

---

Review Article

Volume 11 Issue 3

May-June 2022

---

## MILLETS: AN UNDERUTILIZED TREASURE OF NUTRITION: A REVIEW

**Dr Manasi Ranjit Nimbalkar**

H.O.D. and Assistant Professor, Kriyasharir Department, Ashtang Ayurved College, Pune,  
Maharashtra, India.

### Abstract

The current population of whole world facing problems likes obesity and related diseases such as diabetes and cardiac disorders. Consumption of non-fibrous food and sedentary life style may be considered responsible factors for such types of condition. Therefore it is the need of the current time to find solution for these emerging problems. Consumption of millets in our daily dietary regimen can be one of the solutions for this. Millet is a small grain which is gluten free and very rich in proteins; good fat and dietary fiber content. Millets are rich in phytochemicals and therefore acts as immunity boosters. Millets does not require pesticides as per traditional growing techniques and the land used for growing millet is usually pest-free. This article has made an attempt to review importance of millets as per modern and Ayurveda science with special reference to foxtail millet.

**Keywords:** *Millet, Aahar, Trunadhanya, Foxtail millet, Kangu*

## Introduction

Millets are the cereal grains which are consumed by more than one third of the world population. It is the sixth cereal crop in terms of world's agriculture production. It is used as food and widely used in rural areas. Majority of the world's commercial millet crop is produced by China, India, Greece, Egypt and Africa; it is used as food in humans and fodder for animals. Rajasthan, Uttar Pradesh, Gujarat, Madhya Pradesh, Haryana, Maharashtra, Karnataka, Tamilnadu, Odisha and Kerala are the top ten millet producer states in India. Millets are three to five times higher in their nutritional content as compared to widely used wheat and rice. Millets have nutritional and health benefits as well, and helps in managing metabolic health problems like diabetes mellitus, obesity and atherosclerosis. There are many varieties of millets stated in modern as well as in Ayurveda texts.

Millets are nutritionally superior, small cereal grains belonging to the grass family *Poaceae*, widely grown around the world as cereal crops or grains for fodder and human food. These are short growing season rain fed crops which can withstand in extreme of temperature and are able to grow in both hot and cold regions. The major distinctive feature of the millet is their adaptability to cope with adverse agro-ecological conditions such as a semidry environment and nutritionally poor soil, the requirement of minimal inputs and highly nutritious seed content [1-4].

Sorghum (Jowari), Pearl millet (Bajari), Finger millet (Nachani), Foxtail millet (Kangu), Kodo millet (Kodra), Proso millet (Varai), Barnyard millet (Sama) and little millet (Sava) are commonly found varieties which are cultivated in rain-fed conditions. There are mainly two types of millets, namely Major and Minor. Sorghum and Pearl millet are Major millets and Finger millet, Proso millet, Kodomillet, Foxtail millet, Little millet and Barnyard millet are categorized under Minor millets.

The millets contain protein, fat, carbohydrates and dietary fiber, among which, pearl millet contains high proportion of proteins as well as lipids whereas finger millets contain lower level of proteins and fat. The Niacin content in Pearl millet is higher than all other cereals whereas, finger millet proteins are unique because of the sulphur rich amino acid

contents. Finger millet is the richest source of calcium and other small millets are good source of Phosphorous and Iron.

The millet grain contains about 65% carbohydrate, a high proportion of which is in the form of non-starchy polysaccharides and dietary fibers which help in prevention of constipation, lowering of blood cholesterol and slow release of glucose to blood stream during digestion. Lower incidence of CVS disorders, duodenal ulcers and diabetes are reported among regular millet consumers [4-7].

Dietary Fiber components exert their beneficial effects mostly by way of their swelling properties and by increasing transit time in the small intestine. It reflects reduce the rate of release of glucose and its absorption, thus helping in management of certain types of Diabetes. Dietary fiber components also bind bile salts, thereby promoting cholesterol excretion from the body and thus reducing blood cholesterol levels and food toxins in the gut to reduce their toxicity. The second mechanism by which dietary fiber exerts its beneficial effect is through undergoing fermentation in the large intestine and producing short chain fatty acids which help in the regeneration of colon mucosal cells by serving as a source of energy, thereby reducing the risk of colon cancer and inflammatory bowel diseases.

