

## AYURVEDIC REVIEW ON GUDA (JAGGERY)

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### Abstract:

Guda (Jaggery) is one of the major plant products which are easily available in the markets. It is mainly prepared from the sugarcane. Jaggery is a popular food material and an important raw drug used in Ayurveda for therapeutic and pharmaceutical purposes. It is generally prepared from sugarcane and also from palm, coconut, date etc. Jaggery is widely used in pharmaceuticals in the preparation of Ayurvedic dosage forms such as avaleha, vataka, guda, Arishta, Asava, gudika etc.- There are many forms of jaggery available in the market. The present work was undertaken to review the Ayurvedic and modern understanding about guda (jaggery) from different levels of classics and it comprises of a detailed review of all the available literature on the guda.

Key words : guda, jaggery, sugarcane

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## INTRODUCTION

Ayurveda gives much importance to Guda (Jaggery). Jaggery is a traditional product of sugarcane.<sup>[1]</sup> Jaggery is popularly known as "Medicinal Sugar" among sugar industries in India. It has various health benefits to help in the overall wellness of a person. Jaggery is a pure, wholesome, unrefined sugar which contains the natural goodness of minerals and vitamins produced from sugarcane. It is a good source of minerals like Calcium, Iron, Phosphorous and Protein. Jaggery is a healthy alternative to white refined sugar. Jaggery is unrefined natural sugar that is produced without adding any chemicals. More than 70% of the total world jaggery production is from India. Guda (jaggery, vellum, bella), is the product obtained on concentrating sugarcane juice with or without prior purification, into a solid or semi solid state. Jaggery is prepared mainly from sugarcane juice. It is produced almost throughout India. The manufacture of jaggery holds a very important place in the rural India. Uttar Pradesh accounts for 45% of the total production of guda. The states like Maharashtra, Andra Pradesh, Karnataka and Tamilnadu, together account for 30% of the total production of our country.

Jaggery is nutritionally comparable with honey. It has been used as a sweetener in Ayurvedic Medicine for 3000 years. Indian Ayurvedic medicine considers jaggery to be beneficial in treating throat and lung infections. While refined sugar mainly consists of glucose and fructose, jaggery contains glucose and sucrose. But jaggery also has minerals and vitamins which lacks in the refined sugar. The mineral content of jaggery includes calcium, phosphorus, magnesium, potassium, iron, traces of zinc and copper. The vitamin content includes folio acid and B-complex vitamins. It is a good source of energy; it also prevents rheumatic afflictions, prevents disorders of bile, helps in relieving fatigue, relaxation of muscles, nerves and blood vessels, maintains blood pressure and

reduces water retention, increases haemoglobin level and prevents anaemia. Bakery and confectionery products made out of jaggery are furnished with nutrients, vitamins, and proteins. It forms an important item of Indian diet. It is used as a media for the preparation of different Ayurvedic formulations. Hence in the present study a detailed review about guda and its various informations are compiled from various classics

## Review on guda

Guda or jaggery is one among our important food materials. It has vital role in the medicinal field. Jaggery provides an alternative market to sugarcane growers.

About 26% of the sugarcane produced is diverted for jaggery production. The quality of the jaggery is dependent on the cane juice which in turn is determined by the variety and the environment in which the cane is grown.

## Etymology

Guda bestane - Substances which is wrapped or surrounded

Gudathi vestayadi swam ikshor gunnei - madhuryadibhi swakeeyaha swatantraihi api ithi (which means with all gunas of sugar cane juice and particular gunas of guda itself).<sup>[2]</sup>

## Synonyms of guda

Synonyms of guda are

- Sisupriya - as it is liked by the children
- Rasapakaja - as it is formed as a result of boiling of cane juice
- Ikshurasa - as it is mainly prepared from juice of sugarcane
- Aruna - as it has got reddish brown colour on boiling the cane juice
- Madhura - indicates it has sweet in taste
- Rasaja - as it is produced from juice

## Method of preparation

Sugar cane juice well cooked till it becomes hard is known as guda. In gauda desa, matsyandika itself is known as guda. Charaka mentioned about gudam and ksudra gudam. Acharya also mentioned that the cane juice remained one fourth, one third and half in the process of boiling is heavy in the proceeding order.

