WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Review of Merits and Demerits of Millets as per Ancient Indian Medical Science Ayurveda for their Judicious Use

Dr. Sakshi Bhardwaj[1], Dr. Shailza Bhatnagar[2], Dr. Baldev Kumar Dhiman[3]

[1] P.G. Scholar, Dept. of Samhita And Maulik Siddhant, National Institute of Ayurveda, Jaipur, India
[2] Associate Professor, Dept. of Samhita And Maulik Siddhant, National Institute of Ayurveda, Jaipur, India
[3] Head of Department and Professor, Dept. of Samhita and Maulik Siddhant, National Institute of Ayurveda, Jaipur, India

ABSTRACT

Millets (*Shridhanya)* are rich in nutrients and fibre which are beneficial for our body. Consumption of millets helps in controlling body weight and in preventing diseases like diabetes, heart diseases, and obesity. *Ayurveda* mentions them under *kudhanya* and *trinadhanya varga*. It considers millets to be a beneficial addition to our diets but with proper planning. Their importance, role, indications, contraindications and diseases caused by them have been explained in detailed manner.

KEYWORD- Ayurveda, millets, *Shridhanya*, merits, demerits

INTRODUCTION

Food has been given utmost importance since Vedic period. Conscious eating has been a subject of consideration since ancient times. The patterns of food consumption go on changing from time to time. These are affected by a lot of factors like palatability, cost, availability, health benefits and many more. Agricultural and environmental considerations also contribute to change in the trend of food patterns. But one thing which is very important in all conditions is that in order to stay healthy, it is essential to maintain a stable healthy diet on a regular basis. Millets may have been consumed by humans for about 7,000 years and potentially had a pivotal role in the rise of multi-crop agriculture and settled farming societies.[1] The increasing awareness around healthy eating habits or lifestyle changes has led to a rise in the popularity of millets. In the current era people have moved towards millets again as they have gained popularity in recent years. The Govt. is also launching various movements and programmes to make people aware about the nutritional and medicinal benefits of millets. In this context, on the recommendation of the Indian Govt. , the Food and Agriculture Organization (FAO) of the United Nations, year 2023 was declared as the International Year of Millets. It is very important to know all the perspectives of these grains in relation to conditions where they can be used judiciously and where they can be avoided. For this we can have a glance of ayurveda classics which contain the principles based on observations and experience of many hundred years.

REVIEW ON MILLETS

What are millets

Millets are small grains or a plant with a lot of small seeds belonging to family *poaceae* (the grasses) that are used as food for people and birds[2]. Millets, especially *sorghum*, have been important staples in the semi-arid tropics of Asia and Africa for centuries. These crops are the principal sources of energy, protein, vitamins and minerals for millions of the poorest people in these regions. Millets like *sorghum* are grown in harsh environments where other crops grow or yield poorly. They are grown with limited water resources and usually without application of any fertilisers or other inputs by a multitude of small-holder farmers in many countries. Therefore, they are mostly consumed by disadvantaged groups; they are often referred to as “coarse grain” or “poor people’s crops”[3]. *Ayurveda* also mentions them as *kudhanya* which means they are not much appreciable. Modern research has shown that the millets are helpful in preventing diseases like diabetes, heart diseases, and obesity. Some of the popular millets nowadays are amaranthus (*chaulai or*

[1]Cherfas, Jeremy (23 December 2015). "Millet: How A Trendy Ancient Grain Turned Nomads Into Farmers". *National Public Radio*. The Salt. Retrieved 4 May 2018.
[2]Oxford Languages https://languages.oup.com/google-dictionary-en/
[3]Dayakar Rao B., Bhaskarachary K., Arlene Christina G.D., Sudha Devi G., Vilas, A. Tonapi, 2017, Nutritional and Health benefits of Millets. ICAR_Indian Institute of Millets Research (IIMR) Rajendranagar, Hyderabad, PP Nutritional and Health Benefits of Millets F 37 Dayakar Rao B., Bhaskarachary K., Arlene Christina G.D., Sudha Devi G., Vilas, A. Tonapi, 2017, Nutritional and Health benefits of Millets. ICAR_Indian Institute of Millets Research (IIMR) Rajendranagar, Hyderabad, PP 112

rajgira), barnyard millet (*sama chawal* or *sanwa* or *jhangora*), brown top (*korale*), buckwheat (*kuttu*), crab finger (*sikiya*), finger millet (*ragi* or *mandua*), fonio (*acha*), foxtail millet (*kangni* or *kakun*), job's tears (*adlay*), kodo millet (*kodo*), little millet (*kutki*), pearl millet (*bajra*), proso millet (*chena*), sorghum (*jowar*) etc.

