



Saccharum officinarum (Sweet Salt) – Invention to Domestication

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ABSTRACT

Sugarcane, or *Saccharum officinarum* is thought to have been first domesticated by the Papuans in around 8000 BCE. This ancient civilisation was thought to have simply chewed the cane raw. Sugar was spread and cultivated by the Austronesian peoples across Island South East Asia, before reaching China and India around 3000 BCE. The geographical location of sugar cane growing changed several times over the course of 3,500 years. It began in India and Persia, then spread along the Mediterranean coast to the islands off Africa's coast, and then to the Americas before moving back across the world to Indonesia. In order to produce sugar, a new type of agriculture was developed. This was called the Plantation System, in which colonists planted large areas of single crops. These crops could be shipped far and wide, and could be sold at a good price in Europe. In order to increase productivity and profitability, slaves (or indentured servants) were imported to take care of the labor intensive crops. The first crops grown in the Plantation System were sugar cane, but many other crops followed, including coffee and cotton, cocoa and tobacco, tea and rubber, and eventually oil palm.

Keywords : Tobacco, Tea, Rubber, Oil Palm, *Saccharum officinarum*, BCE

I. CULTIVATION

The exact time and location when humans initially started cultivating sugar cane remains unknown in the archeological record, but it is believed to have happened approximately 10,000 years ago in what is currently known as New Guinea. The species that was tamed is *Saccharum*

robustum, which is commonly found in thick groupings near rivers. The individuals in New Guinea were some of the most creative farmers in history. They tamed a wide variety of native plants such as sugar cane, taro, bananas, yam, and breadfruit.

Sugar cane cultivation progressed eastward through the Pacific, reaching the Solomon

Islands, New Hebrides, New Caledonia, and eventually Polynesia. The growth of sugar cane also spread westward to mainland Asia, Indonesia, the Philippines, and later Northern India. In this progression, *S. officinarum* ("nobel canes") crossed with a nearby wild species known as *S. spontaneum* to create a hybrid, *S. sinense* ("thin canes"). These hybrids were not as sweet and robust as pure *S. officinarum*, but they were more resilient and could be grown more effectively in subtropical mainland areas.

It wasn't until around 3,000 years ago that people in India started pressing sugar cane to make sugar, rather than simply eating it as a sweet treat, as they had been doing for a long time (Gopal, 1964). For an extended period, Indian communities maintained the secrecy of sugar production, leading to significant profits from trade throughout the subcontinent. This situation was completely altered with the reign of Darius I (r. In 510 BCE, Darius I (522-486 BCE), who governed the Persian Achaemenid Empire, launched an invasion of India. The winners brought the technology to Persia and started making their own sugar. By the 11th century CE, sugar made up a large part of the commerce between the East and Europe. Sugar production persisted in Persia for close to a millennium, with a rotating group.

It is thought that sugar remained an Asian secret for a long time, but records from the ancient Greeks and Romans would suggest that sugarcane was used in medicine (despite their acknowledgement of its pleasant taste). In 327 BCE Nearchus, a general in the Greek army wrote: "There is a reed in India that brings forth honey without the help of bees, from which an intoxicating drink is made, though the plant bears no fruit." Only a small amount of sugarcane

was brought back from Alexander's conquest in India and traded to physicians. The Romans recorded the first crystallised form of sugarcane, as Pliny the Elder writes: 'Sugar is made in Arabia as well, but Indian sugar is better. It is a kind of honey found in cane, white as gum, and it crunches between the teeth. It comes in lumps the size of a hazelnut. Sugar is used only for medical purposes.'

Sugar – we all crave it, from children to adults. We indulge in it, from sodas, cakes, and assorted candies, during times of sadness and times of celebration. But crystallized sugar, first invented in India, has a dark history, involving conquest, secret societies, and exploitation.

The Middle East hosted one of the most important seminars the world has ever seen. At the Iranian university, Jundi Shapur, Greek, Christian, Jewish and Persian scholars gathered in around 600 A.D. and wrote about a powerful Indian medicine, and how to crystallise it. Arab entrepreneurs then adopted these techniques and expanded the production of sugar cane across Southern Europe and North Africa around 850 AD. This included setting up large plantations with mills and refineries, and included artificial irrigation systems so as to replicate the tropical climate that is native to the sugar cane plant.

The rest of Europe imported sugar from the Arab world, not only for medicinal purposes, but also as a delicacy when combined with almonds: Marzipan. Sugar in the form of confectionary was only initially consumed by Europe's most wealthy, with William of Tyre describing it as 'a most precious product, very necessary for the use and health of mankind'. Tyre was writing in the 12th century during the crusades, as crusaders brought sugar home with them back from the Holy Land, where they

encountered caravans containing 'sweet salt'. Sugar reached England in the 13th century.

