

Review Article

A Review of Millets from Ayurvedic texts and their significance in present era

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ABSTRACT:

Millets are the grasses and are a set of highly variable, small-seeded plant species indigenous to many areas of the world. They are well adapted to grow under low soil fertility, low moisture, and hot environmental conditions.

Millets are consumed all over India in different forms since ancient period of time. Hence, these are explained in many texts from ancient India. Millets come under group *shukadhanyavarga* in ancient texts. They are also called as *trunadhanya*, *kshudradhanyas* or *kudhanya*. Millets commonly found in market and consumed are Sorghum (*Yavanal*), Bajara/pearl millet (*Sajak*), Corn (*Makay*), finger millet/Ragi (*Nartak*), black & white fonios (hungry millets), Proso millet/ Varai (*Chinak*), Foxtail millet (*Kangu*), Barnyard millet/Sama (*Shyamak*) and kodo millet (*Kodrav*), Brown top millet (*Krishna kangu*) etc.

Millets are the basic source of carbohydrates in daily meal of Indian people. They have low glycemic index and are rich in many nutrients like B Vitamins, minerals like calcium, iron, potassium, magnesium, zinc. Hence, these are good for many Chronic, Metabolic and Lifestyle disorders like Obesity, Diabetes, Coronary heart disease, Cancer, Oxidative stress, Cardiovascular disease, Gastro intestinal disorders. They also work as detoxifying agents in food.

KEY WORDS: Millets, *Trunadhanya*, *Kshudradhanya*, *Kudhanya*, *Shukadhanya*

INTRODUCTION:

Millet is a generic term used for several small sized cereals belong to family Gramineae. Millets have high productivity and grow in short period of time. They are one of the most important drought-resistant crops grown widely in India. Now a days there are two broad categories of the various millet species; these are Major millets and minor millets. Major millets include Sorghum, Bajara etc; and minor millets include Ragi, Proso millets, Foxtail millets, Barnyard millets, Kodo millets, and Brown Top Millets etc.¹

These grains are major source of energy in Indian diet. In poor income families, 70-80 % of daily energy intake is from millets. These are

important source of proteins, calcium, iron, and B-complex vitamins also. In addition, because of their important contribution to national food security and potential health benefits against, millet grain is now receiving increasing interest from Agricultural scientists, technologists, and nutritionists.² The aim of this work was to review millet grains from ancient Indian texts and its nutritional quality and potential health benefits in modern era.

Millets found in ancient ayurveda texts are called as *Shukadhanya*, *Kshudradhanya*, *Kudhanya* (less quality grains) or *Trunadhanya* (uncultivated wild variety grains). These are *Yavanal* (sorghum), *Sajak* (Bajara/pearl millet),

Nartak (finger millet/Ragi), *Makay* (Corn), *Chinak* (Proso millet/ Varai), *Kangu* (Foxtail millet), *Shyamak* (Barnyard millet/Sama) and *Kodrav* (kodo millet), *Krishna kangu* (Brown top millet) etc.

MATERIAL AND METHODS

This article reviews millets from Bruhad-trayi, Laghutrayi, Nighantus and modern science. Charak samhita, Sushrut samhita and Ashtang samgraha have much detailed explanation about millets. While in Laghutrayi, only Ashtanghridaya explained millets in trunadhanya category, and it is same as Ashtang samgraha. Sharangadhar Samhita and Madhavnidan did not mention separately about Kshudradhanyas. Later period texts like Bhavaprakash-nighantu, Shaligram

nighantu, Madanpal nighantu, Kaiyadev nighantu, Raj nighantu, Mahaushadh nighantu, Saraswatinighantu, Dhanvantarinighantu have explained millets in detail. Some more grains like Bajara, Maize, and many types of Sorghum have been mentioned in some nighantus. Other texts like Gunaratnamala and Nighantratnakar also explained many grains in detail under Kshudradhanyas.

