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Ayurvedic and modern review on types of Sugar

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ABSTRACT

Sugar is a natural ingredient that has been part of our diet, medicine since ancient times. Sugar made from sugar cane is consumed mostly and said to have health benefits. There are some *Sharkara's* (sugar) told in Ayurvedic classics which are not in use now days. The functional quality and medicinal quality differ according to form and origin of sugar. In Ayurveda specific description of different types of *Sharkara* method of processing and their properties can be seen. Now industrializations keep sugar to undergo several chemical processing steps to make it into the refined sugar. This results into decline in health benefits of sugar. This article reviews *Sharkara* in Ayurveda classics and different forms of sugar used in present days. Information collected from various classics and published information on recent research articles in PubMed, Dhara online data bases and other allied databases were taken into consideration for the review.

Key words: Sugar, Sharkara

INTRODUCTION

Sugar is not just something sweet, over the centuries it has been used as medicine, source of dietary carbohydrates, sweetening agent and as preservative for food and medicines. In Ayurveda sugar is explained as ingredient of many formulations, as *Anupana* (adjuvant), as *Prakshepaka Dravya* (ingredients) etc. According to Ayurveda treatises sugar is a form mainly derived from juice extracted from the sugarcane plant. Treacle made of juice of the sugarcane boiled down to one fourth, one third or one half its original quantities is called coarse *Guda*

(jaggery) and further process turn it into different physical forms.^[1] According to different physical form, properties and origin different varieties of *Sharkara* described in Ayurveda. As the classical sugar productions faces draw back in commercialization with facing challenges like growing sugar cane plants and wastage during caramelizations, there was need to adopt new techniques. As coffee, tea, and chocolate etc. have made their way to commercialization and drastically increase of sugar consumption, made sugar more popular. With this there was need to follow largest and most technologically advanced sugar refinery methods. New methods of refining sugar allow them operate in large scale and easy manufacturing but medicinal property sugar become less significant. With time being the processed sugar became sweetest poison. The guidelines by WHO recommends adults and children to restrict their daily intake of free sugars to less than 10% of total energy intake.^[2] The American Medical Association's Council on Food and Nutrition suggests limiting consumption of sugar in any form in which it fails to be combined with significant proportions of other foods of high nutritive quality.^[3]

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As processed and artificial sweeteners fall out of popularity, ancient forms of sugar make a major comeback

Description of *Sharkara* in *Samhitha's*

In Ayurveda different types of sugars are mentioned and their property and medicinal values are explained

Charaka Samhitha

Types according to origin^[4]

- 1) ***Ikshu Vikara:*** Variety of sweet derived from sugarcane plant juice.
 - ***Guda:*** Treacle made of juice of the sugarcane boiled down to one fourth, one third or half. According to commentary of Gangadhara when 1/4th is remaining is called *Guda*, when 1/3rd remaining is called *Kshudra Guda* and ½ is remaining is called *Phanitha*. The greater the condensation the heavier the *Guda*. *Dhoutha Guda* is conversely purified *Guda* is that which has very little impurities.
 - ***Matsyandika:*** Further purification of *Guda* turns it into *Matsyandika*. They are small crystals which appears like small eggs of fish.
 - ***Khanda Sharkara:*** Sugar candy /*Khanda Sharkara* / large crystal form sugar. They are considered extremely pure.
 - ***Sharkara:*** White crystal form sugar.
- 2) ***Yavasa Sharkara:*** Variety of sweetening agent prepared from *Yavasa* plant (*Alhagi camelorum*) / *Duralabha Kwatha*. It is astringent sweet and slightly bitter in taste, cold in potency.
- 3) ***Madhu Sharkara:*** *Sharkara* formed from *Madhu* (honey) when it is kept for long time. The honey sugar is dry is effective in treating vomiting and diarrhea and depletive in nature.

Sushruta Samhitha^[5]

- The different modifications of treacle such as, the *Matsyandika*, *Khanda*, and *Sharkara Guda*, *Phanitha* and *Yavasa Sharkara*, *Madhu Sharkara* are explained by Acharya Sushruta.

- Sugar which are progressively more refined, should be deemed as gaining more in their cooling, demulcent and aphrodisiac properties, and getting heavier in digestion in each of the successive stages of refinement. They are successively has more cooling property, and beneficial in cases of hemoptysis.
- ***Madhu Sharkara:*** Sugar prepared from concentrated honey (*Madhu Sharkara*) is parchifying and liquefacient. It proves beneficial in cases of vomiting and dysentery. It has a sweet and taste and sweet in digestive transformation.
- ***Yavasa Sharkara:*** Sugar prepared from a decoction of *Yavasa* plant (*Alhagi camelorum*) has a sweet and astringent taste, leaves a bitter aftertaste, and is possessed of laxative properties, and pacifies the *Kapha Dosha*.
- ***Madhuka Phanitam:*** The sweet and concentrated extract (*Phanitam*) of *Madhuka* flowers should be regarded as pacifying. It produces *Vayu* and *Pitta Dosha*, and pacifies the *Kapha Dosha*. It is sweet, astringent in its digestive transformation, and purifies the blood.

Astanga Hrudaya^[6]

In *Astanga Hrudaya* sugar are described as, *Matsyandika*, *Khanda Sharkara*, *Sita*:

Matsyandika (small crystalline sugar), *Khanda* (sugar candy) and *Sita* (white crystalline sugar) in their succeeding order are better. They are aphrodisiac, good for the emaciated and the wounded, useful in bleeding disease and aggravation of *Vata Dosha*.

Phanitha: *Phanitha* is the product of sugar cane juice (half-cooked molasses) it is said to have properties like heavy to digest, *Abhisyandi* (increasing these secretions in the tissues pores and blocking them) and cleanses the urine.