Guda is the cleaned portion having little mala or impurities. There after by gradual elimination of mala, matsyandika, khanda and sarkara (white sugar) emerges. Sheetatwam (Cold) appears in them subsequently as their mala is eliminated.<sup>[3]</sup> Different types of gudas are explained in different classical texts such as Naveena guda, Purana guda, Prapurana guda, Dauta guda, Adauta guda etc.

Properties of guda explained in different classics are tabulated in Table 1. Acharyas again classified it as guda and kshudra guda on the basis of the quality. According to charaka samhita the acharya says kshudra guda produces krumi, majja, raktha, meda, mamsa. Different opinions of the acharyas are tabulated in Table 2.

## Types of gudas

1. Purana guda (Preserved jaggery)
2. Naveena guda (Freshly prepared jaggery)
3. Dauda guda (Impure jaggery)
4. Adauda guda (Pure jaggery)

## Purana guda

Guda which are preserved for long time are called Purana guda. It is superior in qualities and said to be very suitable for health and with rasayana properties. Kaiyadeva Nighantu considered, one year old guda as Purana guda and above 3 years old guda as Prapurana guda. Prapurana guda is indicated in sandhana kalpana. The guda above 4 years is considered

as veeryaheenam and nishphalam because it is swacham and with durghandham, amla rasam and krumi. It may cause swasa, kasa and a good vaidya never use it.

Nighantu Ratnakaram<sup>[4]</sup> again mentioned about 1 year old guda, 3year old guda and above 3year old guda. Among which 1 year old guda is ruchikaram. patyam, agnideepanam, mutralam and mala sudhikaram, hrudayahitham swadhishtam, pushtikaram, rasayanam, laghu, snigdham, vrushyam, prameha haram, vrushyam, tridosaharam, pandu, sandapa and vatapittaharam. With other proper drugs, it can act as jivaharam also. 3 year old guda is laghu, sarvadoshaharam, srestam and best among Purana guda. It is used in arista kalpana. Above 3 years old guda becomes heena (poor in quality) guda. Properties of purana guda explained in different texts are mentioned in Table 3.

Besides the properties mentioned in table, with suitable drugs it can act as jwaraharam, santapasamanam, mutrasaya and malasayarogaharam, pandurogaharam and agnivaradhanam. Even it act as pramehasamanam with suitable drugs.

## Naveena guda

Freshly prepared guda (Jaggery) are Naveena guda. Properties of naveena guda mentioned in different texts are tabulated in Table 4.

Nighantu Ratnakara mentioned the properties of Naveena guda as madhura rasa, snidhasara gunam, ushna veeryam, pittajananam, vata kaphaharam, mutra sodhanam, vrushyam, sukra majja mamsa rakta karakam and kasa swasapaham. It is ahitha in Raktapitta doshas. Jaggery (guda) is divided into 2 on the basis of its purity. They are dhauta guda and adhauta guda. Differences in properties are mentioned in Table 5.

**Table 1: General properties of guda**

GUNAS	SS	BP	MPN	DN	RN	KN	SNB	SN	AC	YR	MDG
Madhuram	✓		✓	✓		✓				✓	✓
Sakshram	✓		✓	✓						✓	
Katuteekshnam						✓					
Jaggeryu		✓	✓	✓		✓	✓		✓	✓	
Snigham	✓	✓	✓				✓		✓		✓
Saram			✓								
Ushnam				✓		✓				✓	
Natiseetam	✓										
Madhurapaka				✓		✓					
Pittagham											✓
Vatagham											
Natipittagham	✓	✓					✓		✓		✓
Kaphakaram		✓		✓						✓	
Vatapittakaram				✓							
Mootrala sodhanam	✓						✓		✓		
Balaam	✓	✓	✓				✓		✓		
Vrusyam	✓	✓					✓		✓		
Agmkrut			✓								
Ruchyam							✓				
Brimhanam							✓				
Raktha sodhanam	✓		✓								✓

**Table 2: Properties of kshudra guda**

Text	Properties
C.S <sup>[5]</sup>	Produce krumi, majja, raktha, meda, mamsa
S.S <sup>[6]</sup>	Produce meda, kapha, krumi
BP <sup>[7]</sup> & MPN <sup>[8]</sup>	Produce kapha & krumi
AC <sup>[9]</sup> , SNB <sup>[10]</sup> & M.D <sup>[11]</sup>	Produce meda, kapha, krumi.

