Available online at www.ijpcr.com
International Journal of Pharmaceutical and Clinical Research 2014; 6(1): 54-62

ISSN- 0975 1556

Review Article

Special Medicinal Implications of *Navadhanyam*

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Available online: 1st January 2014

ABSTRACT

Food is the basic necessity of man. It is a mixture of different nutrients such as carbohydrate, protein, fat, vitamins and minerals. These nutrients are essential for growth, development and maintenance of good health throughout life. Traditional medicine such as Siddha and Ayurveda considers food as medicine and medicine as food. The main motto of this traditional medicine is prevention of diseases rather than its cure. The system believes that proper intake of nutritious food supplements can prevent the mankind from dreadful diseases. These *navadhanyam* play a vital role in meeting the special needs of pregnant and lactating women and patients recovering from illness. The present study deals with the comprehensive review of the nutritive importance and therapeutic value of *navadhanyam*.

Key words: Navadhanyam, Cereals, Millets, Pulses

INTRODUCTION

The man of yonder years was unaware of many of the most prevalent diseases of today. The humanity suffers to the core from the bonds of these novel diseases. Our food habit is the soul significant reason for this plight. Our ancestors lived completely in harmony with nature with clean air and water, unadulterated and nutritious food.

Of late, we consume lot of polished rice, fast food and preserved foods. They confuse our biological clock and subsequently all the physiological processes are disrupted. Our forefathers had never consumed food for taste but for appetite. They added taste with nutrition in their diets. They included cereals, millets, pulses, fresh fruits and vegetables. Each item had its own characteristic special feature adding good value to the food. If any one of the components is consumed in excess then it turns out into poison.

But if taken in appropriate proportion, then it serves as a well balanced, nutritive and healthy meal. This meal consists of consuming following cereals, major and minor millets in a sequential, proportional and regular basis. These cereals and millets are collectively called as *Navadhanyam*.

Except maize all other cereals and millets can be soaked overnight in water and can be consumed the next day as sprouts. Hence the dietary fibers, vitamins and minerals are preserved such without decomposition and degradation. Moreover in the recent days the young seedlings of cereals and millets before maturation are harvested processed and consumed as grains.

Eg – Wheat grass, Millet grass etc. They provide balanced diet with appreciable nutrients.

This article describes about the special medical implications of each of the above listed *navdhanyam.*

Kezhvaragu

Finger millet/Ragi is originally native to the Ethiopian highlands and was introduced into India approximately 4000 years ago (D'Anrea et al., 1999). It is very adaptable to higher elevations and is grown in the Himalaya up to 2,300 metres in elevation.It is commonly known as poor man's millet owing to its hardiness to survive even in extreme vagaries of climate. The botanists name it as Eleusine coracana.

Related Cognates in other Indian languages: Murugesa mudaliar(1988a)[1] lists out about the various related cognates for finger millet in other Indian languages as below:

English-	Figer millet
Hindi-	Mandua, mandal
Sanskrit-	Rajika
Bengaly-	Marua
Gujarati-	Bavto,nagli
Maratti-	Nagli,nachoni
Telungu-	Ragulu
Kanada-	Ragi
Malayalam-	Muttari

Medicinal implications of Finger millet: The following points are the special highlights about the significant medicinal properties of finger millet that is known widely even to a common man.

1. Gives valour and strength to physique.
2. Maintenance of strength without tiredness
3. Increases body temperature.
4. Increases urination.
5. It is not easily digestible, hence normally consumed by hard manual laborers.

The bran of finger millet causes indigestion hence it needs to be soaked, powdered and the bran/husk is removed, then it is dried and consumed to prevent indigestion problems.