Nutritional benefits of millets

Millets are not only comparable to major cereals with respect to their nutritional features but are very good sources of carbohydrates, micronutrients and phytochemicals with nutraceutical properties. The millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. Among them, pearl millet contains a considerably high proportion of proteins (12-16%) as well as lipids (4-6%) whereas; finger millet contains lower levels of protein (6-8%) and fat (1.5-2%).

A high proportion of carbohydrate which is in the form of non-starchy polysaccharides and dietary fibre help in prevention of constipation, lowering of blood cholesterol and slow release of glucose to the bloodstream during digestion. Prolonged digestion and absorption of carbohydrates are favourable not only for the dietary management of metabolic disorders such as diabetes and hyperlipidemia but for healthy subjects due to positive effects on a number of physiological factors. Lower incidence of cardiovascular diseases, duodenal ulcer and hyperglycemia are reported among regular millet consumers.

Millet grains are also rich in important vitamins viz thiamine, riboflavin, folic acid and niacin. Finger millet is the richest source of calcium (300-350 mg/100 g) and other small millets are good sources of phosphorus and iron.

Dietary fibre components exert their beneficial effects mostly by way of their swelling properties, and by increasing transit time in the small intestine. The increase in transit time reflects a reduction in the rate of release of glucose and its absorption, thus helping in the management of certain types of diabetes (e.g. non-insulin-dependent diabetes mellitus). Dietary fibre 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. They can also have some adverse nutritional effects by binding dietary calcium, magnesium, zinc and iron, thereby reducing their bioavailability.

The second mechanism by which dietary fibre exerts its beneficial effects is through undergoing fermentation in the large intestine (colon) and producing short-chain fatty acids such as butyrate, propionate and acetate. Butyrate helps in the regeneration of colon mucosal cells by serving as a source of energy, thereby reducing the risk of colon cancer and inflammatory bowel disease. The short-chain fatty acids produced are absorbed (especially propionate and acetate) into splenic circulation and transported to the liver where they are known to inhibit cholesterol synthesis by hepatocytes and also glucose release from the liver, thus contributing partly to the hypocholesterolaemic and hypoglycaemic effects of dietary fibre. While the soluble fibres are completely fermented, the insoluble fibres are only partially fermented.

Lipids are relatively minor constituents in millets. A nutritional constraint to the use of millets as food is the poor digestibility of millet proteins on cooking.

Millets and Ayurveda

In the *ayurveda* text such plants with small grains are grouped under the category of *trinadhnaya*[4], *kudhanya*[5] or *kshudra dhanya* (small fibre grass) which is one of the categories of *dhanya varga* mentioned in *Ayurveda* texts.[6] *Kshudra dhanya*, *kudhanya* and *trnadhanya* [7] are synonyms and named so based on their structure or morphology.

List of Millets in Ayurveda Texts

Table No.1

Name of millet	*Caraka Samhita*	*Sushruta Samhita*	*Ashtanga Samgraha*	*Bhavaprakasha Nighantu*
Kordusha	+	+	+[8]	+

[4]Agnivesha. Carakasamhita: Sutrasthana; shaḍvirecanashatashritiyo'dhyayah, 27.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka

[5]Dalhan. Sushruthsamhita Dalhan Tika With Nibandhsangrah. :Sutrasthana; Annapanavidhyadhyayah, 46. Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/esushruta/

[6]Bhavprakash nighantu dhanyavarga adhyaya. Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/e-Nighantu/bhavaprakashanighantu/?mod=read

[7]Agnivesha. Carakasamhita: Sutrasthana; Dirghanjivitiyadhyaya, 2.18-33.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka

[8]Shrimadarunadattaviracitaya Sarvangasundarakhya Vyakhyaya Hemadripranitaya ayurvedarasayanahvaya tikaya Ca Samullasitam sutra sthan annasvarupavijñaniyadhyayah .13 Available from:https://vedotpatti.in/samhita/Vag/ehrudayam/?mod=read