**Table 3: Properties of Purana guda**

Properties	AH	AS	SS	BP	MPN	DN	RN	KN	SN	SNB	YR
Madhuram				✓				✓		✓	✓
Laghu				✓	✓			✓			✓
Snigdham							✓			✓	✓
Tridosahara							✓			✓	✓
Pittagham				✓			✓			✓	✓
Vatagham				✓			✓			✓	✓
Anabhishtyandi				✓	✓			✓			
Rasayanam						✓					✓
Vrushyam				✓							
Hridayam	✓	✓			✓		✓	✓	✓	✓	✓
Pathyam	✓	✓	✓	✓	✓		✓	✓		✓	✓
Ruchyam							✓			✓	✓
Balyam									✓		
Sramaharam							✓				✓
Agnipustikaram				✓	✓			✓			
Arukprasadnam				✓							

SS – Susruta Samhita; BP – Bhavaprakasha; MPN – Madanapala Nighantu; DN – Dhanwanthari Nighantu; RN – Raja Nighantu; KN – Kaiyadeva Nighantu; SNB – Saligrama Nighantu Bhushan; SN – Sodhala Nighantu; AC - Ayurveda Chintamani; YR – Yoga ratnakara; MDG – Madhava dravyaguna; CS – Caraka Samhita; AH – Ashtanga Hridayam

**Table 4: Properties of Naveena Guda**

Properties	AH	AS	BP	SNB	SN	NR	AC
Sleshmakrut	✓	✓	✓	✓	✓		
Agnisadanam	✓	✓		✓	✓		
Agnideepanam			✓				
Swasakrut			✓			✓	✓
Kasakrut			✓				✓
Krumikrut			✓	✓		✓	✓

**Table 5: Differences in properties of Dhauta guda (impure jaggery) and Adhauta guda (pure jaggery)**

	Dhauta guda	Adhauta guda
AH	Dhauta guda causes mild increase of kapha and elimination urine and faeces	Adhauta guda increases intestinal worms, majja (bone marrow), asruk (blood), medomamsa (fat and muscle) and kapha.
AS	Same as above	Same as above
SS	Suddha guda mitigates pitta, vata, Raktaprasadana and madhura rasa	-----
KN	Natisleshmakaram, vataghnam, asrukprasadanam, swadipaka rasam, snigdham, sakrmutra anulomanam	Swadu, saksharam, vata pitta agnik snigdham, mutra rakta visodhana, medo mamsa krumi sleshma majja asruk I sukrakrut
SN	Natisleshmakaram, jaggeryu, susta mutra sakrut, madhuram, vatapittaghnambalyam, asruk prasadanam	Medo mamsa majja asruk karam, vrusyam, natipittakaram, snigdham, slest krumi pradam
NR	Rakta kapha krut, swadu, snigdham, vataharam, mala mutra marga pravartanochitham	-----

## Jaggery

It is defined as a honey brown colored raw lump of sugar. It is the natural mixture of sugar and molasses. It contains all the minerals and vitamins present in sugarcane juice and that is why it is known as healthiest sugar in the world.

### Vernacular names of Jaggery

Vernacular names of Jaggery are bella in Kannada, bellam in Telugu, cakkara in Malayalam, Gore in Gujarathi, Gud in Hindi and Punjabi, Gull in Marathi, God in Kongini, Vellam in Tamil, Jaggery in Urdu.<sup>[12]</sup>

### Manufacture procedures of jaggery

In the manufacture of jaggery or guda three main operations are involved, extraction of the juice from the cane, purification of juice and concentration of juice into jaggery. Canes used

should be light colored, ripe soft and of low fibers, and rich in sucrose. For jaggery making it is better to the top most 2 or 3 joints before crushing, since they are lower in sucrose and higher in glucose than the rest of the stalks.<sup>[13]</sup>

### Extraction

Canes for jaggery making are crushed soon after cutting to avoid loss of weight and of sugar due to inversion. Crushing of canes was formerly done in wooden or stone mortars with wooden pestles moved by bullocks or camels. Now-a-days, 3 roller horizontal or vertical power driven iron crushers are used. Juice extraction varies from 50 to 70 percent of cane with bullock driven crushers, and from 64 to 72 percent in power crushers.

