

MODERN AND AYURVEDIC ASPECTS OF GUDA WITH SPECIAL REFERENCE TO JAGGERY

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ABSTRACT

Jaggery is a natural sweet substance produced by sugar cane plant and from some palm trees, is one of the most valued as well as appreciated natural substance known to mankind since ancient times. Of all the natural foods rich in carbohydrates jaggery is the most wholesome and delicious. The medicinal quality, taste, texture, color and aroma of jaggery differs according to the geographical area and the species of plants from which it has been made. Jaggery is called as guda in Ayurveda. Properties and Type of guda is related to time bonding as navinaguda is freshly prepared and after 1 year of preparation this guda is known as puranaguda. In modern technology properties of jaggery differs from their origin as one is from sugar cane and other are from different types of palm and date trees. Etymology, synonyms, varieties, method of collection, chemical constituents, properties, adulterants, chemical tests, and the usages of jaggery are gathered from text books, experienced ayurvedic physicians and from internet. In Ayurveda, guda is used for external as well as for internal use. Externally guda is mainly used in agnikarma and internally for many formulations. Guda is used in many preparations of Ayurveda like it used as binding material in gutivati i.e. tablets. It's also used as prakshepakadravya in kwatha, used in churna, for preparation of asava and arishta it is a main mediator and also act as a preservative. The present work aims at the review of jaggery or guda as explained in Ayurveda & biomedical science.

Keywords: Jaggery, Guda, Ayurveda, Palm-jaggery, Date-jaggery

INTRODUCTION

For many centuries, sugar has been in vital alternative medicine of Ayurveda and is one among the foods having religious significance. In hindu religion shadrasa bhojana is important and in which madhura rasa is one of the main rasa. In some auspicious days guda also given as divine food Hindus consider guda as one of the five elixirs of immortality

(Panchamrita)¹. In temples, guda is poured over the deities in a ritual called Gudabhisheka. The Vedas and other ancient literature describe jaggery as a great medicinal and health food. Guda is also one important ingredient in Ayurvedic medicine preparations, gudapaka is one of them. Jaggery is a traditional non-centrifugal cane sugar consumed in Asia, Africa and some

countries in America. It is a concentrated product of date, cane juice, or palm sap without separation of the molasses and crystals, and can vary from golden brown to dark brown in colour. It contains up to 50% sucrose, up to 20% invert sugars, and up to 20% moisture, with the remainder made up of other insoluble matter, such as wood ash, proteins, and bagasse fibers.

SYNONYMS²

Sanskrita	Guda
Bengali	Guda
English	Jaggery
Hindi	Guda
Kannada	Bella
Malayalam	Sharkara
Marathi	Gula
Punjabi	Guda
Tamil	Vellam
Telugu	Bellam
Urdu	Guda

Gana mentioned in Ayurvedic text -

*Charaka samhita*³ - *Ikshuvarga*,

*Sushruta samhita*⁴ - *Ikshuvarga*

*AshtangaHridaya*⁵ - *Ikshuvarga*

Scientific classification⁶: Guda is the product obtained by concentrating juice expressed from the stems of *Saccharum officinarum* L. (Fam. Poaceae) with or without prior purification of the juice, followed by cooling.

Kingdom	Plantae
Unranked	Angiosperms
Unranked	Monocots
Unranked	Commelinids
Order	Poales
Family	Poaceae
Subfamily	Panicoideae
Tribe	Andropogoneae

Genus	Saccharum
Species	S. Officinarum

PRODUCTION

Manual Manufacturing⁷

Historically, the sugar cane cultivators used crushers which were ox-driven. Nowadays all the crushers are power-driven. These crushers are located in fields near the sugar crop. The cut and cleaned sugar cane is put into the crusher. The extracted sugar cane juice is collected in a big vessel. A certain quantity of the juice is transferred to a smaller vessel for heating on a furnace.