In modern studies millets are explained as small seeded round shaped cereals, which comes under Gramineae (Syn-Poaceae) family. Many studies regarding climatic condition and its cultivation are available. Millets are unique due to their short growing season.³

Types of millets:

Table No. 1: Routinely available Millets / Kshudradhanya in market ⁷⁻¹³

Sr No	Name Sanskrit, Marathi, Hindi, English	Latin name & Family	Another Sanskrit names and types	Ras, Virya Vipak, Guna, Doshaghnata, Karma according to Ayurveda Texts
1.	Yavanal Ma- Jwari, Jondhale Hi- Jwar, juwar Eng- Sorghum	La- Sorghum vulgarae Linn Pers. Family- Gramineae Syn- Poaceae	Yavanal, Yaavanal, Shwet, Yavanal, Dhawal, Yawanal, Tartandul, Naksha- lakruti, Vistar, Vrutta, Mouktik, Tandul, Jurnavha, Devdhanya, Jurnal, Bijapushpak, Pushpagandha, Sugandha, Segurundak, Juvholi, Juvhal, Anal, Jurnavho, Trunaloanilh, Taniyako, Jurnavika, Tinika, Junhuli, Shikhari, Dirghanal, Dirghashar, Kshetreshu, Ikshupatrak, Pandur, Types- Tugar Yavanal- Kashay Rakta- Rakta Yavanal Lohit- Lohit Tugar Types (Jati) of Yavanal Lalita, Koshtuprucha, Shrikhandi, Sugandhika, Krushna, Bhadrupadi, Shweta, Manda, Jurnaka, Raktika, Kubjika,	Ras- madhur, kashay, Veerya- sheet, Doshghnata- rakta, kapha and pitta vikarhar Guna- ruksha, laghu, Anyaswadu, veeryavardhak, kledakarak, balavardhak, arsha nashak, pathya, gulma rogahar, vranahar, viryavardhak, malastambhak, Avrushya Guna- Dhawal Yavanal guna- Pathya, veeryavardhak, balakarak, tridoshaghna, arsha, vran, gulm, aruchihar Sharad Yavanal guna- kaphakar, picchil, guru, sheet, madhur, veeryavardhak, balya, pushtikar, tridoshaghna

Sr No	Name Sanskrit, Marathi, Hindi, English	Latin name & Family	Another Sanskrit names and types	Ras, Virya Vipak, Guna, Doshagnata, Karma according to Ayurveda Texts
2.	Sajak Ma- Sajagure Hi- Bajara Eng- Pearl millet	La- Pennisetum glaucum (L.) R Br Family- Gramineae Syn- Poaceae	<i>Sajak, Varjari, Nalika, Nali, Nilsasya, Agradhanya, Var- jarika, Nilkana,</i>	<i>Virya- Ushna Doshagnata-Vatal, pittakopak (kaphavaathar by Shaligram Nighantu) Guna- ruksha, guru Guna- hrudya, balya, kantijanak , agnipradipak, ruksha, pittaprakopak, strikamottejak, durjar, pusatvahar, pushtihar</i>
3.	Nartak Ma- Nachani Hi- Nagali Eng-Ragi, fin- ger millet	La- Eleusine coracana L. Gaertn. Family- Gramineae Syn- Poaceae	<i>Nartak, Malinjak, Nrutyakund, Bhuchar, maliyas, kathin, gucha, kanisha, lachan, bahupatrak, Nartakundak</i>	<i>Ras- Kashay Tikatak, Madhur, Virya - Sheet Gun karma- Tarpan, Laghu, Balya, Doshagnata- Tridoshar, especially pitta, rakta dosha nashak</i>
4	Kodrav Ma- kodra, barik, kodru Hi- kodo, ko- dav, Eng- Kodo millet	La- Paspalum scrobiculatun Linn. Family- Gramineae Syn- Poaceae	<i>Kodrav, Koradusha, Uddalak, Vankodrav, Kuras, Koradushak Vanakodrav (Uddalak)</i>	<i>Ras- madhur, tikta Virya- sheet Guna- Guru, ruksha, Doshagnata- kapha pittahar Karma- grahi, vranya, vishahar, mutrakruchrahar. vrushya, bhagnasandhankar, jirna Koradusha is Laghu Kodrav is of above guna and Vanakodrav (Uddalak) is ushana, grahi and atyant vaatarak, kapha vishaghna. maadak, , pittal, It is sheetasparsha, ushnavirya</i>
5.	Nivar Ma- Devbhat Hi- Tini Eng- Wild Rice	La- Hygroryza aristate Nees. Family- Gramineae Syn- Poaceae	<i>Nivar, Utika, Nadi, Munivrihi, Munipriya, Tapas, Munibhakt, Prasadak, Munidhanya, Aranyadhanya, Rasik Prasadhika, Prasavika Trunann, Uddika, Uddi, Vanavrihi, Trunodbhava,</i>	<i>Ras- madhur, kashay, Virya- Sheet Doshagnata- pittaghna, kaphavaatkar, Guna- Snighdha, laghu, ruksha, pavitrya, pathya, grahi, lekhan, baddhavinmutra, swadu.</i>
6.	Shyamak Ma- sama, Samul Hi- Sava Eng- Barnyard millet	La- Echinochloa frumentacea Linn Family- Gramineae Syn-Poaceae	<i>Trunabeej, Munibhaksha, Gopriya Sukumar, Rajadhanya, Trunabeejottam, Shyaamak, Shyaamaak, Shyamastribija, Syadavipriya, Sukumar, Types- 3 Toyashyamak Hastishyamak Ustrashyamak</i>	<i>Ras- Madhur Kashay, Virya- Sheet, Doshagnata- vaatkar kaphapittaghna, Guna- Snigdha, laghu, ruksha grahi, vishahar</i>