### Purification

Coarse suspended impurities from the juice are removed by straining, and then the juice is

boiled. When the juice is slowly heated up to the boiling temperature, vegetable or chemical clarificants are added to flocculate the colloids present in it. The principle vegetable clarificants employed in jaggery making include the mucilaginous extracts of freshly cut green lower portion of stem and part of root of *Hibiscus ficulneus* and *H. esculentus*, green bark of semal tree (*Salmalia malabaricum*) and extracts of ground nut and castor seeds.

The chemical clarificants used in jaggery making are lime water, sodium carbonate and bicarbonate, super phosphate and alum. They can be used in the manufacture of jaggery from inferior, lodged or diseased canes and from canes of over luxuriant growth; they help in solidification of jaggery, but impart a dark color to the product.

### Concentration

After clarification, juice is boiled vigorously to 115-117 degree (striking point), with constant stirring and then concentrated into a thick almost semi solid mass, which on cooling solidifies into jaggery. Frothing which take place during boiling is controlled by frequent sprinkling of an aqueous extracts of crushed castor seeds. Treatment with cane juice with castor seeds and groundnut extracts removes bulk of the colloidal and organic matters at all stages of boiling, the hot semi solid mass is transferred to circular plates, stirred, allowed to cool down, and then moulded into balls, semi spherical blocks or rectangular blocks.

### Production

Guda is produced in three different forms, viz. as lumps of various sizes and shapes (over 80%), powder (4%) and semi liquid forms (15.5%). Jaggery usually ranges in color from yellowish to dark brown, and its quality varies widely. High amounts of nitrogen and phosphorous in juices result in a dark colored

soft product. Generally, good quality jaggery has a light color good flavor, hardness, crystalline structure and good keeping quality. It is reported that a part of the tanning present in the juice reacts with iron during crushing and<sup>[14]</sup> boiling and imparts a dark color to the jaggery and that the remaining portion react with the iron present in the jaggery during storage and intensifies the color of the stored products.

The major nutrients in jaggery are moisture (3-6%), sucrose (65-85%), invert sugar (10-15%) and ash (2-5%). Unlike white sugar which consists almost entirely of sucrose jaggery contains some proteins, fat, minerals and vitamins and hence considered to be more nutritious.

### Composition

The composition of jaggery depends mainly on the quality and the composition of cane juice, also on the methods of boiling and clarification adopted. Good quality jaggery has a high sucrose and low glucose content. Canes growing under saline conditions are reported to yield a poor jaggery and those grown on alkaline or heavily manure soils yield a saltiest jaggery with more mineral matter.

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### Storage

Deterioration of jaggery during storage depends mainly on its composition, form and shape of the product and on the prevailing atmospheric condition. Invert sugar and other non sugar hydroscopic constituents present in guda affect its keeping quality adversely.

Powdered jaggery deteriorates more rapidly than lump or semi liquid forms of jaggery.

### Methods of storage

Method of storage of jaggery varies from place to place. Jaggery lumps are stored in earthen vessels or granaries covered by a lid and made air tight by a paste of mud or flour all around. On a large scale jaggery lumps are stored in a heap over matting or wooden or bamboo platform in a closed room either as such or covered by a blanket of wheat paddy or cotton seed husks or gunny cloth.

### Grading

Jaggery grading is difficult because of the wide variation in its quality, its complex chemical composition and the marked deterioration it undergoes during storage. Classification of jaggery according to its quality is practiced in jaggery markets, but the criteria of quality vary widely. In certain localities, a light colored product is liked while in others dark jaggery may be preferred. Some markets fetch better prices for crystalline jaggery while in others a soft amorphous texture may obtain a premium. There is thus no systematic grading of jaggery in the country and the classification into superior or inferior qualities and the fixation of prices are all done arbitrarily by the traders.