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List of *Navadhanyam*:[5]

S.No	Cereals (tamil cognates)	English Name	Botanical Name
1.	Kezhvaragu	Ragi	*Eleusine coracana*
2.	Kambu	Pear millet	*Pennisetum typhoides*
3.	Cholam	Maize	*Andropogan sorghum*
4.	Samai	Millet	*Panicum miliaceum*
5.	Thinai	Italian millet	*Panicum ittalicum*
6.	Nel	Paddy	*Oryza sativa*
7.	Gothumai	Wheat	*Triticum vulgare*
8.	Varagu	Little Ragi	*Paspalum scrobiculatum*
9.	Kudirai vaali	Banyard millet	*Echinochloa frumentacea*

If diabetic patients consume dosa or porridge made of finger millet, the diabetic level can be controlled (Murugesa Mudaliyar, 1988a)[1]. The above said same author highlights that if finger millet is consumed with sugar and milk as porridge, then the sick people revive their strength and energy. In the above said method, constipation is encountered. In order to overcome this raisins are soaked in hot water and can be consumed along with finger millet porridge. In addition, as a remedy for boils, he has mentioned that finger millet dough is made as a paste and applied over the boils to rupture the boils. It has also been reported that finger millet is ground as flour and boiled with salt and jaggery and consumed as breakfast, then the body weight is reduced.

The nutritional composition of Finger millet: The secret and success of above quoted medicinal properties lies in the nutritive value imbibed in this finger millet

Water – 12 gm
Protein – 7.3 gm
Fat – 1.3 gm
Minerals – 2.2%
Carbohydrate – 72 gm
Calcium – 0.33 %
Phosphorus – 0.27 %
Iron – 5.4 %
Vitamins – 140 IU
Energy – 328 Kcal [8]

Nutritive value of finger millet is higher than that of rice and equivelent to that of wheat. It is rich in calcium, phosphorus, iron etc. The calcium content of finger millet is higher then all the cereals and millets and the iodine content is said to be the highest among all the food grains. The average protein content of finger millet is 9.8% along with the presence of ammino acids, Vitamin A, Vitamin B and phosphorus.[9]

Ragi has the potential to improve nutrition, boost food security, foster rural development and support sustainable landcare (National research council, 1996).

Oryza sativa Paddy: It is known that Paddy is a commonly cultivated crop in the countries such as India, China, Burma and South east countries. About 2/3 rd of worlds' population consumes rice as staple food. In ancient Tamil literatures, rice is quoted by synonyms such as "Thorai, Vai, Sali and Vari.[19] Its botanical name is Oryza sativa.

Related cognates in other Indian languages:

Tuk tuk Kumar (1989) also enlists the different related cognates to Rice in various Indian languages in his book "History of rice in India".[30]

English - Paddy (the de-husked seed is called rice)
Hindi - Chaval
Sanskrit - Vrihi
Arab - Arruz
Dutch - Dhan
Telungu - Vari
Kanada - Bhatha
Malayalam - Nella

In the ancient Tamil literatures such as" Mukkoodal pallu", some of the names of rice lard races are mentioned. The name of the ancient rice varieties are highlighted as below which has been mentioned in Agasthiar gunapadam and has been quoted by Murugesa mudaliar (1988b)[1]

KarArisi- Kuruvai samba
Eeerku samba- Punugu samba
Korai samba- Kurunchamba
Milagu samba- Seeraga samba
Kalan samba- Mai samba
Kodai samba- Kadai samba
Malligai samba- Eluppai samba
Mani samba- Valaithadi samba
Kaivarai samba- Gundu samba
Kallundai samba- Senchamba
Gundumani samba- Annamazhagi

Medicinal implications of Paddy: The following medicinal implications of different ancient varieties of paddy have been well described as follows in Agasthiar gunapadam. The rice of parboiled paddy is called as Parboiled rice and this imparts strength and valour. More over Vatha patients and Children are much benefited by it. Old stock parboiled rice makes the body cool.

But new stock of parboiled rice does not impart strength. It has been quoted that it is not good to consume unboiled rice during treatment because it induces flatulence. It is a

Eleusine coracana

Oryza sativa

Panicum miliaceum

Setaria italica

Paspalum scrobiculatum

Pennisetum typhoides

Andropogan sorghum

Echinochloa frumentacea

Triticum vulgare

source of energy and strength. It reduces physiological irritations. Regarding Kar arisi, it has been cited that it is of damp in nature. It strengthens physique and improves stature. But it increases vata dosham.

This leads to Eczema. In continuation to samba rice varieties, Agasthair has mentioned that all samba varieties are good to health. Varieties such as maisamba, ilupaisamba, valaithalaisamba, sensamba and kundu samba cause vata and eczema. Where as other varieties are healthy to consume.

