Available online at
www.agrospheresmagazine.com

ISSN: 2582 – 7022

Agrospheres:e-Newsletter, (2021) *2*(9), 11-13

Article ID: 288

Jaggery- A Super Food

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Article History
Received: 10. 09.2021
Revised: 16. 09.2021
Accepted: 21. 09.2021

INTRODUCTION

Jaggery is a natural traditional sweetener made by concentrating sugarcane juice and palm sap. However, most of the jaggery is made from sugarcane juice. It is a traditional and unrefined sugar consumed in Asia, Africa, Latin America and the Caribbean. Jaggery is known as the healthiest sugar in the world as it is abundant in minerals and proteins. India is the largest producer as well as consumer of jaggery. Out of the total world production, India produces more than 70% of the total produce. In Ayurvedic system of medicines, it is used as blood purifier and base material for syrups. Jaggery and *khandsari* is among major agro processing industries in India (Anon, 2017).

The increasing production trend and market value of jaggery has much significance to learn about peoples liking towards jaggery (Nandhini & Padmavathy, 2017). As the people are becoming more heath conscious, demand for jaggery has tremendously increased as a heath supplement. Jaggery is produced in solid, liquid and powder/granular form. For ease of handling, packaging and storage, granular jaggery form is becoming popular. However hygroscopic nature of granulated jaggery causes stickiness and caking problems.

Nutritional composition of jaggery

Jaggery is a high calorie sweetener, as it contains minerals, protein, glucose and fructose, and is known to be healthier in comparison to white sugar. Nutritive compositionof different forms of jaggery are given in Table below:

Composition per 100g	Solid	Liquid	Granular
Water (g)	3-10	30-35	1-2
Sucrose (g)	65-68	40-60	80-90
Reducing sugar (g)	9-15	15-25	5-9
Protein (g)	0.4	0.5	0.4
Fat (g)	0.1	0.1	0.1
Total minerals (g)	0.6-1.0	0.75	0.6-0.1
Calcium (mg)	8.0	300	9.0
Phosphorus (mg)	4.0	3.0	4.0
Iron (mg)	11.4	8.5-11	12
Calorific value (Kcal)	383	300	383

Source: Rao et al. (2007)

Jaggery is more complex than sugar, as it is made up of longer chains of sucrose. Hence, it is digested slower as compared to sugar and releases energy slowly, which provides energy for a longer period of time and is not harmful for the body. But it is not fit for consumption by diabetics, because ultimately it is sugar (Singh et al., 2013)

Jaggery also draws out a considerable amount of iron during its preparation, as it is prepared in iron vessels. This iron is also good for health, particularly for those who are anaemic or have iron deficiency (Nath et al., 2015). Jaggery is excellent as a cleansing agent. It cleanses lungs, intestines, stomach, oesophagus and respiratory tracts. People facing dust in their daily life are highly recommended to take a daily dose of jaggery. This helps in cleansing their lungs and can keep them safe from asthma, cough and congestion in chest etc. Jaggery can produce heat and give instant energy to human body and helps to improve the immune system (Baboo & Singh, 1986). Jaggery i1s also used as a cattle feed, in distillery, medicine manufacturing unit.

Physical properties of jaggery

1- Color: The color is one of the most important attribute for grading the quality of jaggery. Usually, jaggery with light colour is preferred for consumption (Thangavelu, 2009). Anthocyanin and saccharetin are two organic non sugars which react with iron salts present in juice or by contact with crusher and pan and are responsible for dark colored jaggery.

2- Texture: The crystalline jaggery is preferred for direct consumption while the amorphous type is preferred for preparing confectionery. The process of moisture absorption in jaggery leads to loss of crystalline texture and becomes soft and sticky (Chand et al., 2011)

3- pH: The pH of jaggery was in the range of 5.07-6.20 reported by (Guerra & Mujica, 2010). In the study it was found that pH of jaggery clarified with Aloe Vera has more pH as compared to the control jaggery. The freshly extracted juice is having pH of around 5.2.

Chemical properties of jaggery

1- Sucrose: A high quality jaggery contains around 70% of sucrose. The most important factor deciding the recovery per cent of jaggery was juice sucrose per cent followed by juice total non-sugars. Higher sucrose in juice gives bright color to the jaggery (Thangavelu, 2009)

2- Reducing sugars: The main reducing sugars present in cane products are glucose and fructose with very small amount of mannose and lactose. The reducing sugar is determined by calorimetric methods. A high content of reducing sugars is not preferred as it increases the hygroscopicity of jaggery, thus affecting its texture and stability during storage.

3- Moisture: During monsoon season, the quality of jaggery is highly affected due to high humidity. Jaggery gets contaminated by microbial activity, thus shelf life reduce. During summer times, the jaggery dries by natural aeration and helps to reduce the moisture up to 6-7% from the initial moisture content of 13-14%. The keeping quality of jaggery can be improved by maintaining the moisture content of jaggery not more than 6% and a relative humidity of 43-61% (Chand et al., 2011)

Microbiology of jaggery

Singh et al. (2009) said that jaggery storage conditions at farmer's level are very poor as hygienic conditions are not properly maintained, which attracts several pathogenic and non-pathogenic microorganisms. These microorganisms can cause adverse effect on human health as well as on overall appearance of the jaggery. The species of microorganisms most commonly occurring in jaggery are Bacillus subtilis, B. mesentericus, B. vulgatus, Aerobacter aerogens, Actinomyces, Saccharomyces, Penicillia, Mucor, and Aspergillus.

CONCLUSION

Jaggery has tremendous health benefits. Nowhere days people are more concerned about their health and diet which is making jaggery their primary preference as a sweetening agent. Jaggery is a high calorie sweetener, as it contains minerals, protein, glucose and fructose, and is known to be healthier in comparison to white sugar. It contains an enormous wealth of minerals, protein, vitamins and useful sugars. According to Ayurvedic sciences, jaggery should be consumed daily after meals as it improves digestion.

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