

An aerial photograph of a tropical ocean scene. The water transitions from a deep blue at the horizon to a vibrant turquoise in the foreground. White, frothy waves are visible, breaking in several places. The sky is a clear, deep blue, dotted with scattered white clouds. The overall atmosphere is serene and majestic.

In the name of lofty unique

TOOTH PASTE





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TOOTH PASTE

- ◉ Paste or gel
- ◉ Clean
- ◉ Maintain the aesthetics and health of teeth

TOOTH PASTE FORMULATION

INGREDIENTS

- ◉ Abrasive
- ◉ Detergent
- ◉ Humectant
- ◉ Gelling agent
- ◉ Flavor
- ◉ Preservative
- ◉ Color

ABRASIVE

- ◉ Cleaning
- ◉ Polishing
- ◉ Abrasive potential

ABRASIVE PROPERTIES

- ◉ Solid
- ◉ Insoluble particles
- ◉ Inherent characteristics
- ◉ Brittle

ABRASIVE PROPERTIES

- ◉ Hardness
- ◉ Particle shape
- ◉ Particle size
- ◉ Potential for fluoride interaction

ABRASIVE TYPES

- ◉ Carbonates
- ◉ Phosphate Salts
- ◉ Silica
- ◉ Others

CALCIUM CARBONATE

- ◉ Aragonite & Calcite
- ◉ Several grades (2-20 μm)
- ◉ Efficient cleaner
- ◉ 20 μm < \times



CALCIUM CARBONATE

DISADVANTAGES

- ◉ Does not produce good luster on teeth
- ◉ Incompatibility with fluorides
- ◉ Alkaline reaction with tubes (sodium silicate)

DICALCIUM PHOSPHATE DIHYDRATE

(DCP)

- ◉ Most commonly used in dentifrices
- ◉ The pH range 6-8
- ◉ Better taste

DICALCIUM PHOSPHATE DIHYDRATE (DCP) DISADVANTAGES

- ⦿ Metastable
- ⦿ Converted to anhydrous form
- ⦿ Harden the paste
- ⦿ Accelerated by fluorides

STABILIZER FOR DCP

- ⦿ Three magnesium phosphate
- ⦿ Tetra sodium pyrophosphate
- ⦿ Calcium sodium pyrophosphate

DICALCIUM PHOSPHATE (ANHYDROUS DCP) & TRICALCIUM PHOSPHATE

- ◉ More abrasive than DCP
- ◉ Less soluble and compatible with F-

Tricalcium phosphate (TCP)

- ◉ Less soluble than DCP
- ◉ Is not popular

CALCIUM PYROPHOSPHATE (CCP)

- ◉ Compatible with sodium fluoride
- ◉ Selective abrasive for fluoride containing toothpastes
- ◉ low soluble calcium

INSOLUBLE SODIUM METAPHOSPHATE

(IMP)

- ◉ Without Calcium ion
- ◉ Compatible with F-
- ◉ Small proportions of soluble phosphate