The vessel is heated for about one hour. Dried wood pulp from the crushed sugar cane is used as fuel for the furnace. While boiling the juice, some lime is added to it so that all the wood particles are collected on top of the juice in froth during boiling which is skimmed off. Finally the juice is thickened and reduced to nearly one- third of the original volume. This hot liquid is golden in colour. It is stirred continuously and lifted with a spatula to observe whether it forms a thread or drips drop wise while falling. If it forms many threads, it has completely thickened. Now it is poured into a shallow flat bottomed concrete tank to cool and solidify. The tank is large enough to allow only a thin coat of this hot liquid to form at its bottom, so as to increase the surface area for quick evaporation and cooling. After cooling down the jaggery becomes a soft solid which is now pressed into the desired shape for selling at the market.

The quality of the jaggery is judged by its colour; brown means it is higher in impurities and golden-yellow implies it is relatively pure. Due to this grading scale

there are malpractices of adding colour or harmful chemicals to simulate the golden colour. Some manufacturers also add sodium bicarbonate (Edible Soda), the juice of Lady's Finger to improve the color, and a local herb known as Veranda in Bengali to give the jaggery a granular texture. The colour and taste depend upon the degree of boiling. Some people prefer dark jaggery to light ones and vice versa. The process for manufacturing Date palm jaggery and Palmyra jaggery remains the same. These two types of jaggery are invariably manufactured manually.

Manufacturing by Automated Plants⁷

This method of manufacturing is still in its infancy and is being used in very few countries. There is nothing much to tell about the process. Just pour in sugar cane juice from one end, set the plant at required temperature and time, and wait for the jaggery blocks to come out from the other end. The best advantage of using an automated plant over the manual method is that you get uniformly processed jaggery, of the same colour and taste, in uniformly packed quantities. This method is used only for sugar cane jaggery. So far, there has not been any instance of using this method for date palm jaggery or Palmyra jaggery.

GUNAOF GAUDA AS PER AYURVEDA

1. Navaguda a) Anirmalikrita^(3,4,5,8,9):

Kharyukta, alpashita, snigdha, mutra-raktashodhaka, alpapittajit, vatahara, medovardhaka, krimikara, balya, vrushya

b) Nirmalikrita^(3,4,5,8,9) : alpakaphakaraka, mal-mutrashuddhikara, pittahara, madura, vatashamaka, raktaprasadaka

2. Puranaguda^(3,4,5,8,9) - ruchikara, pathyakara, anabhishtyandi, agnideepaka.

Acharya Charaka³ mentioned the procedure of preparing guda- heat the sugar cane juice and reduce it to 1/4th, 1/3rd, & 1/2. The first one is heavier to digest than other two. They also given name for nirmalikritaguda as Dhouta Guda.

Note - ^(2,9)

1. Purana Guda: Guda after one year of its preparation and storage is known as PuranaGuda and it is considered to possess better properties than Guda and also more wholesome.

2. Prapurana: Guda after three years of its preparation and storage is known as PrapuranaGuda. It is the best one and useful in all diseases; is suitable for preparation of Arista.

3. Guda stored after preparation for four years should not be used as it loses its potency and causes kmi, svasa, kasa and other diseases.

Gudapakalpana:- In Indian pharmacopoeia gudakalpana specially mentioned. Those preparation with guda as prominent or major ingredients are brought under heading of gudakalpana.

Method of preparation¹⁰The kashaya, swarasa or any other liquid preparation is prepared as per classical reference and taken in clean bigger vessel placed over mild fire. Specified quantity of guda dissolved in it. After complete dissolution of guda the blend may be filtered once to get rid of physical impurities present in it. The filtrate is again taken in wide mouthed clean stainless steel vessel boiled over mild fire and reduce to 2 to 3 thread consistency.

later the vessel taken out of fire and fine powder of medicinal drugs is added little by little and stirred well to homogeneous

mixture. honey should be added after the preparation is fully cool and it is packed in dry airtight containers and preserved. the gudapakakalpana can be either in avaleha form or in khanda form. However majority of gudapakakalpana are in form of bigger pills (modaka)

Gudapakalakshana:¹⁰ Are almost similar to avlehakalpana

1. the paka material sticks strongly to the spoon while stirring.
2. It attained 3 to 4 thread consistency.
3. If the piece of paka material is poured into a bowl of stable water, it settles at the bottom without spreading.
4. it remains very soft and sticky to touch.
5. desired colour, odour and taste of the ingredients are appreciated in paka material.
6. Fingerprints are imparted over the paka material when touched.