Moreover, the medicinal uses of rice depend upon the mode of recipe preparations. Hence, the great Agasthiar has noted that if the rice is boiled with copious water and if the strain is collected, then it can be consumed as healthy porridge. Burning urination, ulcers, fever, indigestion and loss of appetite can be treated efficiently when this porridge is consumed.

Moreover if rice is added with the porridge and consumed, then the body heat subsides. But it increases body weight.

Intake of rice boiled with milk improves seminal fluid secretions apart from reducing body heat. Rice with horse gram porridge is also good for health (Murugesa mudaliar1988b)[1]

The Therayyar gunapadam edited by Murugesa mudaliar (1988b)1reveal about various rice delights such as Popped rice, pop rice balls, rice flour, rice flour paste, dosa, idly, puttu, murukku, thenkuzhul, athirasam etc. which are good for health.

Rice dishes like kozhukattai leads to gastric troubles but reduces body heat appreciably. Therayyar also points out about the goodness of rice flakes can be relished if paddy is soaked, dried slightly, strained and fibally pounded to separate rice and husk. These flat flakes are called as rice flakes.

Digestive disorders such as dysentery diarrhea abdominal pain and intestinal problems etc. can be cured if rice flakes is boiled and the water is filtered and drunken. Body gains strength and valour if rice flakes is consumed with milk or ghee.

Body fatigue and thirst decreases when rice flakes is consumed along with buttermilk but if consumed with curd then docility results. If taken with tamarind it decreases

pitta dosham and with water increase gas troubles. Rice flakes contain comparatively high percentage of iron, fat and minerals than rice.

The significant literary work of Agasthiar also has quoted about Neeragaram (Rice extracts). Rice soaked overnight in water leaves out water extract of the rice in the morning which is known as neeragaram (neer + agaram = water + food). Rice extracts increases strength and valour.

He also has highlighted that rice recipes like milk rice, ghee rice, oil rice, curd rice, rice cooked with non-vegetarian food items, buttermilk rice, cold rice (rice soaked in water overnight), pongal, milagu (pepper) pongal. Tamarind rice, mustard rice, lemon rice and black gram rice (ulunthothanam) etc. are good for health. Pertaining to unboiled rice, it increases power and strengthens the body.

A noteworthy point is that Agsthiar gunapadam highlights about the ill effects of uncooked rice. Both under cooked and overcooked rices are not good for health. Very hot rice consumption leads to constipation, indigestion, etc. Rotten rice consumption leads to mental numbness, vata, pitta and kapha disorders. It is to be noted that either parboiled rice or unboiled rice or rice flakes doesn't contain fiber contents

Nutritional composition of parboiled rice:

Water- 11.62%
Carbohydrate - 79.1%
Protein- 7.13%
Fat - 0.66%
Minerals - 0.8%
Fiber - 0%
Vitamin B - 13%
Energy- 345 K cals 10

Nutritional composition of 100 gm of rice flakes:

Water- 12.2%
Carbohydrate - 27.29 gm
Protein- 6.78 gm
Fat- 16.90gm
Minerals - 1.8%
Fiber- 3.34gm
Calcium- 22.55 mg
Iron - 6.25mg
Vitamin c- 0.19mg

100 gm of rice flakes release 340 calories of energy.[11]

Nutritional composition of 100 gm of rice:

Water- 13%
Carbohydrate - 77.4gm
Protein - 8.5 gm
Fat- 0.6gm
Minerals - 0.9gm
Fiber- 0.2gm
Calcium - 10mg
Iron- 2%
Vitamin B- 20 IU

100 gms of unboiled rice gives 343 calories of energy.[15]

Panicum miliaceum

Samai

This is commonly called as proso millet which had originated in China and has reported entered India through Himalayan foot hills route [20]

The botanical name is Panicum miliaceum. Proso millet is also known as common millet, broom corn, hog millet or white millet. Both the wild ancestor and the location of domestication of proso millet are unknown, but it first appears as a crop in both Transcaucasia and China about 7,000 years ago, suggesting that it may have been domesticated independently in each area. It is still extensively cultivated in India, Russia, Ukraine, the Middle East, Turkey and Romania. In the United States, proso is mainly grown for birdseed. It is sold as health food and due to its lack of gluten it can be included in the diets of people who cannot tolerate wheat

