# DENTAL PRODUCTS

# DENTAL PRODUCTS

- The substances used to produce effect on teeth and in dental cavity is called as dental products.
- E.g. Sodium fluoride.

# DENTAL PRODUCTS: Types

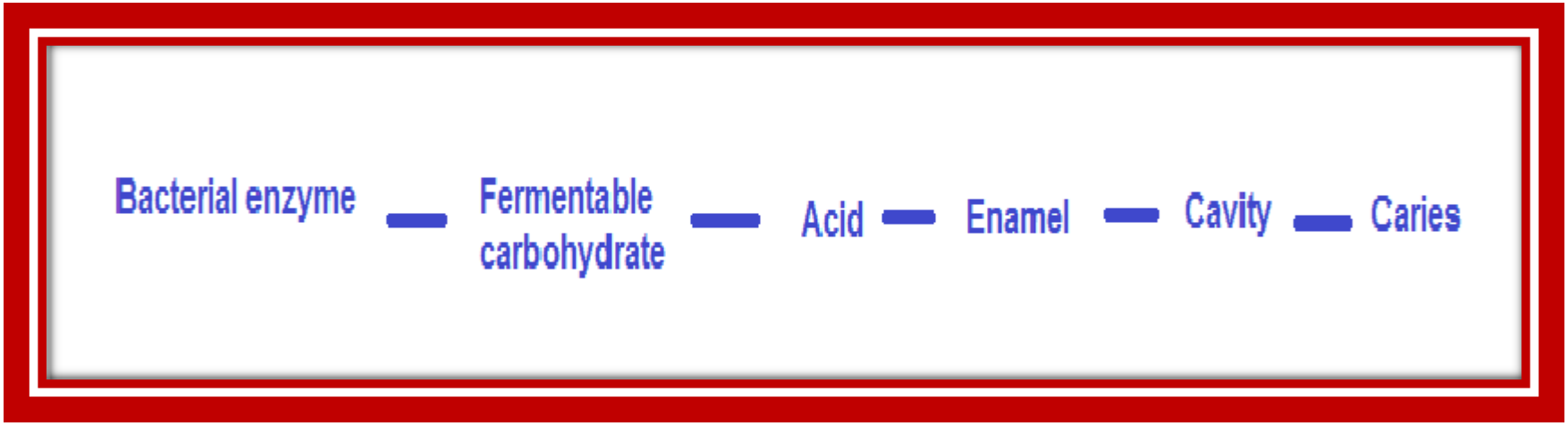
- **Anti caries agent :**
  - sodium fluoride
- **Cleaning agent :**
  - Dibasic calcium phosphate
- **Polishing agent :**
  - sodium metaphosphate
- **Desensitization agents :**
  - Zinc chloride

# Anticaries agent

- The chemical compound used to prevent the dental caries produced by the action of microorganism in the mouth.

# Three types

- Topical
- Immunological
- Systemic




- **DENTAL CARIES IS DEFINED AS A PROGRESSIVE IRREVERSIBLE MICROBIAL DISEASE AFFECTING THE HARD PARTS OF TOOTH LEAD TO DEMINERALIZATION OF INORGANIC CONSTITUENTS AND DISSOLUTION OF ORGANIC CONSTITUENTS THEREBY PRODUCING THE DENTAL CAVITY. THE WORD CARIES ARISE FROM LATIN MEANS ROT OR DECAY.**

# Ideal properties of anti caries agent

ACCEPTABLE TASTE

DEGREE OF SPECIFICITY

NOT PRODUCE LOCAL IRRITATION

DESTROYED OR INACTIVATED BY GIT

ABLE TO PENETRATE DENSE MICROBIAL PLAQUE.

# Types based on mechanism of action

- **SUBSTANCE ALTER TOOTH STRUCTURE OR SURFACE.**
- **EG.FLUORIDES, IODIDES, SILVER NITRATE, ZINC CHLORIDE.**
- **SUBSTANCE INTERFERE WITH CARBOHYDRATE DEGRADATION THROUGH ENZYMATIC ALTERATION WHICH INCLUDES SARCOSIDE AND VITAMIN K**
- **SUBSTANCE WHICH INTERFERE WITH BACTERIAL GROWTH AND METABOLISM.**
- **ANTIBIOTICS**

# Role of fluorides as anticaries agent

- IT IS A TRACE ELEMENT OCCUR IN OUR BODY. IT IS OBTAINED FROM FOOD AND WATER.
- IN SOME PLACES WHERE IT LACKS FLUORIDE, DRINKING WATER CAN BE FLUORINATED BY PROCESS CALLED FLUORIDATION.
- FLUORIDE IS ADMINISTERED INTO THE BODY BY ORAL OR TOPICAL ROUTE. SODIUM FLUORIDE TABLET 2.2MG/ DAILY
- 2% SODIUM FLUORIDE SOLUTION THAT CAN BE APPLIED TOPICALLY ON TEETH.