Matra¹⁰ : 1 karsha (12g)

Saviryaavadhhi¹⁰ : 1 yr

Gada and different anupana⁸

1. Guda + Adraka = Kaphaghna
2. Guda + Haritaki = pittaghna
3. Guda + suntha = Vatnashaka

DIFFERENT TYPES OF JAGGERY¹¹

Although the term “jaggery” is generally used for the molasses obtained from the juice of sugar cane, it also refers to the jaggery made from the sap of palms, like Date palm, Palmyra, Toddy palm and a few other plants. Now, let’s take a look at the various types of jaggery and their different characteristics.

Sugarcane Jaggery

Color: Golden brown to dark brown.

Preparation: It is prepared by boiling sugar cane juice.

Physical state: Amorphous solid to viscous granular liquid.

Place of availability: India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Philippines, Malaysia, Cuba, and Mexico. India is the biggest producer and biggest consumer.

Taste: Very sweet, with a hint of salt, depending upon the quality of the juice that is used.

Date Palm Jaggery

Color: Golden brown to dark Brown.

Preparation: It is prepared by boiling the sap of Date palm.

Physical state: Amorphous solid and viscous granular to clear red liquid.

Place of availability: India (West Bengal) & Bangladesh.

Taste: Very sweet with the typical aroma of Date palm sap, somewhat like dark chocolate.

Palmyra Jaggery

Color: Off-white to pale yellowish white.

Preparation: It is prepared by boiling the sap of Palmyra palm.

Physical state: Amorphous solid.

Place of availability: India (West Bengal) & Bangladesh.

Taste: Very sweet with the typical aroma of Palmyra sap, somewhat like white chocolate.

Toddy Palm Jaggery

Color: Golden Brown.

Preparation: It is prepared by boiling the sap of Toddy palm.

Physical state: Amorphous solid.

Place of availability: Myanmar.

Taste: Very sweet with the typical aroma of Toddy palm sap.

Other Palm Jaggery

These days, even the sap of Sago palm and Coconut palm are being used to make jaggery, but they are rarely available or

heard of. The process of preparation remains the same, that is, the sap is boiled to a concentrated form until it attains an amorphous, solid form. The color ranges from golden yellow to golden brown to brown, depending upon the extent of boiling and the sugar content of the sap. Jaggery from these palms is made in Malaysia, Myanmar and Philippines.

ADULTERATIONS IN JAGGERY¹¹

Although it is not costly, still the insatiable greed of man has not spared even this local delicacy. Not all jaggery is adulterated, but there are certain manufacturers who let greed prevail over the quality of their products. There are different types of adulterations for different types of jaggery, and some of them are explained below.

Adulterations in Sugar Cane Jaggery

The following adulterations have been detected in samples of sugar cane jaggery.

Sodium bicarbonate: Some people might not consider this an adulteration; you might even say that it is a requirement of the process in some cases. Still, sodium bicarbonate is most commonly used in the preparation of sugar cane jaggery to improve its color. It does not have any adverse effect on health. This can be judged by the color. The darker varieties are less likely to have this, while the light colored ones are most likely.

ZFS(Zinc formaldehyde sulphoxylate): Commonly used in the textile industry, this harmful chemical is used in jaggery to improve its color. The darker the jaggery, the better the quality of the jaggery. However, the common belief is that lighter jaggery is good and hence some manufacturers add

these harmful chemicals to lighten the jaggery.

Sodium hydrophosphide: This is another harmful chemical used in jaggery to give it a brighter color.

Calcium carbonate (CaCO₃): This is added to improve color, as well as to add weight, since lime is far cheaper than jaggery. This can also be judged by the color (it should be light), hardness (should be very hard) and by the taste (if you have eaten unadulterated jaggery, you can detect this).