Sr No	Name Sanskrit, Marathi, Hindi, English	Latin name & Family	Another Sanskrit names and types	Ras, Virya Vipak, Guna, Doshaghnata, Karma according to Ayurveda Texts
7.	Kangu/ <i>Priyangu</i> <i>Ma- kang</i> <i>Hi- kanguni,</i> <i>Tanguni</i> Eng- Foxtail millet	La- <i>Setaria italika</i> Linn P. Beauv Family- Gramineae Syn- Poaceae	<i>Kangu, Priyangu, Pitatandul,</i> <i>Asthisambandhan</i> <i>Pitatandulika, Durjara Trunak</i> <i>Priyangu</i> is of four types- black red yellow and white. They are successively superior, dry and mitigate <i>kapha</i> . ⁵ <i>Shwet</i> and <i>rakt</i> are called as <i>Shodhika</i> .	<i>Ras- madhur, kashay-madhur,</i> <i>tikta</i> <i>Virya- kodrav- sheet</i> <i>Vankodrav- ushna</i> <i>Doshaghnata- vaatkar,</i> <i>pitta -kaphanashak. raktapitta</i> <i>vishodhan,</i> <i>Guna karma - baddhavinmutr,</i> <i>swadu, bhagnasandhankar,</i> <i>bruhani, guru, ruksha, kledahar,</i> <i>lekhan, vrananashak</i> <i>Ruchikar, Daah-har,</i> <i>Priyangu is bhagnasandhankar</i> <i>(helps in healing ofFractures)^{vi}</i> Especially good for horses. Uddal (Vankodrav) is helpful in abortions,
8.	Chinak <i>Ma- Varai,</i> <i>Vari</i> <i>Hi- china,</i> <i>chaina</i> Eng- Indian Millet	La- <i>Panicum</i> <i>miliaccum</i> Linn Family- Gramineae Syn-Poaceae	<i>Varak,</i> <i>Kakakangu, sushlakshna,</i> <i>shlakshnak, kangubheda</i> <i>Sthulkangu,</i> <i>Sthulapriyangu</i>	Same as <i>Kangu</i> . As it is a type of <i>Kangu</i> . <i>Ras- Madhur kashay,</i> <i>Gun- ruksha</i> <i>Doshaghnata- vaatpittakar</i>
9.	Gavedhuk <i>Ma-kasai</i> <i>Hi- garahedu</i> Eng-Adlay, jobs tears	La- <i>Coix</i> <i>lachrymal jobi</i> Linn. Family- Gramineae Syn-Poaceae	<i>Gavedhuka, Gavedhu</i>	<i>Ras- Katu</i> <i>Doshaghnata- Kaphanashak.</i> <i>Karma- Karshyakar, Tasty,</i>
10.	Makay <i>Ma- Maka</i> <i>Hi- Makai</i> Eng- Corn	La- <i>Zea mays</i> subsp. Family- poaceae,	<i>Makay, Mahakay, Katij,</i> <i>Kandaj, Shikhalu, Samputan-</i> <i>tasya</i>	<i>Guna same as Yavanal</i> (Sorghum) <i>Truptikarak, kaphapittashamak,</i> <i>grahi, ruksha,</i> <i>Uncooked Corn- pushtikar,</i> <i>ruchikar</i>
11.	Sharabeej <i>Ma- tirkande</i> <i>Hi-</i> <i>Sarapat</i> <i>sarkand</i>	La- <i>Saccharummunja.</i> Roxb. Family- Gramineae Poaceae	<i>Charuk, Sharabeeja,</i>	<i>Ras- Madhur, kashay</i> <i>Veerya- sheet</i> <i>Gun- ruksha, laghu</i> <i>Doshaghnata- vaatkopak</i> <i>Raktapitta kaphaghna,</i> <i>vrushya,</i>