Related cognates in other Indian languages: Murugesa mudaliar(1988c)[1] lists out about the various related cognates for proso millet in other Indian languages as below:

English- Millet
Hindi- China
Sanskrit- China
Telungu- Chema dhanyam
Malayalam- Chama

Agasthiar gunapadam has stated that samai imparts strength to body and increases the body mass. Proso millet is cooked and consumed like rice which reduces vatha. Proso millet porridge cures anemia and acts as an expectorant etc. If proso millet is made as a paste and applied around skin edematous swellings, then it is cured. Proso millet porridge intake increases body strength and glamour. Also it relieves intestinal disorders and white discharges etc. But if proso millet is consumed excessively, then it rapidly increases body heat.

Prosomillet is well adapted to many soil and climatic conditions; it has a short growing season, and needs little water. The water requirement of proso is probably the lowest of any major cereal. It is an excellent crop for dry land and no-till farming. Proso millet is an annual grass whose plants reach an average height of 100 cm (4 feet.) The seedheads grow in bunches. The seeds are small (2-3 mm or .1 inch or so) and can be cream, yellow, orange-red, or brown in colour. Proso is an annual grass like all other millets, but it is not closely related to pearl millet, foxtail millet, finger millet, or the barnyard millets.

Nutritional composition of 100 gm of Samai:

Water - 11.9%
Starch - 68.9%
Protein - 12.5%
Fat - 1.1%
Minerals - 3.4%
Fiber - 2.2%
Calcium - 0.02%
Iron - 5.7mg
Vitamins - 1.88mg

Consumption of 100 gm of proso millet gives 293 calories of energy.[16]

Setaria italica

Tinai

Foxtail millet (botanical name Setaria italica) is the second most widely planted species of millet, and the most important in East Asia. It has the longest history of cultivation among the millets, having been grown in China

since sometime in the sixth millennium BC. Other names for foxtail millet include Italian millet, German millet, Chinese millet, and Hungarian millet. Foxtail millet is an annual grass with slim, vertical, leafy stems which can reach a height of 120-200 cm (4-7 feet.) The seedhead is a dense, hairy panicle 5-30 cm (2-12 in.) long. The small seeds, around 2 mm (less than 1/8 in.) in diameter, are encased in a thin, papery hull which is easily removed in threshing. Seed color varies greatly between varieties. In India: Tinai, samai, kavalai, kambankorai are some of the names for millet in Tamil.Nuvanam is millet flour. The gruel made from millet, the staple of Ancient Tamils, is called kali, moddak kali, kuul, and stagnates.[17]

Related cognates in other Indian languages:

Murugesa mudaliar (1988d)[1] lists out about the various related cognates for foxtail millet in other Indian languages as below:

English- Italian millet
Hindi- Samak dana
Sanskrit- Kanku
Telungu- Korralu
Kanadam- Kavane akke
Malayalam- Thina

In Tamil foxtail millet is also denoted by terms such as Eradi, Eelai, Kangu. Foxtail millet flour imparts strength. According to Therayer Karisal (It is a practical guide to siddha medicine) it has been clearly mentioned that foxtail millet flour strengthens physique.

According to Murugesa mudaliar (1988e)[1] Therayyar Karisal and Agsthiar gunapadam has notified about various medicinal implications of this millet. Foxtail millet increases body appetite. It is made into flour and consumed. Consumption of foxtail millet flour made into balls with sugar syrup reduced to kapha diseases like cold and asthma. It is a traditional customary practice to give foxtail millet porridge to women who had labouredly to deliver baby. Consumption of foxtail millet as food definitely increases strength and stamina. In general, 'foxtail millet food' restores strength and valour, clears off kapha, reduces gastric disorders. Moreover, its flour porridge reduces swellings. They (Agasthiar and therayyar) have also quoted that as foxtail millet increases body heat, it is good to intake in limited quantities during summer.