### **Health benefits of millets:**

Consumption of millets reduces risk of heart diseases, protects from diabetes, improves digestive system, detoxify the body, increases immunity in respiratory health, increases energy levels and improves muscular and neural systems. The important nutrient present in millets include resistant starch, lipids, antioxidants such as Phenolic acids, Flavonoids and Phytosterols which are responsible for many health benefits.

### **Foxtail Millet:**

Millets are rich in minerals, including iron, calcium, potassium, zinc and magnesium, vitamins, crude edible fibers and are gluten free with low glycemic index. Foxtail millet is an important crop (**Figure 1**) used as a staple food in many parts of the world including arid and semiarid areas of China, some part of India and Japan. Its scientific name is *Setaria*

*italica*. It is commonly known as Italian millet, Kangani in Sanskrit and Rala in Marathi. It is the second most cultivated millet after pearl millet. As depicted in **Figure 1** its flora looks like foxtail therefore termed as Foxtail Millet.



**Figure 1: Plant of Foxtail Millet**

Foxtail millet has been identified as major millet in terms of worldwide production, as it is the sixth highest yielding grain. Foxtail millet is one of the world's oldest cultivated crops, at present it is cultivated in 26 countries and ranks second in world production of millets. It is commonly cultivated in China, Africa, India, Russia, USA and some parts of Europe.

It contains amount of nutritional component especially starch, protein, vitamins and minerals. It is also a good source of crude fiber, helps in the digestive process and helps to induce bowel movements thus producing a laxative effect that is beneficial for healthy digestive system. It possesses several health benefits like anticancer, hypoglycemic and hypolipidemic effects, etc [6-8].

#### **Phytochemicals:**

Proteins, antioxidants constitute hydrolysates, carotenoids, polysaccharides, unsaturated fatty acids, vitamins, minerals, phytochemicals, carotenes and tocopherols.

### **Health benefits:**

1. The foxtail millet is an excellent source of iron and calcium which helps in maintaining the health of bones and muscles.
2. Strengthens nervous system due to the presence of vit. B1 and anti-oxidant agents.
3. Boost cardiac health.
4. Manages Diabetes.
5. Lowers bad cholesterol due to the presence of amino acid including Lecithin and Methionine. The presence of Threonine prevents fatty liver, further decreasing the levels of bad cholesterol.
6. Reduces excess weight thus control obesity, Tryptophan present in it prevents hunger pangs. The intake of this millet prevents accumulation of fatty substances in the body.
7. Promotes Digestion.
8. Builds immunity due to the presence of vitamins, minerals and other nutrients.

### **Ayurveda Perspective:**

Ancient Ayurvedic text like *Mahodadhi* written by *Sushena* in the 14 century describes foxtail millet as sweet and astringent to taste, that increases *Vatadosha* but balances *Pitta* and *Kapha*. These millets are termed as *Trundhanya* or *Kudhnya* or *Kshudradhanya* in Ayurveda. In *Nighantu Aadarsha* it has been termed as *Munidhanya* as *Rishimunis* used to consume it due to its very rich nutritional food value and easy digestibility.

### **Ayurveda characteristics:**

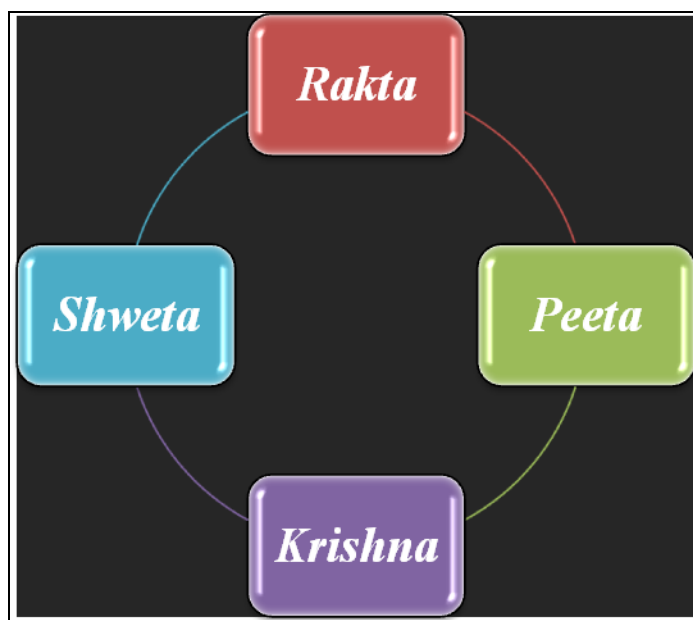
Millets are known as *Trinadhanya* or *Kudhanya* in Ayurveda, Ayurvedic texts describes Foxtail millets as sweet and astringent to taste, that increases *Vata dosha* but balances *Pitta* and *Kapha Doshas* and support *Rakta dhatu*.