TOOTH GEL ABRASIVES

- ◉ Hydrated alumina
- ◉ Silica
- ◉ Sodium aluminum silicates

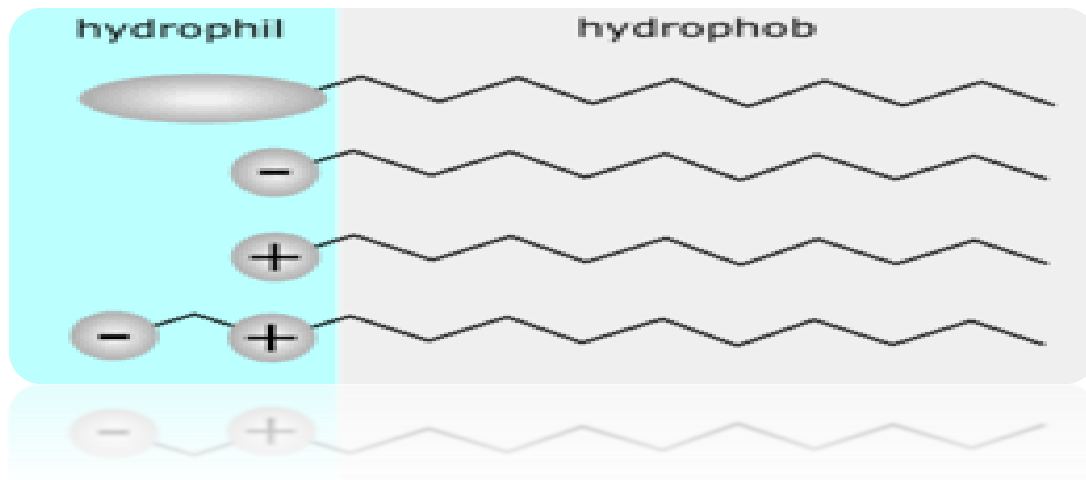


SURFACTANTS

- ◉ Produce foam
- ◉ Aid in the removal of debris
- ◉ Emulsifies flavoring agents

SURFACTANTS DISADVANTAGES

- ◉ May react with other toothpaste components
- ◉ High level may cause mucosal irritation



SURFACTANT TYPES

- ◉ Sodium Lauryl Sulfate
- ◉ Sodium N-Lauroyl Sarcosinate (high solubility)
- ◉ Sodium ricinoleate (high solubility, incompatible with calcium)
- ◉ Na Sulforicinoleate

SURFACTANT TYPES

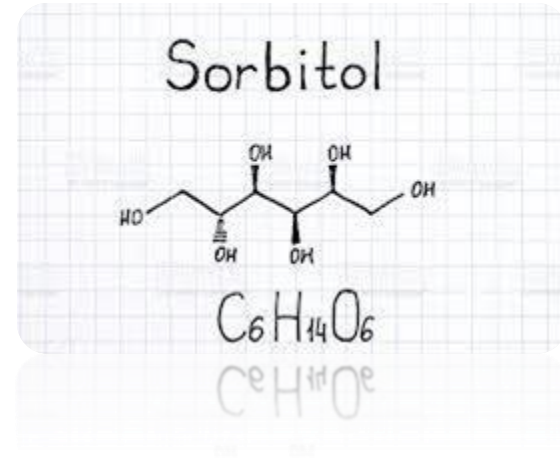
- ◉ Sodium Dodecyl Benzene Sulfonate
- ◉ Na lauryl ether sulfate
- ◉ Coco monoglyceride sulfate
- ◉ Alkane sulfonates
- ◉ Alkyl polyether carboxylate

HUMECTANT

- ⦿ Prevent loss of water
- ⦿ Prevent hardening of the product upon exposure to air
- ⦿ Affect taste perception
- ⦿ Proper usage level produce a clear translucent toothpaste

HUMECTANT TYPES

- Glycerine
- Sorbitol
- Polyethylene Glycol
- Xylitol
- Propylene Glycol



BINDER OR GELLING AGENT

- ◉ Stabilize toothpaste formulations
- ◉ Prevent separation of the liquid and solid phases
- ◉ Improve dispersity
- ◉ Enhance foaming

BINDER OR GELLING AGENT TYPES

Natural Polymers

- ◉ Tragacanth
- ◉ Cellulose derivatives:

CMC or HEC(cationic)

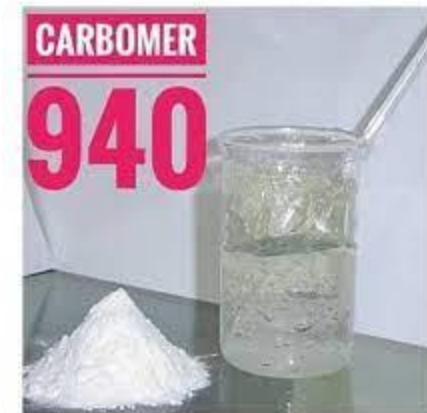
- ◉ Carrageenans
- ◉ Xanthan Gum



BINDER OR GELLING AGENT TYPES

Synthetic Polymers

- Carbopol
- Others
- Starch derivate
- Laponite (Hectorite derivate)



