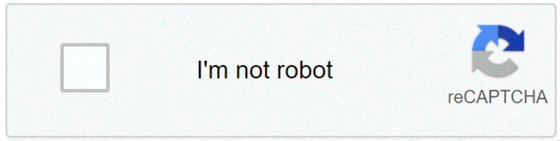

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Sucrose in jaggery

Humans have been sweetening their foods for thousands of years. Whether it’s through honey, natural sugar syrups such as maple syrup, or by using sugar beet or cane sugar, it’s all done to sweeten our dishes. Which sugar you use, used to depended on where you lived and what sugar type was available there. In regions where sugar cane grew (and grows), cane sugar is commonly used. In other areas one of the many other sweeteners might be more common. Cane sugar grows great somewhat close to the equator and thus is commonly used in the surrounding countries. There are a lot of ways to process sugar cane into a suitable sweetener. You can either focus on completely isolating the sugar from the cane by using more advanced crystallization processes. A more traditional process though doesn’t create beautiful ‘clean’ white sugar. Instead, the resulting sweeteners contains sugar, but also a lot of other ingredients naturally present in the sugar cane. This gives flavor bombs fully of sugar and all sorts of other ingredients. In India this product is referred to as jaggery. But, similar products can be found around the world such as panela from Southern America. Sugar cane When we talk about sugar here, we’re talking about the ‘regular’ granulated or icing sugar in your cupboard. The chemical name of this sugar is sucrose. Sucrose is sweet and has some amazing properties which makes it possible to transform it into caramels, toffees, honeycomb and much more! Sugar cane is one of two major crops grown for this sugar production. The other is sugar beet. Cane grows in (sub)tropical climates and are literally ‘canes’, full of sugar. If you chew on a cut piece of sugar cane, you will taste the sugar immediately, it’s very sweet. Cane consists of roughly (exact numbers vary between harvests and types) 70% moisture, 15% of inedible fibers with the rest being sugars and a small amount of minerals and other minor ingredients. The sugar content depends on the geographical location, the season as well as growing conditions. Once sugar cane has been harvested it can’t be kept for long. It might dry out, sugar contents might lowering and because of its high moisture content it can actually be spoiled by micro organisms. Also, since we humans can actually eat all those fibers in the cane, we need to get rid of those. This is why the sugar cane needs to be processed after harvest, similar to how maple syrup needs to be boiled! sugar cane Processing sugar cane into jaggery Sugar cane processing starts with the harvest. Sugar cane is harvested by cutting off the canes. As is the case for a lot of agricultural products, it starts deteriorating soon after. In warm weather, water will start evaporating and sugar (sucrose) might invert into glucose and fructose. Processing of sugar cane can be done on a very small scale, in people’s homes as well as in huge manufacturing facilities that churn out a lot of cane sugar each year. The larger facilities tend to process the sugar more and generally produce those refined sugars we have in our kitchens. Those products tend to really be only sugar (sucrose molecules). However, sugar cane can be processed in a lot simpler way requiring mostly just crushing of the canes and cooking the resulting syrups. This is how jaggery and similar products, are produced. Since you just cook the syrup, it contains a lot more different ingredients than refined sugar does. It has a very pronounced flavor as a result. Step 1 – Crushing the cane The manufacturing process continues by crushing the canes. By crushing the canes, the sugar + liquid within the canes are pressed out of the cane. Ideally, you’re left with dry cane that consists mostly of inedible fibers and a vessel full of moisture and sugars. A crusher or mill can consist of two rolls through which you feed the cane. The rolls crush and squeeze the cane as it travels through. Step 2- Clarifying the syrup The juice that ends up in the pans, still contains various impurities. These impurities have to be removed during the cooking process. During boiling some of the impurities will float to the top and form a skin on the syrup. This is then skimmed of, partially purifying the sugar syrup. Ingredients can be added at this point to help the scum raise to the surface. Commonly used ingredients are baking soda for instance, which causes a vigorous boil to help impurities raise to the surface while also increasing the pH of the solution. Baking soda doesn’t only help with impurities though. Sucrose, the sugar in cane, is prone to inversion. During inversion, sucrose, which is a disaccharide, may split into fructose and glucose (two monosaccharides). This process occurs faster in a more acidic environment, so increasing pH will slow this down. Other alternatives for helping the scum raise to the top are various roots. Which is used depends on the region the syrup is prepared in and the availability of ingredients as well as local knowledge. You will never end up with just sugar and water in this process. A lot of minerals and other minor ingredients will remain within the syrup. Step 3 – Boiling the syrup The sugar syrup at this point is still very watery with pretty low concentrations of sugar. As such, you have to boil the sugar (just like you do for maple syrup). Your aim at this point is to evaporate more moisture to concnetrate the sugar. In smaller production locations, the end point of cooking is judged by experienced cookers. They can see whether the syrup is sufficiently cooked by observing the bubble behaviour of the boiling syrup. Manufacturers