The nutritional composition of 100 grams of foxtail millet:

Starch- 84.2
Protein- 10.7
Fat- 3.3
Water- 0
Minerals- 3.27%
Fibre- 1.4
Calcium- 37mg
Iron - 6.2mg
Vitamin B- 0.48mg

Consumption of 100 gram of foxtail millet gives 295 calories of energy.[18]

Paspalum scrobiculatum
Varagu

KodoMillet (Paspalum scrobiculatum) is a minor grain crop in India, generally cultivated in Gujarat, Karnataka and parts of Tamil Nadu. It has great importance in the Deccan Plateau. This annual tufted grass grows to 90 cm high. Depending on panicle characters, Kodo is classified into the groups Haria, Choudharia, Kodra and Haria-Choudharia. Its some forms have been reported to be poisonous to humans and animals, due to fungus infection in the grain. Kodo may vary in color from light red to dark grey.[19]

Kodo millet is the smallest millet cultivated in south India. It is also called as 'Little ragi'. Its botanical name is Paspalum scrobiculatum

Related cognates in other Indian languages: Murugesa mudaliar(1988e)[1] lists out about the various related cognates for kodo millet in other Indian languages as below:

English- Little ragi
Hindi- Varagu
Sanskrit- Varagu
Telungu- Orragu biyyam
Kanadam- Bhatha
Malayalam- Nella

According to Murugesa mudaliyar (1988f)1,Therayyar karisal has brought out the medicinal facts on kodo millet that consumption of kodo millet grains as food increases the secretion of bile juice and there by stimulates appetite. If kodo millet is consumed excessively, then it results in rashes, boils, and increased pitham. Therayyar karisal has cited that if kodo millet is consumed excessively then it aggravates the disease of the patient. Similarly, in Agasthiar gunapadam, it has been mentioned that over-consumption of kodo millet leads to incidence of skin dryness, itching, scabies and pitha related diseases.

Kodo millet: Kodo millet, Paspalum scrobiculatum L., is a minor grain crop in India but is of great importance in the Deccan Plateau. Its cultivation in India is generally confined to Gujarat, Karnataka and parts of Tamil Nadu. It is classified into the groups Haria, Choudharia, Kodra and Haria-Choudharia depending on panicle characters. Kodo is an annual tufted grass that grows to 90 cm high. Some forms have been reported to be poisonous to humans and animals, possibly because of a fungus infecting the grain. The grain is enclosed in hard, corneous, persistent husks that are difficult to remove. The grain may vary in colour from light red to dark grey.[20]

Nutritional composition of 100 grams of kodo millet:

Starch- 66.6 gm
Protein- - 9.8gm
Fat - 3.6 gm
Fibre- 5.2 gm
Calcium- 35 mg
Iron - 1.7 mg
Vit C- 2.24mg

Consumption of 100 grams of kodo millet yields 353 K.Cal of energy.[21]

Kodo millet was domesticated in India almost 3000 years ago. It is found across the old world in humid habitats of tropics and subtropics. It is a minor grain crop in India, and an important crop in the Deccan plateau. The fibre content

of the whole grain is very high. Kodo millet has around 11% protein, and the nutritional value of the protein has been found to be slightly better than that of foxtail millet but comparable to that of other small millets.

As with other food grains, the nutritive value of Kodo millet protein could be improved by supplementation with legume protein.On the basis of inflorescence morphology the species Paspalum scrobiculatum is divided into three races Regularis, Irregularis and Variabilis.

At the ICRISAT genebank, 658 Kodo millet germplasm accessions from two countries are conserved for utilization in research and development.[22]

Pennisetum typhoides

Cumbu

Botanically this millet is called as 'Pennisetum typhoides' and popularly known as "Pearl millet'.It is the most widely grown type of millet. Grown in Africa and the Indian subcontinent since prehistoric times, it is generally accepted that pearl millet originated in Africa and was subsequently introduced into India. The earliest archaeological records in India date to 2000 BC, so domestication in Africa must have taken place earlier. Its origin has been traced to tropical Africa.23

Related cognates in other Indian languages: Murugesa mudaliar(1988g)[1] lists out about the various related cognates Pearl millet in other Indian languages as below:

English- Pear millet
Hindi- Bajra
Sanskrit- Bajri
Telungu- Sajjalu
Malayalam- Kambu
Kanadam- Sajje

It gives strength to body. The purification action of Pearl millet on physiological systems of the body has been quoted in Therayar kappiyam. Moreover, it has been mentioned in Agathiar kunapadam that Pearl millet reduces body heat and cools down body. It also adds strength to body. If Porridge of Pearl millet is mixed with butter milk (or) curd and drunken everyday morning, then chest burning sensation are reduced. Piles can be cured if Pearl millet flour mixed with water is applied over the anal region regularly. Murugesa mudaliyar (1988h)[1] has explained about the medicinal properties of Pearl millet as per agasthiar's version. If Pearl millet is consumed above the prescribed limits, then it leads to rashes, skin diseases, cough and wheezing etc.

