

# SUGAR – ROLE IN COOKERY



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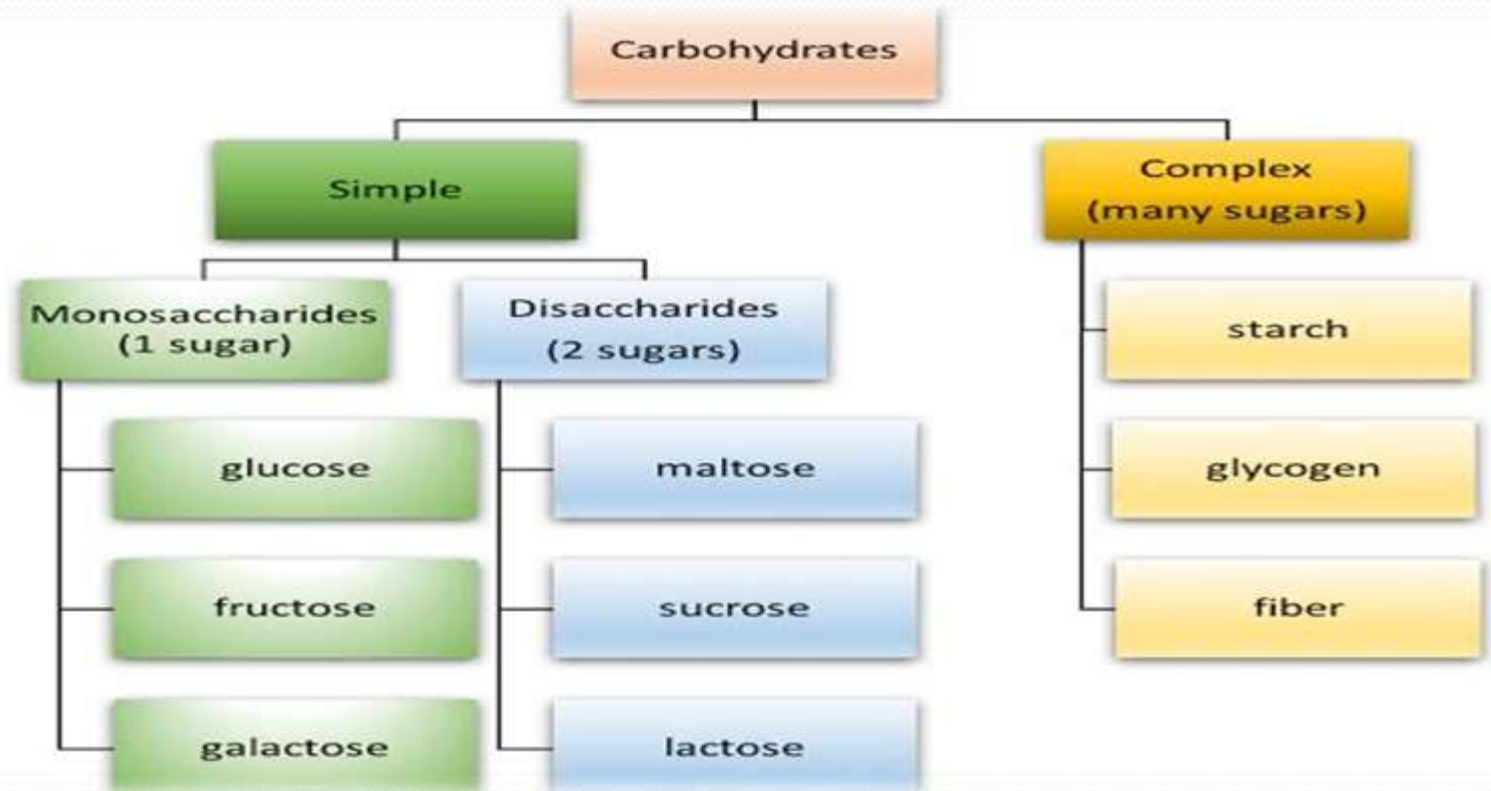
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# INTRODUCTION

- Sugar is a simple **carbohydrate**.
- Sugar provides fuel to the body.
- It can be broken down in to groups and subgroups.



# Nutritive value of sugar

- Sugar provides only energy to the body.
- Foods with high sugar content generally have **low nutrient density**
- **Sugars are source of energy, not source of nutrients**
- Molasses and honey
  - provide very small amounts of other nutrients in addition to energy.



# PROPERTIES OF SUGAR

- Properties of sugar are-

- 1.Solubility

- 2.Absorption of moisture- Hygroscopic

- 3.Fermentation

- 4.Acid hydrolysis

- 5.Enzyme hydrolysis

- 6.Melting point and decomposition by heat:

**Caramelisation**

- 7.Decomposition by alkalies

- 8.Sweetness

# Solubility

- In natural state of foods, sugars are in solution
- Crystallisation of sugar occurs from saturated sugar solution. This is used in the commercial production of sugar from sugar cane and sugar beets.
- Sugars vary in solubility
- Most soluble sugar is fructose but difficult to crystallise
- Lactose is the least soluble sugar

# Absorption of Moisture

- Hygroscopic in nature (absorbs moisture)
- Fructose is more hygroscopic than other sugars
- Cakes made with honey and molasses remain moist for a long time.