Sr No	Name Sanskrit, Marathi, Hindi, English	Latin name & Family	Another Sanskrit names and types	Ras, Virya Vipak, Guna, Doshaghnata, Karma according to Ayurveda Texts
12.	Venuyava Ma- Venuyav Hi- Bans ke beej Eng- Bamboo seeds	La- Bambusa arundinacea wild. Family- Gramineae	<i>Vanshayav, Venuyav,</i>	<i>Ras- kashay,</i> <i>Virya- ushna</i> <i>Vipak- katu</i> <i>Dishaghnata- vaatapittakarak,</i> <i>Gun- ruksha, mutravibandhak,</i> <i>Sarak, kaphaghna</i> <i>(It removes fat, helminths and poisons. it is strength promoting)⁶</i>
14.	Yav Ma- Saatu Hi- Jou Eng- Barley	La- Hordeum vulgare Linn. Family- Gramineae	<i>Akshat, Tikshnashuk</i>	<i>Ras- Madhur</i> <i>Veerya- Sheet,</i> <i>Doshaghnata- pittakaphahar</i> <i>Guna- Ruksha, guru</i> <i>Saarakpurisha kar, vaatakar,</i> <i>vrushya, sthir, mutra, med jayet</i> <i>Pinas, shwas, kaas, kantharog,</i> <i>tvakroghar</i> <i>(light to digest, producing abundance of flatus and faeces, promotes stability)⁶</i>

Fig.1. Brown top millet



Fig.2. Barnyard millet



Fig.3. Proso millet

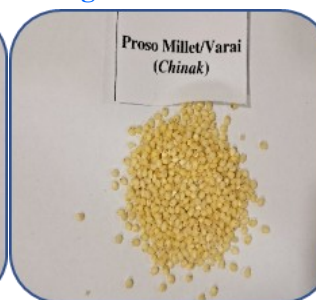


Fig.4 Finger millet



Fig.5. Little millet



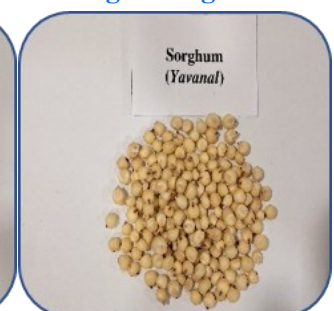
Fig. 6. Kodo millet



Fig.7. Pearl millet



Fig.8. Sorghum



DISCUSSION:

