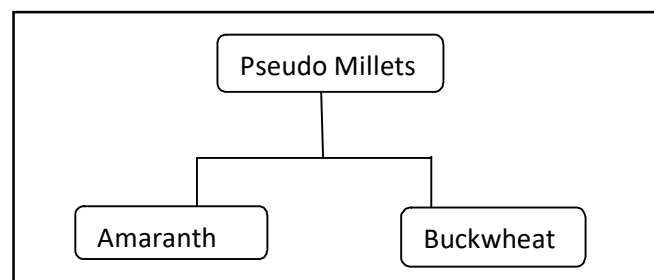
and low carbohydrates, high fiber which helps to weight loss, It contain high calcium and iron, good for strengthening bones. It helps and effective in reducing blood glucose and lipid levels and recommended for the patients with cardiovascular disease and diabetics mellitus.

Little Millets:

It is cultivated throughout the India. It can be eat as a rice replacement. It is excellent option for lose body weight. It is rich in fiber, and minerals like calcium, iron, potassium, zinc. It acts as antioxidants. It helps in curing the disease like genital and reproductive system.

Proso Millets (White Millets):

It contains high protein and significant amount of carbohydrate and fatty acid. Cheaper source of manganese from spices and nuts, high in calcium which help for bone growth and development, reduces cholesterol levels and risk of heart disease. Its promotes the nervous system and reduce liver damage. Its contain B-complex vitamins like vitamin B6, folic acid. It acts as an antioxidants.



Amaranth (Ramdana/Rajgira):

High protein (amino acid) content like lysine this amino acid negligible amount or missed in other cereals. Also contain unsaturated fatty acid and high in linoleic acid. It contains various minerals calcium, iron, magnesium, phosphorus and potassium. It helps lowering cholesterol level and prevents the cancer.

Buckwheat:

It contains Protein as a lysine amino acid which is less amount or absent in other cereals. It is rich in carbohydrates. Vitamin B1, vitamin C and vitamin E. It is good source of minerals like zinc, copper, and manganese than other cereals grain. High in digestible fiber and polyunsaturated fatty acid as a linoleic acid. It helps to control blood pressure, act as a anti inflammatory and anti carcinogenic properties.

Nutritional Importance of Millets:

Almost all types of millets are used for human consumption in developing country. Millets are nutritionally comparable to major cereals and are good source of Protein, dietary fiber, Micro nutrients, phytochemicals and antioxidants. They are low in Glycemic Index (GI).

Conclusion:

Millets are easy to digest and have full of nutrient and are suitable for all age group peoples. It's the integral part of our daily diet and has low price as compare to wheat and rice. It acts as an anti acidic, Prebiotic and

Table 1 : Nutritive value of millets as per 100gm of edible portion as compared with rice and wheat (Dayakar Rao *et al.*, 2017)

Grains	Carbohydrates gm	Protein gm	Fat gm	Energy Kcal	Dietary fiber gm	Ca mg	P mg	Mg mg	Zn mg	Fe mg	B1 mg	B2 mg	B3 mg	Folic acid µgm
Sorghum	67.7	9.9	1.73	334	10.2	27.6	274	133	1.9	3.9	0.35	0.14	2.1	39.4
Pearl millets	61.8	10.9	5.43	347	11.5	27.4	289	124	2.7	6.4	0.25	0.20	0.9	36.1
Finger millets	66.8	7.2	1.92	320	11.2	364	210	146	2.5	4.6	0.37	0.17	1.3	34.7
Kodo millets	66.2	8.9	2.55	331	6.4	15.3	101	122	1.6	2.3	0.29	0.20	1.5	39.5
Proso millets	70.4	12.5	1.10	341	-	14.0	2.06	153	1.4	0.8	0.41	0.28	4.5	-
Foxtail millets	60.1	12.3	4.30	331	-	31.0	188	81	2.4	2.8	0.59	0.11	3.2	15.0
Little millets	65.5	10.1	3.89	346	7.7	16.1	130	91	1.8	1.2	0.26	0.05	1.3	36.2
Barnyard millets	65.5	6.2	2.20	307	-	20.0	280	82	3.0	5.0	0.33	0.10	4.2	-
Amaranth seed	61	1.3	5.6	356	7.5	162	412	270	2.8	8.0	0.04	0.04	0.52	24.7
wheat	64.7	10.6	1.47	321	11.2	39.4	315	125	2.8	3.9	0.15	0.15	2.7	30.1
Rice	78.2	7.9	0.52	356	2.8	7.5	96	19	1.2	0.6	0.05	0.05	1.7	9.32

Table Source: Indian Food Composition Tables, NIN-2017, Nutritive value of Indian Foods, IN- 2007

detoxifying. Millets are provision under Food Safety and Standards Act, 2006 (Guidance Note No.12/2019).

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