Name of millet	*Caraka Samhita*	*Sushruta Samhita*	*Ashtanga Samgraha*	*Bhavaprakasha Nighantu*
Shyamaka	+	+	+	+
Hastishyamaka	+	+	+	
Nivara	+	+	+	+
Toyaparni	+	+	+	
Gavedhuka	+	+		+
Prashantika	+		+	
Ambhashyamaka	+			
Lauhityanu	+			
Priyangu/kangu[9]	+	+	+	+
Mukund	+	+	+	
Jhintigarmuti	+	+		
Varuka	+	+		
Varaka	+	+	+	
Shibir	+			
Utkata	+		+	
Jurnava	+		+	
Uddalaka [10]*/vanakodo* [11]		+	+	+
Madhulika		+	+	
Shatanu		+		
Nandimukhia		+		
Kuruvinda		+		
Sara		+		
Venuyava		+	+	+
Kodrava			+	+
Kandlauh			+	

[9]Shrimadarunadattaviracitaya Sarvangasundarakhya Vyakhyaya Hemadripranitaya ayurvedarasayanahvaya tikaya Ca Samullasitam sutra sthan annasvarupavijñaniyadhyayah .12 Available from:https://vedotpatti.in/samhita/Vag/ehrudayam/?mod=read

[10]Indu shashilekhakhyavyakhyaya Samvalitah Ashtangasangrahah Cikitsasthanam shvitrakṛmicikitsitam.31 Available from:https://vedotpatti.in/samhita/Vag/esangraha/?mod=read

[11]Indu shashilekhakhyavyakhyaya Samvalitah Ashtangasangrahah Cikitsasthanam shvitrakṛmicikitsitam.31 Available from:https://vedotpatti.in/samhita/Vag/esangraha/?mod=read

Name of millet	*Caraka Samhita*	*Sushruta Samhita*	*Ashtanga Samgraha*	*Bhavaprakasha Nighantu*
Chinak				+
Jwar				+
Charuk/Sharbeej				+

General Properties And Action

Rasa (Taste)- *Kashaya(*pungent*), madhura (*sweet*)*

Vikapa (Specific transformation) - *Katu* (astringent)

Virya (Potency) - *Shita* (cold)

Guna (Properties) - *Laghu* (light), *ruksha* (dry)

Karma (Action)- *Lekhana* (scraping), *vrishya* (aphrodisiac effect), *kledashoshana* (absorb excess fluid), *sangrahi* and *baddhamalakara* (constipating)

Effect on *Tridosha* & *Dhatu* - *Kapha-pittahara* (removes *pitta* and *kapha*), *vatala*, *rakta samaka*[12].

Properties And Therapeutic Uses of Millets Available Nowadays in Ayurveda Texts

In present times all the varieties are not found. The ones whose information is available in modern literature are discussed here in terms of their specific properties and therapeutic uses.

Table No 2

Millet	Botanical Name	Synonyms	*Rasa*	*Guna*	Therapeutic Uses
Kanguni (Foxtail millet)	*Celastrus paniculatus* Linn	*Kanguni, Pitatandula, Vatal, Sukumara, Priyangu*	*Madhura*	*Guru,Ruksha*	Vitiates *vata* Alleviates *pitta,*useful in healing fractures
Chinak (Common Millet)	*Panicum miliaecum Linn*	*Varaka, Sthulkangu, Sthulapriyangu, Kangubheda, Marha, chena*	*Madhura*	*Ruksha*	*Brihana (*growth promoter)
Kodara (Kodo Millet)	*Paspalum scrobiculatum* Linn.	*Kodrav, Kordush, Kudyal,UddalakMad anagraj*	*Madhura Tikta*	*Guru,Ruksha*	Obesity, *Raktapitta* (bleeding disorders), *Pittajkasa,Visha* (poisoning),*Urustambha, Trishna* (thirst), *Jalodara* (ascites), *Kustha* (skin diseases) *Stanyadosa* (lactation disorders)
Gavedhuk (Job's Tear)	*Coix lacryma Linn.*	*Vaijyanti*	*Kashaya, Madhura*	*Ruksha*	Obesity, *Kaphaja Chardi* (vomiting)
Sama (Barnyard Millet)	*Echinochloa esculenta Linn.*	*Shyamaka, Shyama,Tribeej, Rajdhanya, Trinbeej,Uttam*	*Madhura*	*Shita,Snigdha, Laghu*	Obesity, *Raktapitta, Pittajkasa, Urustambha, Stanyadosa* (lactation disorders), *Jalodara* (ascites)
Jwar (Great Millet)	*Sorghum bicolor Linn.*	*Jurnahwa, Yavnal, Raktika, Krostupuccha, Sugandhika,*	*Madhura*	*Guru, Shita*	*Brihana* (growth promoter), *Malrodhaka* (constipating),

[12]Bhavprakash Nighantu dhanyavarga adhyaya.63. Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/e-Nighantu/bhavaprakashanighantu/?mod=read