### General characteristics:

- *Rasa*                      *Kashaya*
- *Vipaka*                    *Madhur, Katu*
- *Virya*                      *Ushna*
- *Guna*                      *Laghu & Ruksha*
- *Karma*                    *Kledashoshaka & Lekhana, Vatakara, Pittakaphahara*

### Types:

There are four types of *Kangu* as depicted in **Figure 2**. *Rakta*, *Peeta*, *Krishna* and *Shweta* are four types of *Kangu* amongst them *Shwetapriyangu* is of superior quality. There are four types of *Priyangu* namely *Krishna*, *Rakta*, *Sita* and *Peeta*, amongst them, *Peeta* variety is of superior quality. *Kangu* is *Sheeta* in *Veerya*, the general *Karma* of *Trunadhanya* is *Lekhana* but *Kangu* is *Brihana*. So it is believed that *Kangu* is *Sadyatarpana* and used in patients with weak lungs or *Kshataksheena*.



**Figure 2: Types of *Kangu***

### Functions in *Vyadhi*:

1. As per *Chakradatta* when *Priyangu* is mixed with curd, it is very useful in *Nadivrana*.
2. Useful in *Raktapitta* due to the presence of *Sheeta veerya* and *Madhura rasa*.

3. As stated in *Vangasena*, it is very effective in *Annadravashula* in the form of *Payasam*.
4. Useful in *Asthibhagna* due to the healing property.
5. As stated in *Nighantu Ratnakara*, it is *Dhatuavriddhikara* and can be advised to the patients of having history of abortions.

श्यामाकश्च प्रियंगुश्च भोजनं रक्तपित्तिनाम् ॥ ( रक्तपित्त चि. )  
बंगसेन— १. अन्नद्रवाख्यशूले—  
प्रियंगुतण्डुलैसिद्धं पायसं शाकंरं हितम् ॥ ( शूल चि. )

उपयोग—चक्रदत्त— १. नाडीव्रणे—  
माहिषदधिकोद्रवान्नमिश्रं हरति चिरविरूढं च ।  
भुक्तं कंगुनिकामूलचूर्णमतिदारुणं नाडीम् ॥ ( नाडीव्रण चि. )