are looking for a high enough temperature so that moisture is low enough to prevent spoilage of the sugar during storage. They are looking for a temperature of 115-177°C (239-242°F). This is considerably higher than the temperature to which maple syrup is cooked. Because of this higher temperature (and thus lower moisture content), it won’t be liquid as maple syrup is. Instead, it will crystallize and solidify upon cooling, although varieties of softer jaggery exist as well. Moulding the jaggery Once the cane sugar solution has been cooked to a low enough moisture content, it has to cool down. The hot syrup can be poured into moulds immediately. Alternatively, it may be cooled down first before it is scooped into molds or container for further solidification and storage. Instead of moulding the sugar, it can also be transformed into a powdery material. By forcing the sugars in the syrup to crystalilize and by moving the syrup while it is crystallizing, individual sugar crystals will form instead of one plarge block. It still is the same material though and isn’t refined sugar. It’s quite a long video, but does show the different steps taken in jaggery production well. Difference to regular cane sugar The powdered cane sugar you can buy in supermarkets is essentially a more refined version of the jaggery described here. It truly is just sucrose molecules and nothing else. This cannot be achieved by simply boiling the mixture. Instead, the manufacturing of these sugars uses a crystallization process. The sucrose crystals within the sugary solutions crystallize. As such, it is very easy to remove them from the rest of the mixture and you can end up with very pure sugar crystals. The non sugar part is centrifuged away and is what makes up molasses. Flavour Sucrose itself doesn’t have a lot of flavour apart from its sweetness. Jaggery on the other hand, ads a lot of flavour. It has quite some bitter notes. If you haven’t had jaggery, but have had molasses, it will remind you of molasses. This is to be expected though since jaggery essentially is sugar+ the molasses since the two have not been separated in jaggery production. Jaggery vs panela, muscovado, gur, turbinado, rapadura A more technical definition of jaggery would be non-centrifugal cane sugar or evaporated can sugar. In other words, the sucrose has not been forced to crystallize and separate from the rest of the mixture. Jaggery is an Indian term for describing this product, but there are a lot more very similar products around the world. They might all change slightly in their manufacturing process, but are essentially the same: boiled down cane sugar syrups. Panela, muscovado, gur, turbinado, they all are very similar. There are even more very similar sugars out there. However, they tend to not be made from cane. Instead, they can be made from palm, coconut or date to name just a few. 100g chapatti flour (finely ground whole wheat flour) 100g all purpose flour 1/4 tsp turmeric powder 130 ml water 100g chana dal (split chickpeas) 340ml water 50g dried coconut (unsweetened) 50g jaggery 40 ml water 1 tsp cardamon powder ghee (clarified butter) for spreading on the paratha Put the chana dal with the water in a pan and cook the chana dal until the lentils are soft and easily mushed with a fork. Do so on a low heat to not evaporate too much moisture. This takes about 45 minutes.Prepare the dough by kneading the flours, turmeric and water for the dough into a smooth ball. The dough should be soft and flexible and not sticky. Leave the dough to rest while preparing the rest (ideally at least 30 minutes). This resting period will help relax the gluten and helps to roll out the dough later on.In a dry frying pan toast the dried coconut until it has turned a light brown. It burns quickly so keep an eye on it.Add the jaggery and water and dissolve the jaggery. If necessary a table spoon of ghee. You should end up with a slightly thick mixture without any clumps.Add the soft dal and mush the mixture so there are no whole dal pieces left, using a fork or masher. Mix in the cardamon powder. Whole and especially hard, pieces of dal can break the dough once you start filling the paratha.Divide the dough and filling into 6 equal portions.There are several ways to fill the boli. You can split a portion of dough into 2 evenly sized balls and roll them out flat. Add the portion of filling on one of the two dough layers. Place the other one on top. Carefully press the sides closed while ensuring that you don't capture too much air within.Using a rolling pin, roll the filled dough out flat. The dough might tear a little in some places which is ok, as long as no gaping holes are formed.Bake the boli on a tawa or hot flat griddle on both sides until cooked fully through. The boli may puff up a little, this is a sign it is fully cooked.Spread the boli with ghee on either or both sides for an extra crispy and flavourful crust.Enjoy as such, or with some yogurt or refreshing chutney. Sources H. Panda, The complete book on sugar cane processing and by-products of molasses, 2011, chapter 3, link Panela Monitor, Non centrifugal cane sugar (NCS) (panela, jaggery, gur, muscovado) process technology and the need of its innovation, April 2014, link Max Falkowitz, How to use raw sugar: jaggery, gula melaka, panela, and more, Serious Eats, Feb-20, 2018, link To have or not to have, is that the question? White sugar is bad for health, but what about brown sugar? What’s the difference between jaggery and brown sugar? What are molasses? Is brown sugar better than jaggery? Between brown sugar, molasses, jaggery, and white sugar, which is better? While we are at it, we’ll also look