Millet	Botanical Name	Synonyms	*Rasa*	*Guna*	Therapeutic Uses
					Ruchikaraka (appetite promoting), *Viryavardhak, Raktavikara*
Ragi (Finger Millet)	*Eleusine coracana Linn.*	*Madhuli, Ragika, Nartak,Madua*	*Madhura Tikta*	*Laghu, Shita*	—--
Bajra (Pearl Millet)	*Pennisetum glaucum Linn.*	*Bajranna, Sajak, Nalika, Neelkaran, Agrayadhanya*	*Madhura*	*Ruksha,Ushna*	*Balya* (strength promoter), *Agnideepaka, Durjara (*difficult to digest)

Where to use Millets

Some references from the *Ayurveda* texts have been collected regarding use of millets.

- *Nivara, kodrava, uddalaka, shyamaka* are beneficial for all in general along with *godhuma* and *yava.*[13]
- *Raktapitta* (Bleeding disorders)- Use of *nivara, kordusha, prashantika, shyamaka, priyangu shali* and *shashtika* rice is indicated.[14]
- *Raktarsha* (Bleeding piles) - Use of *shali, shyamaka, kodrava* is indicated for use with milk, or *yusha* of *masura,mudga, adhaki, makushtha* with *amla rasa.*[15]
- *Pittaja kasa* (cough)- Use of *shyamaka, yava, kodrava* is advised with *mudga yusha, jangala* meat soup and *tikta shaka.*[16]
- *Urustambha* -Use of *yava, shyamaka, kodrava* with *shaka* processed with water and oil and no salt is indicated.[17]
- *Sthaulya* (obesity)- *Prashatika, priyangu, shyamaka, yavaka, yava, jurnava, kodrav*a are indicated in the treatment of obesity.[18]
- *Premeha*- Preparation of millets are indicated to be used with *shashtik* rice in *premeha.*[19]
- *Mukha, dantamula* and *galaroga (*oral, dental and throat disorders*)-Peya* of *trinadhanya* and *yava* is indicated in treatment of *mukha, dantamula and galaroga.*[20]
- *Jalodara* (ascitis)- Use of *shyamak* and *kordusha* is mentioned as a diet in *samsarjana krama* after the surgery and elimination of *dosas* from *udara*.[21] Here the *ruksha* property of *shmayaka* and *kordusha* help in non accumulation of fluid in the *udara.*
- *Trina dhanya odana* (millet cooked in water) increases hunger, is easy to digest, increases digestion and aids wound healing. It also helps in multiple disorders related to respiratory system and spleen but is the producer of all the *vatika* disorders.[22]

Millets in context to cause of disease[23]-

Vataprakopaka- Varaka, uddalaka, kordush, shyamaka, nivara ,mudga, masura, aadhki etc. are mentioned to increase *vata dosha.*

Cause of *Raktapitta -Yavaka,uddalaka* and *kordusha* when used excessively with *nishvapa, masha, kulatha* (lentil soup) and *kshara* (alkali) are mentioned to be causative factors for bleeding disorders.

Cause of *Prameha* - Newly harvested *haynaka, yavaka, chinak, uddalaka, naishadha, itkat, mukundak* when used in excess are causative factors of *prameha.*

---

[13]Dalhan. Sushruthsamhita. :Sutrasthana hitahitiyamadhyayah. 5. Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/esushruta/
[14]Agnivesha. Carakasamhita: Cikitsasthana; Raktapittacikitsitam, 4.36.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[15]Agnivesha. Carakasamhita: Cikitsasthana; Arshashcikitsitam, 14.205.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[16]Agnivesha. Carakasamhita: Cikitsasthana; Kasacikitsitam, 18.96.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[17]Agnivesha. Carakasamhita: Cikitsasthana; Urustambhacikitsitam, 27.26.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[18]Agnivesha. Carakasamhita: Sutrasthana;.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[19]Agnivesha. Carakasamhita: Cikitsasthanam Prameha;.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[20]Agnivesha. Carakasamhita: Cikitsasthanam 30;.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka
[21]Dalhan. Sushruthsamhita. :Uttartantra; shirorogapratishedhadhyayah, 26. 62-63. Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/esushruta/
[22]Kaideva Nighantu 5.21
[23]Agnivesha. Carakasamhita: Cikitsasthanam Prameha;.Last accessed on 2023 Oct 06 Available from: https://niimh.nic.in/ebooks/ecaraka

Cause of *Kushtha- Haynaka, yavaka, chinak, uddalaka, kordusha* when used in excess are causative factors of *kushta.*

Here we see according to multiple references in classical texts, inappropriate use of millets can cause diseases too.