### Nutrient values

Nutrient values of jaggery on calculation basis of 1 gm sugar (carbohydrate) are tabulated in Table 6.

### Palm jaggery

Palm jaggery is darker and richer in color and is somewhat salty in content. The jaggery does not taste too sweet as cane jaggery. To prepare this the palm juice is boiled until it becomes golden brown, a little salt is added to into act as a preservative.

Then it is cooled and poured into long cone made of palm leaves. The cone is then wrapped in rice straws and preserved. Some families dry the palm juice on mats. The palm jaggery is stored in a air tight container which preserves it easily for up to a year.

The jaggery made from the sap of the palms is more prized and less available outside the districts where it is made. The sago palm and coconut palm are used as the sources of jaggery mainly in India and Srilanka.

### Health benefits of jaggery

For centuries, jaggery has been used throughout India as a healthy sweetener. Jaggery actually comes from the sap of either the sugarcane plant or from several species of sugar palm trees. To convert the sap into jaggery, simple evaporation or crude centrifugation is the only process. No chemicals or bleaches are added. It is then simply poured into moulds to form small cakes.<sup>[15]</sup>

Jaggery, has a mineral content of approximately 60 times that of refined white sugar. One teaspoon of jaggery contains approximately 4-5 mg calcium, 2-3 mg phosphorus, 8 mg magnesium, 48 mg potassium, 0.5 mg iron, as well as trace amounts of zinc, copper, thiamin, riboflavin, and niacin. The corresponding values for white sugar are all essentially zero.

Jaggery is grainy and light brown in color with a flavor which is truly superior to white sugar; it tastes like a combination between molasses, maple syrup, and brown sugar. It can definitely be used exactly like sugar in drinks or recipes which call for sugar. You will probably need to use about 25-50% more jaggery than sugar to achieve the same degree of sweetness. Remember, even jaggery must be used in moderation.

**Table 6: Nutrient values of jaggery<sup>[16]</sup>**

Parameters	Guda (Jaggery)	
	Per 4g (1 tsp)	Per 100g
Total calories	12.32	308.0
	(Kcal)	
	51.8	1293.0
	(KJ)	
Protein	Trace	Trace
Carbohydrate (g)	3.08	77.0
Fat (g)	Trace	Trace
Sodium (mg)	Trace	Trace
Total Sugars (g)	3.08	77.0
Dietary Fibre (g)	---	---
Vitamins (I.U)	>32.0	>800.0
Minerals (mg)	>80.0	>2000.0
Transfat (g)	---	---

CALCULATION BASIS – 1G SUGAR (CARBOHYDRATE) = 4KCAL

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Ayurvedic medicine considers jaggery to be beneficial in treating throat and lung infections. Magnesium strengthens the nervous system and potassium is vital to conserve the acid balance in the cells and jaggery is very rich in iron, a composite of hemoglobin prevents anemia. The preventive action of jaggery on smoke induced lung lesions suggests the potential of jaggery as protective agent for workers in dusty and smok; environments.

According to an experiment, jaggery treated rats showed enhanced translocation of coal particles from lungs to tracheobronchial lymph nodes. Hence, it fights pollution too. Jaggery is regularly consumed by thousands of industrial workers or traffic policemen who are exposed to higher levels of pollution. It helps them breathe easier and counter pollution naturally.

### CONCLUSION

Jaggery is known as the "medicinal sugar" and is nutritionally comparable with honey. It has been used as a sweetener in Ayurvedic Medicine for 3000 years. Refined sugar mainly consists of glucose and fructose, jaggery contains glucose and sucrose. But jaggery also has minerals and vitamins which lacks in the refined sugar. The mineral content of jaggery includes calcium, phosphorus, magnesium, potassium and iron and traces of zinc and copper. The vitamin content includes folic acid and B-complex vitamins. Thus, other than that it is a good source of energy, it also prevents rheumatic afflictions; prevents disorders of bile; helps in relieving fatigue, relaxation of muscles, nerves and blood vessels; maintains blood pressure and reduces water retention; increases hemoglobin level and prevents anaemia.



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