Nutritionally composition of 100 grams of Pearl millet

Protein - 7.3 gm
Fat - 5gm
Starch - 67.5gm
Water - 12.4 %
Minerals- 2.3 gm
Calcium - 42 mg
Iron - 8.8 %
Fiber- 1.2gm
Vitamin C - 10 IU

Consumption of 100 gms of cumbu gives 361 K.Calories of energy.

If we consume in the form of sprout it gives the same nutritional values.[24]

Andropogan sorghum

Cholam

This millet is an important south Indian crop. Since it has been cultivated to a larger extent in South India, the name chola mandalam was in vogue. Since it grows in dry tracts with minimal irrigation facilities, it is considered as poor man's food. It is popularly called in English as 'Maize' or 'Corn'. The commonly consumed maize bears the botanical name as 'Zea mays"

Related cognates in other Indian languages:

Murugesa mudaliar (1988i)[1] lists out about the various related cognates for Corn in other Indian languages as below

English- Maize
Hindi- Makai Ka Atta
Sanskrit- Joornakam
Telungu- Jonna
Kanadam- Jola
Malayalam- Cholam

Types of Cholam:

Murugesa mudaliar (1988j) 1 enlists about the following types of Corn.

1. Karuncholam(Block colored)
2. Sencholam(Red colored)
3. Kakkaicholam(Jackdaw colored)
4. Makkacholam(yellow colored)
5. Vellai (or) Muthucholam(Pearl colored)

Amidst these, Makkacholam is superior and can be consumed as food.

Agasthiar gunapadam delineates about the goodness of Corn / as follows. Corn / cholam flour can be made as a paste and consumed to gain strength and improve austerity. The stalk of corn can be made into decoction and can be given for curing urinary infection and urinary problems. After removing the grains, the cobs are incinerated into ash and if this ash is given along with salt, then it controls cough, whooping cough etc. The straw of Corn is sweet. So, it is popularly used as cattle feed to increase milk secretion. Corn is popped, ground into flour and mixed with sugar which is a healthy supplement. It is not good to eat sprouted corn which leads to indigestion and flatulence. Excess consumption of Corn leads to skin diseases and reduces the potency of medicines.

Nutritional composition of 100 gms of Cholam:

Starch - 72.6gms
Protein- 11.4gms
Fat - 2.8-3.18 gm
Water - 11.9 %
Minerals - 1.6gm
Calcium - 26mg
Iron - 5.8mg
Vitamins - 115 IU
Fibe - 1.6gm

Consumption of 100 grams of cholam yields 342 calories of energy[25,3]

Echinochloa frumentacea

Kudiraivalli

Barnyard millet is the fastest growing millet and its origin is probably in eastern India. It is grown in India, china and Japan as a substitute crop when paddy fails. Botanically it

is called as 'Echinochloa frumentacea' and popularly known as in English-Barnyard millet. Echinochloa frumentacea' is considered to have originated either from 'Echinochloa colonum' or'Echinochloa crus-galli' and possesses characters intermediate between the two. It has often been treated as a variety of 'Echinochloa colonum' or 'Echinochloa crus-galli'. 'Echinochloa frumentacea' is one of the less important millets of India and except in a few areas, its importance as a food crop is limited. It is the quickest growing of all millets, coming into maturity, under favourable conditions, in about six weeks after sowing. The millet is cultivated in almost all the states in India as a rain fed crop. It is a robust tufted annual, 2-4 ft. high, with broad leaves, large spikelets and small, smooth, shining seeds, rounded at the base and sharp at the apex. It is cultivated over the grater part of India and Himalayas up to 6500ft.