DISCUSSION & CONCLUSION

The discussion around millets has increased in recent times due to the rise of lifestyle diseases such as diabetes, heart diseases, and obesity. People are looking for healthier and more nutritious food options, which has led to an increase in the popularity of millets. The fact that millets are also environmentally friendly and easy to grow has further added to their popularity. Apart from their various health benefits, they show some side effects also. Epidemiological evidence suggests that millet may play a role in the genesis of endemic goitre in these areas, and sparse experimental data in rats support this suspicion [24].

Millets have many anti-nutrients like phytates, tannins and protease inhibitors (trypsin, chymotrypsin, alpha amylase, cysteine) which have adverse effects on pancreas when taken in high amounts[25]. A high intake of *Ragi* could increase the amount of oxalic acid in the body. Therefore, it is not recommended for patients having kidney stones (urinary calculi)[26]. The glycosides present in *ragi* can be readily converted to thiocyanate by enzymes after ingestion. This thiocyanate is associated with cases of goitre in the population that consumes millet and cassava regularly[27]. *Ragi* consumption is said to negatively influence the function of the thyroid gland and the pancreas. *Ragi* can also cause pathological changes in the liver[28]. It is hypothesised that excessive millet usage could be a reason behind thyroid dysfunction and goitre. The trend of using *bajra* on a regular basis in healthy condition is not advised particularly in the South Indian population.[29]

As per *Ayurveda,* the general qualities and effects of millets gives an obvious idea that millets are *vatavardhak*. Generally the millets are *ruksha* and may cause constipation (if used alone and in large quantity) as they possess *shoshaka karma* (absorbent property*).*These can be advised to people with imbalance of *pitta, kapha* or *raktdushti*.

They are not to be used in single and in large quantities and for a long time. They can be used with wheat and barley keeping into consideration the state of patients. All can be used in obesity but are not a good choice in case of pregnant, lactating females where more calories are required. They should not be used by *vatala prakriti* individuals, in *vatika* disorders and in lean and thin individuals. When taken in excess quantity by people with *mandagni* may cause bloating and constipation as the fibre present in them takes time to digest.

In nutshell, *Ayurveda* highlights not to use millets regularly under the list of *nitya sevaniya ahara*, also as the name suggests *kudhanya* i.e. inferior among cereals. They should be used in *santarpana janya* disorders and better to avoid in *apatarpana janya* disorders. There they can be used with other grains and with various *samskar* (by different methods of cooking).

To conclude following points should be noted before using millets-

- In daily routine, millets are not to be used for prolonged periods or in excess.
- Millets like *cheena, jowar, ragi* possess *brimhana* action, thus can be used cautiously in case of children and lean and thin individuals.
- *Kodarva, gavedhuka, sama* are indicated in obesity so should be used in lifestyle disorders like diabetes and hypertension.
- *Bajra* and *jowar* can be practised in obese children because they cause satiety and are helpful in growth .
- Millets can be a healthy and beneficial option for middle-aged people, obese or for people with sedentary lifestyles.
- Newly harvested grains should not be taken in excessive consumption, especially without appropriate *samskara*.

Finally, it is concluded there must be a judicial distribution of millets and other foods as a balanced diet to meet the necessity of maintenance of health and cure of diseases.

[24] https://pubmed.ncbi.nlm.nih.gov/2921306/

[25] https://eatsmartdietclinic.com/millets-good-or-bad-for-health/

[26] Nagaraja MS, Halagundegowda GR, Meenakshi HK, Krishnamurthy KN. Regression Analysis to Identification of Stable Genotypes of Finger Millet for Plant Height across India. Int. J. Curr. Microbiol. App. Sci. 2017;6(2):1179-86.

[27] Chebet SJ. *Assessment of the Levels of Thiocyanate in Processed and Unprocessed Red and Brown Finger Millet (Eleusine Coracana) Grown in Mogotio Area, Baringo County, Kenya* (Doctoral dissertation, Kenyatta University), 2014.

[28] Ambuko J, Onwonga R, Nyongesa O, Shibairo SI. Variation of nutritional and anti-nutritional contents in finger millet (Eleusine coracana (L.) Gaertn) genotypes. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS) e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 7, Issue 11 Ver. I (Nov. 2014), PP 06-12. https://www.iosrjournals.org

[29] Nutritional And Therapeutic Aspects Of Bajra ,Central Council For Research In Ayurvedic Sciences