Adulterations in Date Palm Jaggery

This variety of jaggery is commonly adulterated with the following.

Sugar Cane Jaggery: Sugarcane jaggery is much cheaper (Rs.10 to 25 per Kg.) than Date Palm Jaggery (Rs.40 to 100 per Kg.). So, the reason is obvious. It can be detected by the hardness (original unadulterated date palm jaggery is very soft and melts even at room temperature, whereas adulterated one should be much harder) and by the taste (it lacks the typical aroma and taste of unadulterated date palm jaggery). Sometimes, simple sugar cane jaggery blocks are coated with date palm jaggery to fool the customers. Therefore, see what is inside before you buy.

Plain sugar: Again, the reason for this use is the same as above; sugar is cheaper. It makes the jaggery harder.

Adulteration in Palmyra Jaggery

This variety of jaggery is adulterated with the following.

Sugar: Palmyra jaggery, being the most expensive of all types of jaggery available in India, is most commonly adulterated with plain sugar. This can easily be detected by the hardness (the test is the same as that of

date palm jaggery adulterated with sugar cane jaggery). Sometimes, sugar crystals can also be seen embedded in the jaggery blocks when scrutinized carefully. Again, the jaggery adulterated with sugar will be much whiter than the unadulterated one, which is pale yellow in color. So, be sure to check well.

Sodium bicarbonate: This is added to give the jaggery a whiter look.

Yellow Color: This color is often added when the jaggery contains excessive sugar contained in it and looks very white. This may be harmful for the health as no edible colors are used in these cases.

NUTRITIONAL VALUE PER 100 G (3.5 OZ)⁷

Carbohydrate (g)	77
Calcium	80mg
Iron	2.4mg
Protein	Trace
Vitamins	
Thiamine (B1)	0.02 mg
Riboflavin (B2)	0.07 mg
Niacin (B3)	0.3 mg

IDENTITY, PURITY AND STRENGTH²

Loss on Drying	Not more than 10 per cent (other than that of the liquid or semi-liquid variety)
Total ash	Not more than 6%
Acid-insoluble ash	Not more than 0.5%
Water-insoluble matter	Not more than 2%
Total sugars	Not less than 90%
Sucrose	Not more than 70ppm
Sulphur dioxide concentration	Not more than 70 ppm
Heavy metals	Complies with API
Microbial limits	Complies with API
Pesticide residue	Complies with API

DISCUSSION

As guda is mentioned in Ayurveda and its uses are from ancient time. There are

different types of guda depended on the time duration mentioned in Ayurvedic text books. In Kaiyyadeva nighantu there are exact time period and according to that guda name were described, in Bhavprakasha nighantu action on tridosha with different type of anupana were mentioned. Accordong to that guda can be used for all tridoshamaka chikitsa. As it act on vatadosha when it gives in combination with suntha and with adraka it is kaphaghna and with haritaki it is pittaghna. Gudapakakalpna and its uses are mentioned. In Modaka Kalpana Mainly gudapaka is used and this modaka is one of the form of tablets in ayurvedic forms. In *Ayurveda* only sugar cane jaggery is mentioned. But here also mentioned different type of jaggery according to their different origins. There chemical constituents and standard values should have to derived. That is further scope of study. Nutritional values of sugar cane jaggery also standard value of jaggery according to API was mentioned. Jaggery is valuble product and use in medicine for their treatment value as well as for their test and as preservative. Mostly sugar cane jaggery is used in daily bases, also for medicinal preparation same jaggery is used widely. Palm jagerry is mostly used locally in west Bengal.

CONCLUSION

It can be concluded that jaggery is an invaluable natural substance with many diverse usages. It helps in many diseases with single use or as a part of medicine. It also helped in preparation of medicine as binding agent or as preservative or as ingredient. But it must be pure and genuine.

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Source of support: Nil,
Conflict of interest: None Declared

Cite this article as

Shardul Chavan: Modern and Ayurvedic
Aspects of Guda With Special Reference to
Jaggery. ayurpub 2017;II(1):275-281