Sugar has always been a part of our diet and is one of the oldest commodities in the world. It is thought that man first used cane sugar in Polynesia and spread to India in 510 BC. In the 7th century AD, the Persian Emperor, Darius, invades India where he finds the reed that gives honey without bees. The origin of cane sugar is closely guarded while the finished product is exported. In 642 AD, the Arab peoples invade Persia and discover sugar cane being cultivated and learn how sugar is made. As they expand, they establish sugar production in other countries that they conquer, such as North Africa, and Spain. Sugar was not discovered by western Europeans until the Crusades in 11th century AD. The first record of sugar being used in England is from 1069. The following centuries saw a massive expansion of Western Europe's trade with the east, including the import of sugar. At the time, sugar was considered a luxury.

A new cane press was invented in 1390 which doubled the quantity of juice that each cane could produce. This sparked an economic expansion of the sugar trade, spearheaded by the island of Madeira. Madeira was incredibly accessible by sea, and offered cheaper sugar than the existing European monopolies. The cane was grown in Madeira before being shipped to Antwerp to be refined and distributed. By the late 15th century, Madeira had become Europe's largest producer of sugarcane.

According to German chemist Andreas Marggraf in 1747, sugar is the same sugar found in a sugar beet as it is in sugarcane. The word "sugar" is derived from the Sanskrit word "sugar", which translates to "ground, or candied sugar," originally meaning "grit, gravel".

It is believed that sugar was first discovered in New Guinea thousands of years ago, and then traced to

India and South Asia. The first production of sugar was in northern India around the first century CE, when people chewed raw sugarcane for its sweetness.

India was the first to start sugar production, using the process of forcing sugarcane to produce juice and boiling it to make sugar crystals. The Indians discovered how to make sugar crystals during the Gupta dynasty around 350 AD.

Indian mythology supports the fact it contains legends showing the origin of sugarcane. Today India is the second largest producer of sugarcane next to Brazil. Currently, there are about 4 million hectares of land under sugarcane with an average yield of 70 tonnes per hectare.

India is the largest producer of sugar including traditional cane sugar sweeteners, khandsari & Gur equivalent to 26 million tonnes raw value followed by Brazil in second place at 18.5 million tonnes. Even for white crystal sugar, India has ranked No.1 position in 7 out of the last 10 years.

The traditional sweeteners of India like Gur & Khandsari are consumed mostly by the rural population in the country. In the early 1930's nearly 2/3rd of the sugarcane production was used for the production of alternate sweeteners like Gur & Khandsari. Accordingly, because of the better standard of living & higher incomes, the sweetener demand has shifted to white sugar. Currently, 1/3rd of sugarcane production is used by the Gur & Khandsari sectors.

It is believed the domestication of sugarcane was first carried out by the peoples of New Guinea over 10,000 years ago. Moving from island to island this sweet grass eventually made its way to India. It was in India that the science of creating sugar rock crystals was first developed. There it was known as 'sharkara' Sanskrit for gravel or grit.

The techniques involved heating and cooling, seeding, and agitation of the syrup to produce various qualities and refinement of the sugar. These techniques were passed down to a select few, from master to apprentice. But sugarcane was not simply a sweet, it was also used in medicine. For those with jaundice, a disease producing yellowing of the eyes and skin, rock sugar was prescribed. The disease would cause it to taste very bitter but in time would become sweet as the patient was cured. Sugarcane juice was also used by holy men to provide strength during their austerities.

One holy man, Siddhartha Gautama, was known as being 'born of sugarcane' since his ancestry was traced through the Solar dynasty of Maharaj Ikshvaku (Sanskrit Ikshu meaning 'sugarcane') and back to the first King Manu. In one tradition, it is said that after attaining enlightenment, the first food the Buddha tasted was sugarcane provided by two brothers from Orissa named Tapassu and Bhallika. Seeing his emaciated body, and understanding him to be a holy man, the brothers felt compassion and gave him some sugarcane they were transporting to market. They would subsequently become his first followers.