at their nutritional values so that you can make an informed decision and lead a healthy lifestyle. That being said, the positives of organic jaggery and brown sugar is a whole different ball game altogether due to the absence of harmful chemical compounds. Difference Between White vs. Brown Sugar There are around ten types of sugar available in the market. Despite that, sugar is sugar and is considered slow poison. Manufactured from the same plant – sugarcane or beet sugar – the processing and level of refining define the colour of the sugar. When the sugarcane juice is being processed, it produces a thick, brown-coloured juice that is called molasses [1]. When the molasses is separated from sugar and refined, the result is white sugar. When molasses are added to the sugar during processing, it becomes brown sugar. The quantity of molasses and the level of processing are the two main things that define brown sugar’s colour and texture. Image source: Thehealthsite.com Nutritional Value of Brown and White Sugar White Sugar Brown Sugar Nutrition facts (Per Teaspoon*) Protein 0 0 Fat 0 0 Carbs 4 g 3 g Calories 16 Kcal 12 Kcal Glycemic index 65 65 Vitamins 0 0 Minerals 0 Available in an insignificant amount *These values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie need Source: Practo What is Jaggery? Like sugar, jaggery is also made from sugarcane and is often called unrefined sugar. That’s because it is manufactured without separating the molasses. Once the sugarcane juice is extracted and filtered, it is cooked for a while until the mixture becomes a thick, sticky brown paste. This paste is then poured in moulds and kept aside to cool [2]. The colour of jaggery varies from light, golden brown to dark brown due to the type of sugarcane and the juice in it. Because of its colour, it is often confused with brown sugar. But there are several common differences between jaggery and brown sugar, some of which we will explore here. Before we dive into the key difference between jaggery and brown sugar, let us look at the nutritional value of jaggery and see why it is often considered a healthy replacement of any form of sugar. Nutritional Value of Jaggery Nutrition Facts Serving size 10 g % Daily Values Energy 38.3 Kcal Carbohydrates 9.8 g 3% Protein 0 g 44% Sugar 9.7 g 3% Cholestrol 0 mg 0% Dietary Fiber 0 g 88% Vitamins Vitamin B6 0.004 mg 2% Vitamin B3 (Niacin) 0.011 mg 1% Choline .23 mg 0% Folate 0.1 mcg 0% Minerals Calcium 8 mg 1% Sodium 3 mg 0% Iron .30 mg 3% Magnesium 16 mg 4% Potassium 13 mg 0% Phosphorus 4 mg 21% Selenium 0.12 mcg 0% *Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie need Source: Ayur Times Difference Between Jaggery and Brown Sugar Image source: Wikipedia Difference Between Jaggery and Brown Sugar #1 – Manufacturing Process The most obvious difference between jaggery and brown sugar is the way these two sweeteners are manufactured. Brown sugar is made by mixing refined sugar and a controlled amount of molasses. The molasses in the brown sugar gives it a toffee-like flavour and colour. This type of sugar is often used to make dense cakes, cookie dough, and barbecue sauces. Jaggery, on the other hand, is made by sugarcane juice or palm sap. The sugarcane juice is reduced to a thick brown paste before being set in moulds to harden. Jaggery is browner in colour and has loads of flavours since it is unrefined. The predominant flavours of jaggery are fruity, earthy, caramel with slight notes of smoke. Difference Between Jaggery and Brown Sugar #2 – Nutritional Value Another difference between jaggery and brown sugar is the nutritional value. Even though the two have almost similar calorie value, jaggery has a noticeable amount of iron and other essential minerals. The mineral content makes jaggery healthier for people trying to reduce empty calories from brown or white sugar. One can argue that the molasses in brown sugar makes it a source of certain minerals like calcium, potassium, iron, and magnesium. However, these minerals are present in almost insignificant amounts, providing no real benefits. Despite that, brown sugar is comparatively better than white sugar since white sugar contains no minerals and also risks having sulfur, which is harmful to the human body but is still used during the refining process. Difference Between Jaggery and Brown Sugar #3 – Sweetness Another difference between jaggery and brown sugar is their level of sweetness. Jaggery, with its reputation for being a healthy sugar, is relatively less sweet than brown sugar. Since it is rich in minerals, jaggery’s taste is also different from brown sugar. That is why when you substitute brown sugar with jaggery, you need to add more of it to attain the same level of sweetness. Conclusion If you want to adopt a healthy lifestyle, the first step has to be a cut in your sugar intake. Regardless of whether you are having white or brown sugar, they are both empty calories which do more harm than good. That is why jaggery has emerged as a healthier option since it is less sweet and has more nutritional value. The biggest difference between jaggery and brown sugar is the nutritional value and its taste. Even though both jaggery and brown sugar have molasses, brown sugar contains an insignificant amount of minerals and vitamins and has a high glycaemic index. So, if you are on a weight loss diet or are planning to start one, the good news is that you can have jaggery in small amounts. Jaggery is also suitable for diabetic patients when consumed in moderation as it also increases blood sugar levels. The next time you have a sugar craving, try 24 Mantra Organics’s Jaggery Powder and enjoy the benefits of organic food.