भावप्रकाश निघण्टु

क्षुद्रधान्यं कुधान्यं च तृणधान्यमिति स्मृतम् ।

क्षुद्रधान्यमुष्णं स्यात् कपायं मधु लेखनम् ।

मधुरं कहुकं पाके रूक्षं च क्लेदशोषकम् ।

वातकृत् वद्धविट्कं च पित्तरक्तकफापहम् ॥

धान्यवर्ग—69

निघण्टु आदर्श

स्त्रियां कंगुः प्रियंगुः दवे कृष्णा रक्ता सिता तथा ।

पीता चतुर्विधा कंगुः तासां पीता वरा स्मृता ॥ 9

पीततण्डुलिका कंगुः प्रियंगुस्तु कुरी मता ।

सिनकंगुस्तु मुसटी रक्त कंगुस्तु शोधिका ॥ 12 ॥

चीनाकः काककंगु स्यान् श्यामाकः तृणकंगुकः ।

कंगुणी कंगुनीप्रोक्ता चीनाकः पीततण्डुला ।

वातलः सुकुमाश्च स च नानाविधः स्मृतः ॥ 14 ॥

कंगुः प्रियंगुः काकांगी पीनाह्वा पीतमण्डलाः ।।3

कं जलम् अक्राति गच्छति इति ।

प्रियं गच्छति इति प्रयुङ्गुः ।

राजनिघण्टु

प्रियंगुः मधुरोरुच्यः कषायः स्वादुशीतलः ।

वातकृत् पित्तदाहदनो रूक्षो भग्नास्थिवन्धकृत् ।।

सुश्रुत

कोटदूषश्यामाकनीवार शान्तनुवरकोददालकप्रियङ्गुमधूलिकानन्दीमुखी कुरुविन्द

गवेधुकसरबरुकतीदपर्णीमुकुन्दुकवेणयवप्रमृतयः कुधान्यविशेषा ।।

सु.सू. 46-29

टीका – कुधान्येति कुत्सितानि कुधान्यानि ।

उष्णाः कषायमधुराः रूक्षाः कटुविपाकिनः ।

श्लेष्महना बद्धनिःस्यन्दा वातपित्तप्रकोपणाः ।।22

कषायमधुरस्तेषां शीतः पित्तापहः स्मृतः ।।

कोद्रवश्च सनीवारः श्यामकश्च सशान्तनुः ।।23 ।

रक्ता पीताश्च कृष्णाश्च श्वेताश्चैव प्रियङ्गवः ।

यथात्तरं प्रधानाः स्युः रूक्षाः कफहराः स्मृताः ।।24 ।।

अष्टांगहृदय

कड.गुकोद्रवनीवारश्यामाकादि हिमं लघु ।।99

तृणधान्यं पवनकृल्लेढानं कफपिन्नहत् ।

भग्नसंधानकृत्तत्र प्रियङ्गुबृंहणी गुरुः ।।12 ।

वा.सू.छ. 11,12

टीका – तृणधान्यं तुच्छधान्यम् ।



चरक

सकोरदूपः श्यामाकः कषायमधुरो लघुः ।

वातलः कफपिताहनः शीतः संग्राहिशोषणः ।।

हस्तिश्यामाक नीवार तोयपर्णीगवेधुकाः ।

प्रशान्तिकाम्भः श्यामाक लौहित्याणुप्रियडावः ।। वा.सू. 27-16, 17

चक्रदत्त :-

1. माहिषदधिकोद्र वान्मिश्रं हरित चिरविरुढं च ।

भुक्तं कंगुनिकामूलचूर्णमनि दारुणां नाडीम् ।। नाडीव्रणचिकित्सा

2. श्यामाकश्च प्रियंगुश्च भोजनं रक्तपित्तिनाम् । रक्तपित्त चिकित्सा ।

3. प्रियंगुतण्डुलैर्सिद्धं पाचयं शार्करं हितम् ।। वंगसेन शुरुचिकित्सा

निघण्टुरत्नाकर

धातुवृद्धिधकराश्चैव गर्भपाते हितावहाः ।।

## Conclusion

Millets are precious grains gifted by our ancient philosopher especially in this era where metabolic diseases like diabetes and heart disease have high prevalence rate. These are easily growing grains especially in dry weather which feeds on very less amount of water. Fertilizers and pesticides are not much required for cultivation and can be stored for long time. Millets are treasure of minerals and micronutrients so they are very rich in nutritional value. It is *Pathyakar* in diseases and can be consumed as alternative to wheat and rice. It should not be consumed in large quantity, as it may cause *Vataprakopa*. It is a complete energy food i.e. *Sadyatarpanakara*, so can be consumed in fasts or *Upavasa*. It is very effective in obese person who are willing for weight loss. It is also useful in person having sedentary job. Millets should be the part of our regular diet in the form of rice,

upma, dosa, idli and payasam, etc. Millets are not consumed due to unawareness of its nutritional value and they are not that much readily available.

## References

1. Kimeeraambati and sucharitha KV, Millets-Review on nutritional profiles and health benefits, International journal of recent scientific research, 2019; 10 (07): 33943-33948.
2. Roshankumarsingh, Manoj Prasad, Foxtail millet- an introduction, 2017; 978-3-319-65616-8: page 1/9.
3. B. Dayakarrao, K Bhaskaracharya, G. Darien Christina, G. Sudhadevi, Nutritional and health benefits of millets, Indian Institute of Millets Research(Iimr), June 2017.
4. Sangramwandhekar, S.K.Sadawarte, V.S. Pawar, Akshay M. Swami, Production Status, Nutritional Aspects and Health Benefits of Millets- A Review, Jetir, 2021; 8: 4.
5. Nighantu Aadarsha, Bapalal G. Vaidya, Choukhambabharati Academy, Vol. 2, Varanasi, 221001, 753.
6. Ashtanghriday of Vagbhata, Edited by Chokhamba Sanskrit Sansthan, Varanasi., Page 86.
7. Sushrutsamhita, Edited by Vaidya Yadvji Trikamji Acharya, Choukhamba Sansrit Sansthan, Varanasi. Page No 216.
8. Charaksamhita Edited by Vaidya Yadavaji Trikamaji Acharya, Chokhamba Sansritsansthan, Page 154.