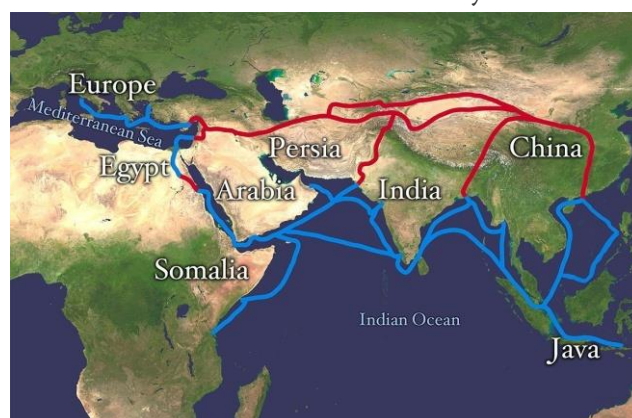
The first written reference to sugar occurs in 325 B.C. after the conquest of Persia and attempted invasion of India by Alexander the Great. One of his admirals, Nearchus, while sailing down the Indus River wrote to his amazement of "a reed in India that brings forth honey without the help of bees." Perhaps this reference to honey indicates not simply the sweetness of the new found sugar but also to its color – which the Indians had not yet developed the process of creating clear white crystals. He also noted the Indians consumed a pudding made of rice, milk, sugar, and cardamom, what today we might call a 'sweet rice'.

It was in India that Alexander first encountered sugar, cardamom, and rice. The Greeks referred to rice as *Oryza* which linguists believe to be a loan word from Tamil 'arici' meaning rice. Alexander brought these items back and spread them throughout his empire.

However, while rice started to be grown in areas as far off as Egypt, sugarcane never really caught on. We know that sugar grows best in tropical environments with lots of rain. Most likely the European and North African environments were not conducive to its growth. With the collapse of Alexander's empire shortly after his death the knowledge of sugar once again fell into obscurity.

In 647 AD the Chinese Emperor Taizong of the Tang dynasty sent a mission to the Kingdom of Magadha (modern Bihar, India) to learn the secrets of sugar making. We know by this time that India had developed the process to refine clear white crystals as the Chinese referred to it as Tang Shuang – 'white frost'. Buddhist monks carried the tradition back to Asia where it is said they became expert in its creation.

India was in a unique geographic position, with Persia, Arabia, and Europe to its West, and Indonesia, China, and Japan to its East. Physically at the center of the ancient world it became a bridge that linked East and West, allowing for the transmission of new trade and ideas by land and sea.



Then in 653 A.D. the Persian empire, under Yazdgerd III, collapsed after years of war with the invading Arab armies. Prince Pirooz, the son of Yazdgerd III, would escape to China where one of his sisters was married to the Emperor.

It is during this period that we find the first Arabic reference to 'shukkar' derived from 'sharkara', ultimately becoming the English loan word sugar. In a similar manner, the Indian word for rock sugar, known as 'khandā' meaning 'a broken piece' in Sanskrit, became Arabic 'qandi', and ultimately ended up in the English lexicon as candy.

By the 10th Century, the persecution of the Persians became so great that a contingent sailed to India in search of peace and freedom. The Persians had heard tales of a pious King named Jadi Rana and sailed to his Kingdom on the coast of Gujarat. It is said the King presented the leaders of the Persians a bowl of milk filled to the brim symbolizing that his Kingdom was full. At this presentation the leader of the Persians took some sugar from a pouch and sprinkled it in the milk – it did not overflow. Like sugar they would blend in and only sweeten the Kingdom. The King then granted them refuge. Their descendants are today known as the Parsis.

In 1099 A.D. European Christians conquered Jerusalem taking it back from the Arabs in the first of what would become nine Crusades. By 1119 A.D. a monastic military order, known as the Knight's Templar, was formed to provide safe travel for pilgrims to the Holy Land. Many myths, legends, and conspiracies surround the Knight's Templar. It was seen as a secret society with its own independent base of political and financial power. Its membership was drawn mostly from the nobility of France and Britain.

When the Knights Templar first entered the Holy Land they encountered caravans carrying 'sweet salt'. This was brought back to Europe where it

quickly became a treat for the nobility. Eventually they would establish their own sugar mill on the island of Cyprus to secure their own independent supply.

The last Crusade ended in 1291 A.D. when the Christians lost the Holy Land to the Arabs. With the defeat the political fortunes for the Templar Knights would change. On Friday, October 13, 1307, the King of France Philip IV ordered the destruction of all Templar Knights. Most were tortured to death and burned at the stake.

No further attempts were made to re-conquer the Middle East. The political reality was, having spent over two hundred years at war with the Arabs, the Europeans were now completely dependent on Arab merchants for access to the riches of the East. Eyeing this wealth they became yellow with envy.

In 1492 Columbus sailed for India as a means of circumventing the Arab and Persian access to the East. He headed West hoping to circumnavigate the earth and end up in India. Instead he landed in a "New World" later to be called the Americas.

