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Sugars

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- Introduction
- Some sugar producing plants.
- Their description—
- As family, Botanical name,
- Distribution, Botanical characters,
- Cultivation, Industries,
- Economic uses.

Sugars

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- **Introduction-** Sugars are **manufactured by green plants** and so are to be found in small amounts, at least , in all individuals(plants).
- So much of the manufactured product, however, is used directly in the metabolism of the plant and so that comparatively **little is accumulated**.
- Storage sugars are to be found in roots, as in the case of beets, carrots etc, in stems, as in sugarcane, maize, sorghum, sugar maple, in leaf as in Stevia, in flower, such as palm and in many fruits.
- Several types of sugar are to be found, chief among which are **sucrose**(in cane sugar), glucose(in grapes) and fructose(fruit sugar).
- Sugar is one of the most necessary food for man. It can be readily assimilated by the human body. Sugar is an **energy producer**.

- **Some sugar producing plants-**
- The world's major supply of sugar come from --
- 1. **Sugarcane**- Family- Poaceae, Botanical name- Saccharum officinarum. (from culms). and
- 2. **Sugarbeet**- Amaranthaceae, Beta vulgaris .(from roots).
- A small quantity is also obtained from----
- 3. **Sugarmaple**- Poaceae, Acer saccharum(Confined in North America).
- 4. **Palm sugar**-- all belongs to family- **Areaceae**
- i. Phoenix sylvestris (wild date).
- ii. Cocos nucifera (Coconut).
- iii. Caryota urens (Toddy palm).
- iv. Arenga pinnata (Gomuti palm).
- v. Borassus flabellifer (Palmyra palm)
- 5. **Stevia sugar**- Asteraceae, Stevia rebaudiana

Sugarcane

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Sugar, Jaggery

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Jaggery and Molasses

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Beet Root

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WILD DATE

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COCONUT TREE

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Toddy palm

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Toddy palm other products

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Sugarcane description

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- Sugarcane- Family- Poaceae, Botanical name- Saccharum officinarum.
- The Dutch first established sugar works in Brazil in 1580. Sugarcane was first introduced in U.S.A. in 1741.
- Sugarcane is the world's largest crop by production quantity, with 1.8 billion tonnes produced in 2017, with Brazil accounting for 40% of the world total. In 2012, the Food and Agriculture Organization estimated it was cultivated on about 26 million hectares (64 million acres), in more than 90 countries.
- In India, it is chiefly grown in Uttar Pradesh, Bihar, South India and Punjab.
- Sugarcane accounts for 79% of sugar produced; most of the rest is made from sugar beets.
- Sugarcane is a cash crop.
- The sugar industry in India is the second largest industry in the country.(next to textile)

Sugarcane

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- Sugarcane is a tropical, perennial grass that forms lateral shoots at the base to produce multiple stems, typically 3 to 4 m (10 to 13 ft) high and about 5 cm (2 in) in diameter. The stems grow into cane stalk which, when mature, constitutes around 75% of the entire plant. The Jointed, fibrous stalks or stems are rich in sucrose($C_{12}H_{22}O_{11}$)which accumulates in the stalk internodes.
- A mature stalk is typically composed of 11–16% fiber, **12–16% soluble sugars**, 2–3% non-sugars, and 63–73% water.
- A sugarcane crop is sensitive to climate, soil type, irrigation, fertilizers, insects, disease control, varieties, and the harvest period. The average yield of cane stalk is 60–70 tonnes per hectare (24–28 long ton/acre; 27–31 short ton/acre) per year. However, this figure can vary between 30 and 180 tonnes per hectare depending on knowledge and crop management approach used in sugarcane cultivation.

- Manufacture of cane sugar- This process involves following steps in the Industries -
- Extraction of the juice.
- Clarification of juice- Sulphination and Carbonation.
- Concentration and crystallisation.
- Separation of crystals.
- Refining of sugar.
- Recovery of sugar molasses(mother liquor).
- Global production of sugarcane in 2018 was 1.91 billion tonnes, with Brazil producing 39% of the world total, **India with 20%**, and China and Thailand producing about 6% each.

- Economic uses-
- 1. Globally Sugarcane is used to produce **sugar** as the main product.
Gur and **Jaggery** are used for sweetening purposes and sugarcane juice is also used as beverages.
- 2. There are three by- products of sugar industry as **bagasse, molasses and press mud**.
 - a)Bagasse- This is used mainly as fuel. It is also used for the manufacture of paper pulp, cardboard and insulation board.
 - b)Molasses- (Mother liquor residue after sugar preparation) has demand in the preparation of acetic acid, aconitic acid, power alcohol, chemicals, chloroform in different industries.
 - c) Press mud- used in the manufacture of carbon paper and polish.

Sugarcane

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Economic uses-

- 3. It is used in food preservation.
- 4. The sugar is used as an article of food and sweetening agent in sweets and drinks as milk, tea, coffee etc.

Sugarcane juice, Jaggery, Molasses 16



Sugarbeet, Sugarcane, Stevia 17



- A second important source of sugar is the **sugar beet**.
Amaranthaceae, Beta vulgaris.(from roots).
- A small quantity is also obtained from----
- The juice of **several species of palm** constitutes a source of commercial sugar. The date palm is tapped .

THANKS

Stevia

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- ***Stevia rebaudiana*** is a plant species in the genus Stevia of the sunflower family (Asteraceae). It is commonly known as **candyleaf**, **sweetleaf** or **sugarleaf**.^{[1][2]}
- It is a small seasonal plant which grows to a height of 1–2 feet (30–61 cm).^[2] It has elongated leaves that grow along the stems and are lined up against each other. Flowers are typically trimmed to improve the taste of the leaves.^[3] Stevia is a tender perennial native to parts of Brazil and Paraguay having humid, wet environments.^{[2][3]}
- Stevia is widely grown for its leaves, from which extracts can be manufactured as sweetener products known generically as stevia and sold under various trade names.^[4] The chemical compounds that produce its sweetness are various steviol glycosides (mainly stevioside and rebaudioside), which **have 200–300 times the sweetness of sugar**.^{[2][5]}
- When extracts of its leaves are processed into a powder, stevia is used as a **sugar substitute** in most of the developed world.^[1]