# Role of fluorides as anticaries agent

- Prevention of tooth decay
- It occurs naturally it is mainly used to prevent tooth decay. During tooth formation fluoride is taken up into enamel which helps to reduce the tooth decay later.
- It helps to maintain bone structure, very low dose of fluoride salts may be used to treat conditions that cause faster bone loss than normal.

## Source

- Fluoridated water
- sea food

## Dose

- Infant 0.01 mg/ day - 0.5 mg/day
- children 1-13 years 0.7 - 2 mg/daily
- Adults 3-4 mg/ daily
- Females 3 mg/ daily

# SODIUM FLUORIDE

## Physical properties

- Aqueous solution of NaF corrodes glass container hence it should be prepared in distilled water and stored in a dark colored pyrex bottle.

## Chemical properties

- sodium fluoride reacts with sulphuric acid yield hydrofluoric acid

# Preparation

## Sodium carbonate is treated with HF gives NaF

water

$Na_2CO_3 + 2HF \longrightarrow 2NaF + H_2O + CO_2$

Sodium carbonate — Hydro fluoric acid — Sodium fluoride — carbon di oxide

$CaF_2 + Na_2CO_3 \longrightarrow 2NaF + CaCO_3$

Calcium fluoride — Sodium carbonate — sodium fluoride — calcium carbonate

$2AlF_3 2NaF + 2NaOH \longrightarrow 8NaF + 2AlF_2 + H_2O_2$

Cryolite ore — Sodium hydroxide — Sodium fluoride — Hydrogen per oxide

should not be stored in glass container

$$2\,NaF + H_2SO_4 \longrightarrow 2\,HF + Na_2SO_4$$

sodium fluoride — sulphuric acid — Hydro fluoric acid — sodium sulphate

$$Na_2SiO_3 + 6HF \longrightarrow Na_2SiF_6 + 3\,H_2O$$

This gas attacks the silicate and glass

# Assay

- Complexometric titration
- Substance treated with water and boil it, add standard lead nitrate titrate it against disodium edetate using xylenol orange as indicator. The end point is appearance of violet color
- Non - Aqueous titration
- By this titration also we can assay NaF.

# USES

1. Anticaries agent
2. Prophylaxis of dental caries.
3. Manufacturing of dental products.
4. Used for preparation of insecticides and rodenticides.

# Uses

- Important agent in dental practice for retarding or preventing dental carries.
- It renders more resistant to enamel of the teeth against acid.
- 2 % aqueous solution has topical agent.
- NaF paste contains 75% NaF and 25% glycerol which is applied to teeth rubbed for one minute and removed by mouth wash.

# Uses and Caution

- Insecticide for cockroach and ants
- Used for fluoridation of drinking water

Caution

- Large dose are poisonous.
- Fluoride in water should not be more than 3 ppm [ 1.5 - 3 ppm] leads to mottling of teeth nausea etc..

## Storage

" It should be stored in well closed container at a cool place."

# DENTRIFRICES

- Agents used to clean and polish the natural teeth. This will be called as dentrifrices they are used along with tooth brush.
- Eg.Powder gel
- They are available as powder, paste, gel or liquid form in market.They are used to remove debris and dental plaque.

# CALCIUM CARBONATE

## Preparation

$$CaCl_2 + Na_2CO_3 \longrightarrow CaCO_3 + NaCl$$

Calcium chloride

Sodium carbonate

Calcium carbonate

Sodium chloride

# Assay-ComplexometricTitration

Substance dissolved in HCl, then add NaOH to adjust the PH to 12.Titrate it against disodium edetate using naphthol green as indicator. The end point is appearance of deep blue colour.

## Use

- Dental cleaning
- Polishing agent
- It is common ingredient for tooth powder and paste..

# DIBASIC CALCIUM PHOSPHATE CAHPO4

## Preparation

Disodium hydrogen phosphate

sodium chloride

$$CaCl_2 + Na_2HPO_4 \longrightarrow CaHPO_4 + 2NaCl$$

calcium chloride

Calcium hydrogen phosphate

## Assay

- Complexometric titration
- Substance treated with HCl then add excess of disodium edetate then add strong ammonia.

## Use

- Cleaning action
- oral electrolyte replenisher
- Good source of calcium and phosphorous for growing children pregnant woman and lactating mother.

# ZINC CHLORIDE

## Preparation

$$Zn + HCl \longrightarrow ZnCl_2 + H_2$$

zinc granules — Zinc chloride

$$ZnO + 2HCl \longrightarrow ZnCl_2 + H_2O$$

$$ZnCO_3 + 2\,HCl \longrightarrow ZnCl_2 + H_2O + CO_2$$

$$Zn + HgCl_2 \longrightarrow ZnCl_2 + Hg$$

## PROPERTIES

- Deliquescent in nature

## ASSAY

## COMPLEXOMETRIC TITRATION

- substance treated with H2O then ammonia - ammonium chloride buffer is added to maintain the ph. titrate it against disodium edetate using solochrome black-T as an indicator, the end point is appearance of deep blue color.

# THANK YOU