PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

SUGARS

MA II (SEM)

PAPER NAME: FOOD SCIENCE AND EXPERIMENTAL FOODS

PAPER CODE: HSC M 205

DR. PRIYANKA SHANKAR
ASSISTANT PROFESSOR
P G DEPARTMENT OF HOME SCIENCE
PATNA WOMEN'S COLLEGE
PATNA UNIVERSITY

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Introduction

Sugars are simple carbohydrates classified as *monosaccharides or disaccharides*.

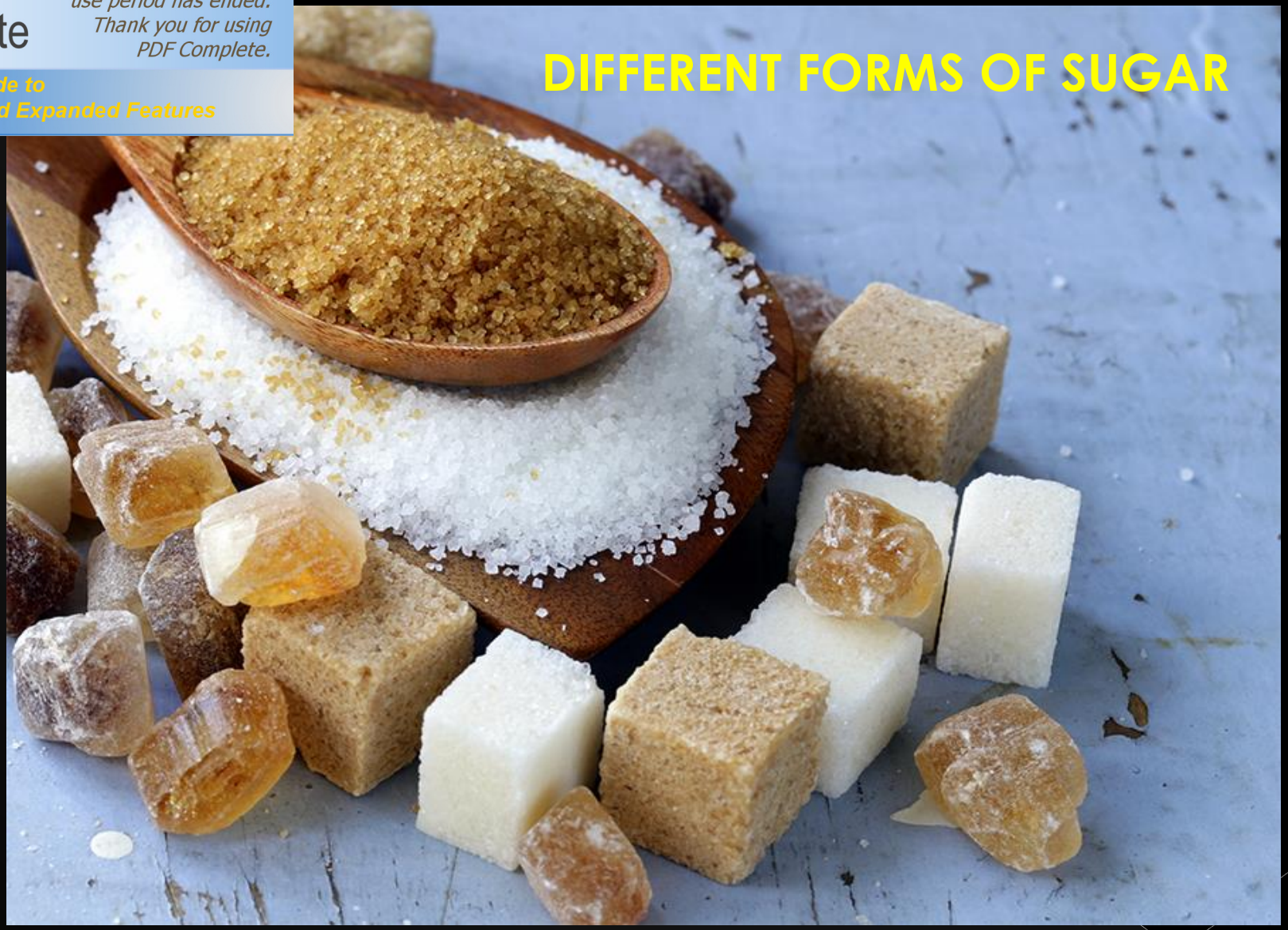
The common granulated or **table sugar** is the dissacharide **sucrose**, made of glucose and fructose.