# Fermentation

- Sugars may be fermented by yeasts to produce carbon dioxide and alcohol.
- Bread, wine ,beer are products of fermentation.
- The gas carbon dioxide produced leavens the product.
- Alcohol volatilizes during baking.



# Acid hydrolysis

- Sucrose is easily hydrolysed by acid.
- End products of sucrose hydrolysis are a mixture of glucose and fructose.
- This mixture is commonly called “Invert Sugar”.
- Monosaccharides are not affected by acids.
- Heat enhances the action of acid.

# Enzyme hydrolysis

- Invertase or sucrase enzyme is used in candy industry to hydrolyse sucrose in cream fondant to fructose and fructose.
- This is done to produce soft, semifluid centers in chocolates.

# Melting point and decomposition by heat:

## Caramelisation

- It is a complex reaction, involving the removal of water and eventual **polymerisation**.
- Caramel has pungent taste, bitter and is less sweet than original sugar and is non crystalline.
- It is soluble in water.
- Fructose caramelizes at 110°C, maltose-180°C and galactose at 170°C .



# Decomposition by alkalies

- Monosaccharides are decomposed by alkalies.
- Flavour may become bitter and strong.
- Sucrose is least affected by alkalies.

# Sweetness

Level of sweetness in food-

- Most sweet- Fructose
- Sucrose
- Glucose
- Galactose
- Maltose
- Least sweet-Lactose
- Sweeter the sugar the more simple the molecule

# SUGAR COOKERY

- Testing the doneness of sugar mixtures by measuring the temperature of the boiling solution is a method of estimating the concentration of sugar in mixture.
- The final concentration of sugar is related to the consistency of the product when it is completely prepared.
- More concentrated sugar solution gives more firm consistency of the finished product

# The Seven Stages of Cooking Sugar

<b>Thread</b>	<b>230° to 234° F</b>	<b>The syrup spins a soft, loose, short thread. Types of candy: syrup</b>
<b>Soft Ball</b>	<b>234° to 240° F</b>	<b>The syrup forms a soft, pliable, sticky ball. Types of candy: fudge, fondant, and butter creams</b>
<b>Firm Ball</b>	<b>244° to 248° F</b>	<b>The syrup forms a firm, but still pliable, sticky ball. Types of candy: marshmallows</b>
<b>Hard Ball</b>	<b>250° to 265° F</b>	<b>The syrup forms a hard, sticky ball. Types of candy: nougats and divinity</b>
<b>Soft Crack</b>	<b>270° to 290° F</b>	<b>The syrup forms longer strands that are firm, but yet remain pliable. Types of candy: toffee and butterscotch</b>
<b>Hard Crack</b>	<b>300° to 310° F</b>	<b>The syrup forms stiff strands that are firm and brittle. Types of candy: lollipops, brittle, and glazed fruit</b>
<b>Caramel</b>	<b>320° to 338° F</b>	<b>The syrup changes color, ranging from a light golden to a dark amber brown. It forms hard strands that are firm. Types of candy: caramels and pralines</b>

# Crystallisation

- **Crystallisation occurs only when solution is super saturated.**
- Factors affecting crystallization-
- Nature of crystallising substances
- Concentration of the solution
- Agitation or stirring
- Impurities
- Addition of acid



# Classification of candies

- Boiled sugar solutions may be treated to produce
  1. Crystalline candies- they are soft, smooth and creamy
  2. Non-crystalline candies- also known as amorphous candies which means without form. They are chewy such as caramels or hard as toffees and brittles

# Crystalline Candy

- Contains fine sugar crystals
- Texture is smooth and creamy

Examples: Fudge, fondant,  
divinity



# Noncrystalline Candy

- Does not contain sugar crystals
- Texture is chewy or brittle

Examples: Caramels,  
peanut brittle, toffee



# Functions of sugar in food

- **Sweetener**- used for sweetening ice cream, fruit juices, sherbet etc.
- **Preservative**- In high concentration it prevents the growth of microorganisms eg. jams and jellies
- **Tenderizer**- It helps in improving the texture of cake and confectionary.
- **Crystallization**- This property is used in preparation of laddoo, fondant and fudge
- **Fermentation**-Increases the fermentation of yeast eg. bread, wine, beer etc.
- **Caramelization**- Caramel sugar is used to improve colour and flavour

# SUGAR RELATED PRODUCTS

- Corn syrup-
- Maltodextrins
- Molasses
- Maple syrup
- Honey
- Jaggery
- Caramel sugar



# Artificial Sweeteners

- They are synthetic sugars substitutes but may be derived from naturally occurring substances, including herbs or sugar itself.
- They are also known as intense sweeteners because they are sweeter than regular sugar.
- Usually they don't have calories.



# ARTIFICIAL SWEETENERS

everyone should avoid

INGREDIENT	BRAND NAMES	SWEETNESS
<b>Aspartame</b>	Equal, NutraSweet & Sugar Twin	180 times sweeter than sugar
<b>Acesulframe-K</b>	Sweet One & Sunset	200 times sweeter than sugar
<b>Saccharin</b>	Sweet N' Low, Necta Sweet & Sweet Twin	300 times sweeter than sugar
<b>Sucralose</b>	Splenda & Canderel	600 times sweeter than sugar
<b>Neotame</b>	Newtame	7,000 - 13,000 times sweeter than sugar
<b>Advantame</b>	No brand names	20,000 times sweeter than sugar



**THANK YOU**