The millet is consumed mostly by the poorer classes either cooked in water like rice, or parched or boiled with milk and sugar. It is sometimes mixed with rice and fermented to give a beer. The grains are also used for feeding cage birds.

Related cognates in other Indian languages:

Hindi-	Sanwa,Shamula,sawa,shama
Bengali-	Shamula,sanwa,syama dhan
Gujarati-	samo,samo ggas
Marati-	Janglisama,samul
Telungu-	Bontashama,Bonta chamalu, oddalu
Kanada-	samai ,savai
Punjab-	sawank, sanwak[13]

The grain gave the following values:

Protein -	6.2%
Fat -	0.5%
Starch -	65.5%
Water -	11.1%
Mineral -	4.4%
Fiber-	9.8%
Calcium -	0.02%
Phosphorus -	0.28%
Iron -	2.9 mg
Carotene -	Trace[14]

The principal protein is a prolamine rich in lysine, cystine and histidine, with a nutritive value markedly superior to that of polished rice and

3 parts of the millet provided favorable nutritive balance. The presence of vitamin B1 in sufficient amounts to prevent vitamin B1 deficiency has been demonstrated. Glutelin and albumin are the principal protein of the bran.

Analysis of dry roughage gave the following values:

Dry matter-	88.9
Protein -	5.6
Fat -	1.1
Starch -	65.5%
Mineral -	7.2
Fiber -	36.3
CaO -	0.30
P2O5 -	0.19
K2O -	1.73

As a cattle fodder the straw is considered inferior to ragi and paddy straw in Mysore and Madras[26]

The plant is sweet, acrid, oleaginous, cooling and digestible. It is said to be useful in biliousness and constipation[27,28]

Triticum vulgare

Gothumai

It is known that Wheat is a commonly cultivated crop in the Indian states like Panjab, Rajasthan and Maharashtra areas. It is an important food dish to North Indians. About2/3rd of worlds' population consumes wheat as staple food. Broken grains of wheat and flour are used for preparing food varieties. In ancient Tamil literatures, wheat is quoted by synonyms such as "Yavai and Gothumpai". Its botanical name is Triticum vulgare. Wheat gives strength, increase spermatogenesis and improves body temperature.

Related cognates in other Indian languages: Murugesa mudaliar (1988k)[1] lists out about the various related cognates for wheat in other Indian languages as below

English- Wheat

Hindi-	Gehum
Sanskrit-	Godum
Arab-	Hintah
Pers-	Gandum
Telungu-	Godumulu
Kanadam-	Gothi
Malayalam-	Kothampam

Types of Wheat:

Murugesa mudaliar (1988l)[1] quotes about different varieties of wheat that are cultivated. They are

Samba varieties

Flour varieties

Long tail varieties

However, their qualities are more or less the same. They are sweet in taste, Cold in potency with the qualities of hardness, stability and greasiness.

The following novel medicinal properties of wheat have been discussed in detail by Agasthiar in Agasthiar gunapadam and have been cited by Murugesa mudaliar (1988m)[1]. It is cooked with water and consumed. This cures three thosha diseases, running nose and respiratory problems. It gives strength to our body.

Wheat adai prepared from the flour. It is also a nutritious one and gives strength, induces appetite, increases seminal fluid and reduces respiratory problems. For Diabetic patients, it is good to prepare chapatti from the flour and is used for gastric ulcer and blouching.

Wheat gruel is the best diet during fever. This causes excessive menstrual flow in ladies and also in diseased persons. For the arthritis patients the wheat is fried, mixed with honey and given for increasing bone strength. We can use this flour externally to treat diseases like Herpes, wounds, inflammation, fire wounds etc.,

Wheat kali (semisolid-halva like) is prepared and applied to the boils and tumors. For summer heat boils

Wheat flour and rice water mix is used .The wheat seeds are soaked in water and ground. Then the juice is collected which is called as "Wheat milk" and is used to treat tuberculosis patients. We can also prepare sweet halva from this. Wheat grass has rich fibers and protein. If it is given to children and patients, it improves health and

controls body sugar levels thereby reducing blood cholesterol.