In Ancient Ayurveda, different varieties and different names of millets are mentioned in many texts. Some millets found well explained and some are just mentioned with their names. Their Ayurvedic properties are also explained. *Koradush, shyamak, Nivaar, Toyaparni, Gavedhuk, Prashantika, Ambha shyamak, Lohitanu, Priyangu, Mukund, Zinti, Garmuti, Varak, Varuk, Shivir, Utkati, Jurn* are *kashay* (astringent in taste), *madhur* (sweet in taste), *laghu* (light to digest), *vaatavardhak* (aggravate), *kapha pitta har* (mitigate *pitta* and *kapha*), *sheet virya* (cold in potency), *sangrahi, rasa shoshak* (makes dry), *lekhan guna* (reduces fat). *Acharya Charaka* explained all millets in *shukadhanyavarga* along with *Vrihi, Godhum, Yava* etc as above. *Acharya Sushruta* called millets as *Kudhanyas*. *varak, uddalak, priyangu, madhulika, nandimukhi, kuruvindgavedhuk, sara, baruk, toyaparni, mukundak, venuyava, etc* are, hot in potency, astringent, sweet in taste, dry, pungent after digestion, mitigate *kapha*, binds the urine, and also it is *vaat pitta* aggravating. But *Koradush, shyamak, shantanu, nivar* are cold in potency and mitigates *pitta*. As per *Acharya Vagbhata, Bruhuni, guru. koradush* is *param grahi* (constipating), cold for touch, *vishapaha* (poison reducing). *Sharangadhar Samhita and Madhav Nidan* does not mentioned properties of millets.⁶

Millets in Nighantus and other texts:

Millets are said to be hot (somewhere less hot) in potency in many nighantus.

In *Bhavaprakash Nighantu Kangu, chinak, shyamak, kodrav, gavedhuk, nivaar, yavanal* are explained. *Kangu priyangu* are said to be feminine.⁷

Madanpal Nighantu explains *kangushyamakadi* under *Dhanyagunah*. *Kangu, shyamak, nivar, varak, uddalak, nartak, varattika, todaparni, kodravashcha, priyangu, koradushak, mukunda, varika* all are *trunadhanya*. Some other are *pita-tandulika, kangu, priyangu, karkati, sitakangu, musati, raktakangu, shodhika, chinak, kakakangu, shyamak, shanakanguk*. And also mentioned that *shalis* are types of *kangu*.⁸

Kaiyadev Nighantu the names included are,

sitkangu, shyamak, kodrav, uddalak, nartak, devadhanya, varuvha, varittika. He also explained many grains under *chinak prabhritiya* those are, *chinak, kakakangu, shyamak, trunabija, kodrav, koradush, syaduddalo, vanakodrav*,⁹

As per *Shaligram nighantu Kshudradhany, Kudhanya, Trunadhanya* are called same. Grains explained in detail are *kangu, chinak* (as a type of *kangu*), *nivar, varak, nartak, shyamak, kodrav*. *Makay* (corn) has been explained in detail. Other grains like *sharbeej* and *vanshayava* are also mentioned in this *varga*.¹⁰

As per *Saraswati nighantu* only synonyms of *kodrav* and *kangu* are mentioned.¹¹ In *Dhanvantari nighantu kodrav, nivar, shyamak, priyangu*, names are just mentioned.¹² *Koradusha, uddalak, shyamak, kangu, varak, sajak, nartak* are the explained millets in *Nighantaratanakar*.¹³

Nutritional value and health benefits of Millets:

As millets are *madhur, kashay, sheet* these are *rakta, kapha* and *pitta vikarhar. ruksha, Lekhan shleshmahar, kledashoshak, Karshyakar guna karma* can be helpful in *Prameh, Sthoulya* and other *Medovikar. swadu, veeryavardhak, balavardhak guna* helps in *vandhyatva*. These are also said to be *arsha nashak, gulma rogahar, vranahar*. Some of these are *grahi, laghu*, can be used in *grahani, atisar too*.