Table sugar comes from two sources:

It naturally exists as syrup in the ***sugar cane*** or in ***sugar beet***, *both of which are identical in chemical composition.*

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

DIFFERENT FORMS OF SUGAR



Source : https://www.google.com/search?q=food+starch+crystals

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

SOURCES

Sugar cane has been used for centuries to produce sugar. It is washed, shredded, pressed, and heated, and the extracted juice is centrifuged to create raw sugar with its slightly brown colour.

As the juice is centrifuged, molasses separates from the crystals and becomes a by-product of sugarcane- sugar production. The crystals then are further refined for uses in various forms.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Roots of the beet are less frequently used to produce sugar and were first extracted in the 1790s. They too are washed, shredded, and so forth.

Then roots are treated with lime to remove impurities and further refined to yield usable sugar.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

es of sugar in food systems

The roles of sugars are diverse.

Sugar may be utilized in *trace amounts or it may be the primary ingredient of a formulation.*

Sugar imparts sweetness, tenderness, and browning; is hygroscopic (water retaining); and functions in various other ways in food systems.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Sweetness

Sugar provides flavour appeal to foods, and therefore is incorporated into many foods.

It is a significant ingredient of candy, baked goods, and frostings as well as some beverages and may be used in a less significant manner or not at all in other foods.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Tenderness

A batter/dough formula *with sugar is more tender than one without sugar because* sugar binds with each of the two proteins gliadin and glutenin and absorbs water so they do *not form gluten.*

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Browning

Sugar browns and imparts colour to foods by two types of non-enzymatic browning, including

(1) Low temperature Maillard browning reaction

(2) High temperature caramelization

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Maillard browning *involves the reaction of the carbonyl group of a reducing* sugar with the amine group of an amino acid and occurs with *low temperature* heat, a high pH, and low moisture.

Maillard browning is responsible for the colour changes that occur in many baked breads, cakes, and pie crusts, canned milks, meats, as well as caramel candies.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Maillard browning

https://www.google.com/search?q=browning+reactions+in+food

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

***ion** is a nonenzymatic browning process that occurs in sugars heated to high temperatures.*

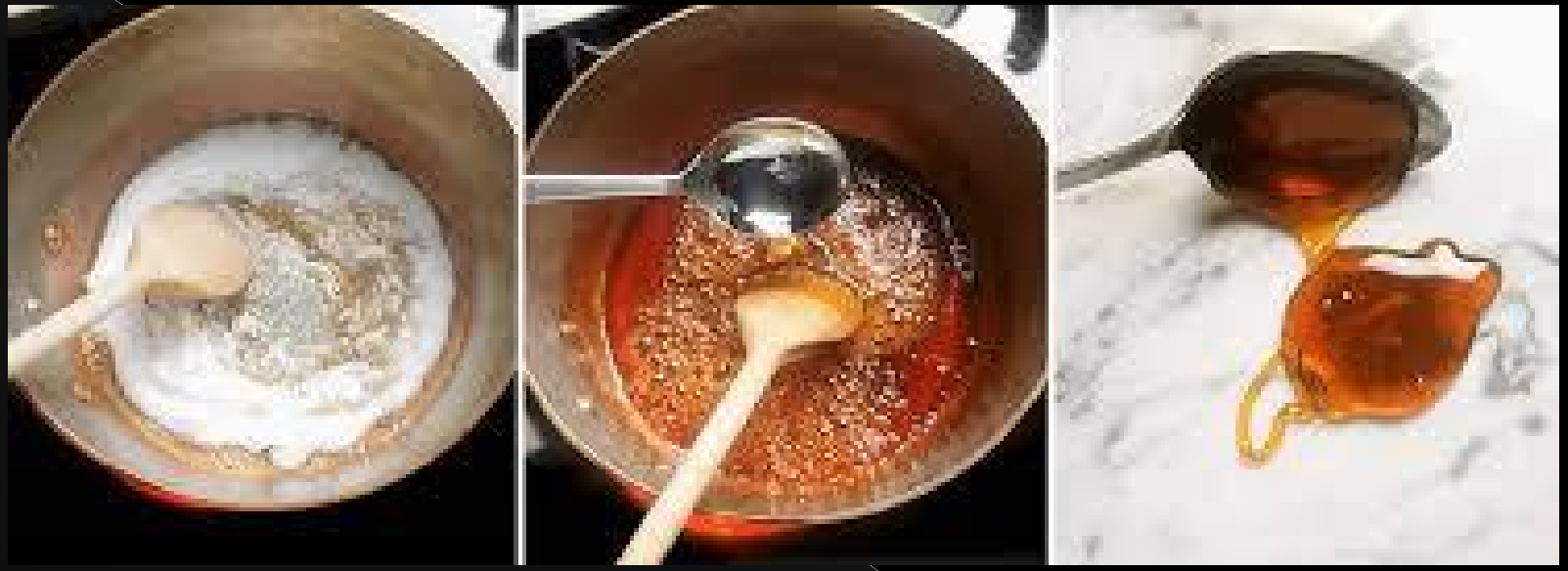
As sugar is heated to temperatures above its melting point (170 °C), it dehydrates and decomposes.