Nutritional composition of 100 gms of wheat whole:

Starch - 71.2 gm
Protein - 11.8 gm
Fat - 01.5 gm
Water - 12.8 %
Minerals - 1.5%
Fibers- 1.2%
Calcium - 41 mg
Iron - 5.3%
Vitamins - 180 IU

Consumption of 100 grams of wheat yields 346 K.Calories of energy.[24]

Nutritional composition of 100 gms of Wheat flour:

Starch- 69.4gm
Protein - 12.1 gm
Fat - 1.7 gm
Water- 12.8%
Minerals - 2.7gm
Calcium - 48mg
Iron - 5.3%

Consumption of 100 grams of Wheat flour yields 341 calories of energy.[24]

Wheatgrass:

Wheatgrass refers to the young grass of the common wheat plant, Triticum aestivum, that is freshly juiced or dried into powder for animal and human consumption. Both provide chlorophyll, amino acids, minerals, vitamins, and enzymes. Claims about wheatgrass's health benefits range from providing supplemental nutrition to having unique curative properties. Some consumers grow and juice wheatgrass in their homes. It is often available in juice bars alone, or in mixed fruit and/or vegetable drinks. It is also available in many health food stores as fresh produce, tablets, frozen juice and powder.

The consumption of wheatgrass in the Western world began in the 1930s as a result of experiments by Charles F. Schnabel and his attempts to popularize the plant. Schnabel, an agricultural chemist, conducted his first experiments with young grasses in 1930, when he used fresh cut grass in an attempt to nurse dying hens back to health. The hens not only recovered, but they produced eggs at a higher rate than healthy hens. Encouraged by his results, he began drying and powdering grass for his family and neighbors to supplement their diets. The following year, Schnabel reproduced his experiment and achieved the same results. Hens consuming rations supplemented with grass doubled their egg production. Schnabel started promoting his discovery to feed mills, chemist and the food industry. Two large corporations, Quaker Oats and American Dairies Inc., invested millions of dollars in further research, development and production of products for animals and humans. By 1940, cans of Schnabel's powdered grass were on sale in major drug stores throughout the United States and Canada.

Dosage and usages:

The average dosage taken by consumers of wheatgrass is 3.5 grams (powder or tablets). Some also have a fresh-squeezed 30 ml shot once daily or for more therapeutic benefits a higher dose up to 2–4 oz taken 1-3 times per day on an empty stomach and before meals. For detoxification, some users may increase their intake to 3–4 times per day. It should be noted that consumers with a poor diet may experience nausea on high dosages of wheatgrass. Outdoor wheatgrass is harvested for a few days each year from plants grown in the "bread basket" regions of the US and Canada. Winter wheat requires more than 200 days of slow growth in cold temperatures to reach the peak nutritional content. Even after that length of time, the plant is only 7 to 10 inches high.

Nutritional composition of 100 gms of Wheat grass

Protein - 860mg
Beta- 120 IU
Vitamins E - 880Mcg
Vitamins C - 1mg
Vitamins B12 - 0.30Mcg
Phosphorus- 21mg
Fibers - 1.2mg
Calcium - 7.2mg
Iron - 0.66mg

Consumption of 100 grams of wheat yields 346 K.Calories of energy.

Proponents of wheatgrass claim regular ingestion of the plant can improve the digestive system, prevent diabetes and heart disease, cure constipation, detoxify heavy metals from the bloodstream and promote general well-being. While none of these claims have been substantiated in the scientific literature, there is limited evidence in support of some of these claims.[29]

CONCLUSION

Navadhanyam are foods that provide essential nutrients to the human body. Traditionally, these were consumed as whole grains. But most current foods are derived from refined fractions of cereals and pulses. Consumption of processed or refined products may reduce the health benefits of food. *Navadhanyam* contains the majority of the health beneficial components. These components have been shown to reduce the risk of major chronic diseases of humans.

ACKNOWLEDGEMENT

The authors wish to place their deep sense of gratitude to The Vice – Chancellor, SASTRA University and The Associate Dean and Coordinator, Centre for Advanced Research in Indian System of Medicine (CARISM), SASTRA University, Thanjavur for their support and encouragement. Special thanks to Dr. A. Sathya, Assistant Professor, Department of Civil Engineering, SASTRA University, Thanjavur for her valuable suggestions and corrections.

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