Millets are highly nutritious, soothing and easy to digest. They are considered to be the least allergic and most easily digestible among available grains. Compared to Paddy rice, especially polished paddy rice, millets release lesser percentage of glucose. They are rich source of insoluble dietary fibre. Linoleic and oleic were the major unsaturated fatty acids detected in all the millet types. Millets were also found to be rich in free and bound phenolic acids. Kodo millet was found to have the highest free and bound phenolic contents.¹⁴

Expected glycemic index of millets ranges between 42.7 and 58.3, hence these are valuable low glycemic Index food sources for diabetics. And these lower the risk of diabetes for non-diabetics.⁷ Millets are particularly high in

Vit B complex, minerals like iron, magnesium, phosphorous, potassium and zinc. Finger millet (Ragi) is the richest in calcium and iron. Hence these are useful in Pregnancy, childhood, and anaemia in females.

Numerous compounds in millet exhibited antioxidant properties. The phytochemicals in millet, such as phenolics and dietary fibre, were predominantly found in the bran layers, together with micro nutrients (carotenoids and tocopherols) known to have antioxidant properties. Moreover, millet could also be enriched with antioxidants (such as peptides) via fermentation and germination. Hence are useful in many diseases.

Consumption of Millets in India

India is the largest producer of many kinds of millets, which are often referred as coarse cereals. All millets are cooked as rice after dehulling. Sorghum, Bajara, Ragi is milled into flour and consumed as stiff porridge called as roti. Sorghum is mainly consumed in Maharashtra, Karnataka etc. Bajara is mainly consumed in Rajasthan, Gujarat and Maharashtra too. Rotala is common bread type of Bajara consumed in Gujarat and Rajasthan. It is also consumed in the form of Kheer with mixing it in Ghee and Jaggary. It can be cooked with dal to make Bajara khichadi. Proso millet, Kodo millet, Barnyard millets are much used in Kerala, Andhra, Tamilnadu and Maharashtra. Proso millet flour is also used as a substitute for rice flour in various foods consumed as snacks. Millet protein lacks gluten, hence it is unsuitable as the sole material for preparation of bakery products. Mudde from Ragi is prepared by steaming the dough and making it into balls in Andhra, Karnataka, Tamilnadu. Millet flours are soaked overnight in cold water containing a little butter milk and the slurry after fermentation is used to prepare porridge. Millets and black gram mixed in the ratio of 3:1 is wet ground and fermented overnight which can be steamed to make idli or baked on hot pan to prepare dosa or wet pan cakes. Non-conventional foods like flakes, extruded products or by par boiling of millets, popping and malting, products can be prepared from millets. Flakes are prepared by soaking pearled millets

in water and then steamed under pressure for complete gelatination of the starch and dried to about 18% moisture.¹ Then they are pressed to requisite thickness between heavy duty rollers and dried to prepare flake. Assam and Bihar have highest consumption of small millets and finger millets. Madhya Pradesh has highest area of small millets followed by Chhattisgarh, Uttarakhand, Maharashtra, Gujarat and Tamil Nadu.¹⁶

CONCLUSION

Since they are consumed with different names in different areas it is difficult to find out and match all the types with ancient names to millets available in market. Millets commonly found in market and consumed are few of them like sorghum, Bajara/pearl millet, finger millet/Ragi, Proso millet/ Varai, Barnyard millet/Sama and kodo millet, foxtail millet (Kangani / kangu), little millet.

As per Acharya Charak, though *koradush* etc are called *kapha pitta nashak* yet if someone eat *nishpav*, *kanji* after *yavak*, *uddalak*, *koradush* it is said to be *pittaprapakopak*.

Millets can be good for many chronic, metabolic and lifestyle disorders like Obesity, Diabetes, Coronary heart disease, Cancer, Oxidative stress, Cardiovascular disease, Gastro intestinal disorders etc.¹⁷ They also work as detoxifying agents too. Hence cultivation and consumption of millets should be promoted in present era for prevention of these disorders.

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