Thinking that he had landed in India, Columbus named the natives as 'Indians'. Here he planted the first sugarcane plantation on the island of Hispaniola. To his dying day he insisted he had landed in India regardless of what evidence was presented to him.

The race was now on to conquer this New World and exploit its resources. It is estimated that the native population of the Americas in 1492 was between 50-100 million which collapsed to just 8 million by 1650. This was due in large part to the, often intentional, introduction of new diseases such as smallpox, typhus, influenza, and measles.

The discovery of this new land acted as a European population pressure valve – allowing many of the poor to cross the ocean in search of new opportunities. This reduced population pressures in

Europe, leading to less disease, pollution, and conflict over resources. It is estimated that around 350 million people in the Americas today (North, Central, South) are of direct European ancestry.

With the native population decimated the colonial powers turned to the African slave trade as an economic institution of exploitation. The Trans-Atlantic Slave Trade Database has the most comprehensive shipping records of the slave trade. While these are only estimates, the best figures we have suggest that between 1525 to 1866 approximately 12.5 million Africans were shipped to the New World as slaves, of which 10.7 million survived the trip. Of the 10.7 million approximately 388,000 ended up in North America. The rest went to Central and South America.

Sugarcane reached the 'New World' when Christopher Columbus sailed to Hispaniola, which is modern day Haiti and the Dominican Republic. The island set up mills and refineries, and by 1516, it was the New World's largest producer of sugar. Meanwhile, in 1501, Portuguese explorer Pedro Cabral landed in Brazil by accident, and established several sugar plantations. He left Portuguese workers there to run the production of the sugar, and they invented new mill designs and new refinery methods. It wasn't long before Brazil was producing much more sugar than they could handle. The need for labour was met by the transatlantic slave trade, which involved 12,570,000 people being shipped from Africa to the Americas between 1501 and 1867, for the purpose of facilitating the cultivation of sugarcane. To amplify the problem, coffee, chocolate and tea started being transported to Europe, increasing the demand for sugar and therefore the need for labour, fuelling the abominable slave trade. Britain and the USA abolished slavery when the overproduction of sugar started to make the practice less profitable. Brazil

was the last nation to abolish the use of slaves on plantations in 1888.

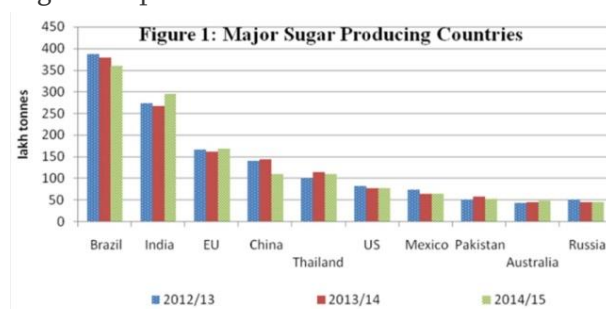
The main propagators of the slave trade were the Portuguese and Spanish, followed by the English. Of the 10.7 million slaves around half ended up working on sugar plantations. Brazil had the largest number with over 4.8 million slaves followed by the various sugar islands in the Caribbean, Trinidad, Barbados, Cuba, and Jamaica.

The life of a slave was one of constant brutality. In his satire 'Candide', the French philosopher Voltaire has one slave describe life in the sugar plantations of Surinam:

"Yes, sir," said the negro, "it is the custom. They give us a pair of linen drawers for our whole garment twice a year. When we work at the sugar-canes, and the mill snatches hold of a finger, they cut off the hand; and when we attempt to run away, they cut off the leg; both cases have happened to me. This is the price at which you eat sugar in Europe."

As sugar production increased the price fell. This expanded the market from the rich to the middle class and finally to the poor of Europe. All of this exploitation for some sweet crystal powder to satisfy the tongue.

Today Brazil is the worlds largest producer of sugar followed far behind by India. While slavery is long gone many still work in harsh conditions in sugarcane plantations around the world.



The Vedic Sages have described the exploitation in the world as a disease like jaundice. Born out of ignorance and false ego, we cause great suffering to

others. The Sages prescribe the rock sugar of the Holy Names of the Lord to cure this disease. At first, spiritual life will appear bitter in our diseased condition. But as we become cured of this exploitative mentality we will taste the sweetness of the knowledge of our original spiritual position, as spiritual brothers and sisters to all.

II. Conclusion

Sugar still represents a significant health concern globally. The cry out for non-artificial and healthy sweeteners is loud and pertinent, yet there is no non-artificial substitute that can carry quite the same flavour as sugar. Similarly, artificial alternatives do not carry the same health benefits that sugar was first cultivated for. Currently, there is 170 million metric tons of sugar produced annually.

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