The sugar ring (either pyranose or furanose) opens and loses water.

Thus, sugar becomes brown, more concentrated, and develops a caramel flavour as it continues to increase in temperature.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Contd...



CARAMELIZATION OF SUGAR

https://www.google.com/search?q=sugar+caramelization+stages

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Roles of Sugar in Food Systems

- Functions as a *separating agent to prevent lump formation in* starch-thickened sauces.
- *Reduces starch gelatinization.*
- *Dehydrates pectin and permits gel formation in* jelly-making.
- Stabilizes *egg white foams.*

Å Raises the coagulation temperature of protein mixtures .

•

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

- *Adds bulk and body to foods such as yogurt.*
- Helps *aerate batters and dough.*
- Reduces gluten structure by competing with gliadin and glutenin for water, thus increasing *tenderness.*
- Acts as the substrate that *ferments to yield CO2 and alcohol.*
- Adds *moisture retention properties to baked products.*
- Slows/prevents crystallization in candies if invert sugar is used

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Properties of Sugars

Sugars (glucose, fructose, maltose, sucrose, and lactose) share the following characteristics in varying degrees:

(1) They are usually used for their sweetness.

(2) They are soluble in water and readily form syrups.

(3) They form crystals when water is evaporated from their solutions (this is the way sucrose is recovered from sugarcane juice).

(4) They supply energy.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

(5) They are readily fermented by microorganisms.

(6) They prevent the growth of microorganisms in high concentration, so they may be used as a preservative.

(7) They darken in colour or caramelize on heating.

(8) Some of them combine with proteins to give dark colours, known as the browning reaction.

(9) They give body and mouth feel to solutions in addition to sweetness.

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

Thanks...

PDF Complete
Your complimentary use period has ended. Thank you for using PDF Complete.
Click Here to upgrade to Unlimited Pages and Expanded Features

hes

(1) They are not sweet
(2) They are not readily soluble in cold water
(3) They form pastes and gels in hot water
(4) They provide a reserve energy source in plants and supply energy in nutrition
(5) They occur in seeds and tubers as characteristic starch granules.
(6) When a suspension of starch granules in water is heated, the granules swell due to water uptake and gelatinize; this increases the viscosity of the suspension and, finally, a paste is formed which, on cooling, can form a gel. Because of their viscosity, starch pastes are used to thicken foods, and starch gels, which can be modified by sugar or acid, are used in puddings.
(7) Both pastes and gels can revert or retrograde back to the insoluble form on freezing or ageing, causing changes in food texture. Partial breakdown of starches yields dextrins, which are intermediate in chain length between starches and sugars and exhibit other properties intermediate between these two classes of compounds.