Guda: *Guḍa* or "jaggery" represents one of the varieties or products of *Ikshu* (sugar cane)

Dhoutha Guda: *Guda* (jaggery) washed well and made white and purified.

Purana Guda: Jaggery which is preserved for long time and is good for health of heart.

Nava Guda: Freshly prepared jaggery increases *Kapha Dosh*a and causes indigestion.

Yasa Sharkara: Sugar prepared from *Yavasa* plant (*Alhagi camelorum*) is similar in property to sugar but is bitter sweet astringent in taste.

Madhu Sharkara: Crystallized honey is similar to honey in properties.

Present scenario^[7]

Production: Sugar production involves two distinct operations: (a) processing sugar cane or sugar beets into raw sugar and (b) processing the raw sugar into refined sugar. Cane and beet sugar extracts contain sucrose and undesirable amounts of polysaccharides, lignin's, proteins, starches, gums, waxes, and other colloidal impurities that contribute colour and/or taste to the crystalline product and reduce product yield. The raw juice, therefore, is subjected to heating, liming addition and clarification to remove proteins and colloidal matter. Sugar processing consists of the different steps. First sugar cane is crushed, the juice is heated and filtered, then sent to a series of crystallization steps to create crystals of raw sugar, followed by centrifugation to remove any remaining juice or syrup. The last step produces a small stream of remaining syrup called cane mill molasses containing up to 55% (wt.) sucrose and substantial amounts of invert sugar (glucose/fructose mixture) impurities. Sucrose is the fraction that becomes crystalized sugar and has considerable commercial value but cannot be extracted economically because of the impurities. Several processes are followed to recover sucrose from molasses and other syrups incorporating Nano filtration (NF) and microfiltration (MF).

Types of cane sugar^[8]

Processed sugar comes in two forms: non-crystalline and crystalline of which there are two basic types; centrifuged and non-centrifuged. The different forms of sugar are produced in many different countries and often have different names.

Non-crystalline sugar: A non-crystalline liquid of high viscosity (thickness) concentrated from whole cane juice. It can vary from golden brown to dark brown and contains; up to 50% sucrose, high levels (up to 20%) of invert sugars, up to 20% moisture and the remainder is made up of other insoluble matter (ash, proteins, bagasse etc.).

Crystalline sugars: These can be divided into two types: non-centrifugal sugars and centrifugal sugars. Noncentrifugal sugars are basic lump sugars where the molasses and crystals have not been separated. Centrifugal sugars are free flowing granular sugars where the molasses and crystals have been separated to some degree.

Non-centrifugal sugars Lump sugars: These sugars are a concentrated product of the cane juice and are produced in many countries for direct consumption. They vary from yellowish brown to dark brown (almost black sometimes) in colour and contain up to 80% sucrose with the remainder made up from moisture, invert sugars and other insoluble matter such as ash, proteins and bagasse fines in varying proportions. Lump sugars are produced in many countries around the world and are known by a range of names: jaggery in Africa, gur in India and Bangladesh, desi in Pakistan, chancaca in Peru; other names include panela, piloncillo, and rapadura.

Centrifugal sugars: *Khandsari*: A basic raw granular sugar, developed in India that has been separated from most of the molasses. *Khandsari* varies in colour from golden yellow to brown and contains between 94 and 98% sucrose. At its most basic, *Khandsari* is manufactured using simple animal-drawn crushers, is subjected to simple clarification, boiled to the consistency of a thick syrup, and allowed to stand until sugar crystals are formed. The small crystals are then separated in manually operated centrifuges and sun dried.

White granular sugars: Free flowing white granular sugars are often referred to as plantation white. These sugars are traditionally produced in large-scale White sugar is produced through a purifying process that removes a brown syrup called molasses.

Brown granular sugars: There are two categories of granular brown sugar: those produced directly from the cane juice at the place of origin and those that are produced during the refining of raw sugar. The first type includes demerara, muscovado and turbinado sugars. The second types are coated brown or 'soft' sugars and manufactured demerara. Those produced directly from the cane juice at the place of origin can be made using medium scale open pan production methods.

Demerara sugar: Named after the area in Guyana where it was first produced, demerara is a centrifuged sugar prepared from the first crystallizations of cane syrup and has large yellow crystals and a slightly sticky texture. Demerara sugar undergoes minimal processing.

Muscovado: Also known as Barbados sugar, muscovado is the product of the third crystallization. It is dark brown in colour with small grains and sticky texture.

Turbinado:^[9] Less processed than brown sugar, turbinado is made from the first pressing of sugar cane and retains some natural molasses.

Piloncillo:^[10] Similar to jaggery, this uniquely Mexican sugar. Piloncillo is made by boiling down cane juice into thick, crystalline syrup. It is then poured into cone-shaped molds where it is left to harden. The name piloncillo means "pylon" for its conical shape. It has an earthiness to it that has hints of both bitter and sweet.

DISCUSSION

Sugar was mainly produced from sugarcane plants. Also there are sweeteners produced from sources other than sugar cane plants mentioned in Ayurveda. Depending upon the process of cleaning crystallizing different sugar variety is explained. Sugar of various physical form and origin provide unique characteristics Traditional sweeteners of Ayurveda like *Guda*, *Sharkara*, and *Khanda Sharkara* are used in various medicinal preparations. Now a days sugar has more processed and artificially synthesized compounds are used in the place of naturally

occurring sugars. Traditional sugars retain vital health benefit as they processed without use of chemical.

CONCLUSION

Traditional sugar has beneficial health effect. Sugar which has been existence for many centuries whose medicinal value are time tested need to be given due recognition. The promotion of traditional sugars intake might increase the health of individual. So, research is required to differentiate functional characteristics and beneficial impact on health of the various sugar forms explained in classics.

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