SWEETENER

- ◉ An important part of toothpaste flavoring system
- ◉ Non-carcinogenic
- ◉ Sodium Saccharin
- ◉ Sodium Cyclamate
- ◉ Acesulfame K



FLAVOR

- ◉ Improve taste of toothpaste
- ◉ One of the most important factors for consumer
- ◉ A mixture of flavoring agents

FLAVOR TYPES

- ◉ Minty
- ◉ Fruity
- ◉ Cinnamon

PRESERVATIVES

- ⦿ Potassium Sorbate
- ⦿ Parabens
- ⦿ Sodium benzoate

TYPICAL COMPOSITION

Ingredients	Weight %
Humectants	6 - 20
Water	0 - 50
Binders	0 - 12
Abrasive	18 - 50
Flavor	0.5 - 2.0
Sweetener	0.2 - 1.0
Surfactant	0.5 - 2.0
Fluoride	0.2 - 1.2

EXAMPLE

◉ Calcium carbonate	56
◉ Sodium lauryl sulfate	1
◉ Glycerin	22
◉ Gum tragacanth	1. 5
◉ Sodium saccharine	0. 1
◉ Flavor	q.s.
◉ Water	up to 100

WHITENING

- ◉ Calcium Peroxide
- ◉ Hydrogen Peroxide
- ◉ Carbamide peroxide (urea & H₂O₂)
- ◉ Sodium perborate



ANTI-CARIES TOOTHPASTE

Bacteriostatic agents

- ⦿ Benztonium chloride
- ⦿ Chlorhexidine
- ⦿ Hexachlorophene

FLUORIDES

- ⦿ Sodium Fluoride NaF
- ⦿ Sodium Monofluorophosphate MFP
- ⦿ Stannous Fluoride SnF_2
- ⦿ Ferric fluoride

FLUORIDES

- ◉ Zirconium fluoride
- ◉ Stannous fluoro zirconate
- ◉ Indium fluoro zirconate
- ◉ Mn fluoride
- ◉ Aluminum fluoride

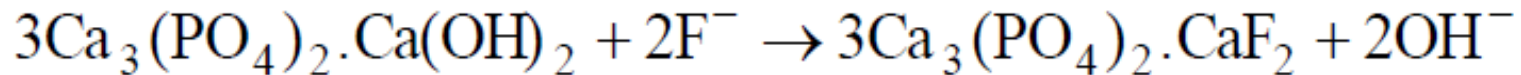
SODIUM FLUORIDE & STANNOUS FLUORIDE

formulated with:

- ⦿ Insoluble sodium metaphosphate
- ⦿ Silica
- ⦿ alumina

FLUORIDES

- ◉ Reaction with hydroxyapatite



- ◉ Fluoroapatite (lower solubility)
- ◉ Remineralization
- ◉ Enzyme inhibitor action

SODIUM MONOFLUOROPHOSPHATE

- ◉ less susceptible to reaction with soluble calcium salts
- ◉ Release fluoride ions after hydrolysis
- ◉ wider choice of abrasive
- ◉ Fluorophosphate ion replace in crystalline structure of apatite

DENTAL PLAQUE

- ◉ Calcification (crystallization of minerals) on the surface of the tooth formed mainly in the presence of plaque
- ◉ Rough surface promotes further growth of plaque

DENTAL PLAQUE

- ◉ Stains easily (yellow / brown)
- ◉ Most prevalent near salivary glands and around necks and roots of teeth
- ◉ Removed only by dentist

DENTAL PLAQUE

DENTAL BIOFILM (PLAQUE)

HEALTHY TOOTH

TOOTH WITH DENTAL BIOFILM
(PLAQUE)



DENTAL PLAQUE

HEALTHY TOOTH

TOOTH WITH PLAQUE



ANTI PLAQUE

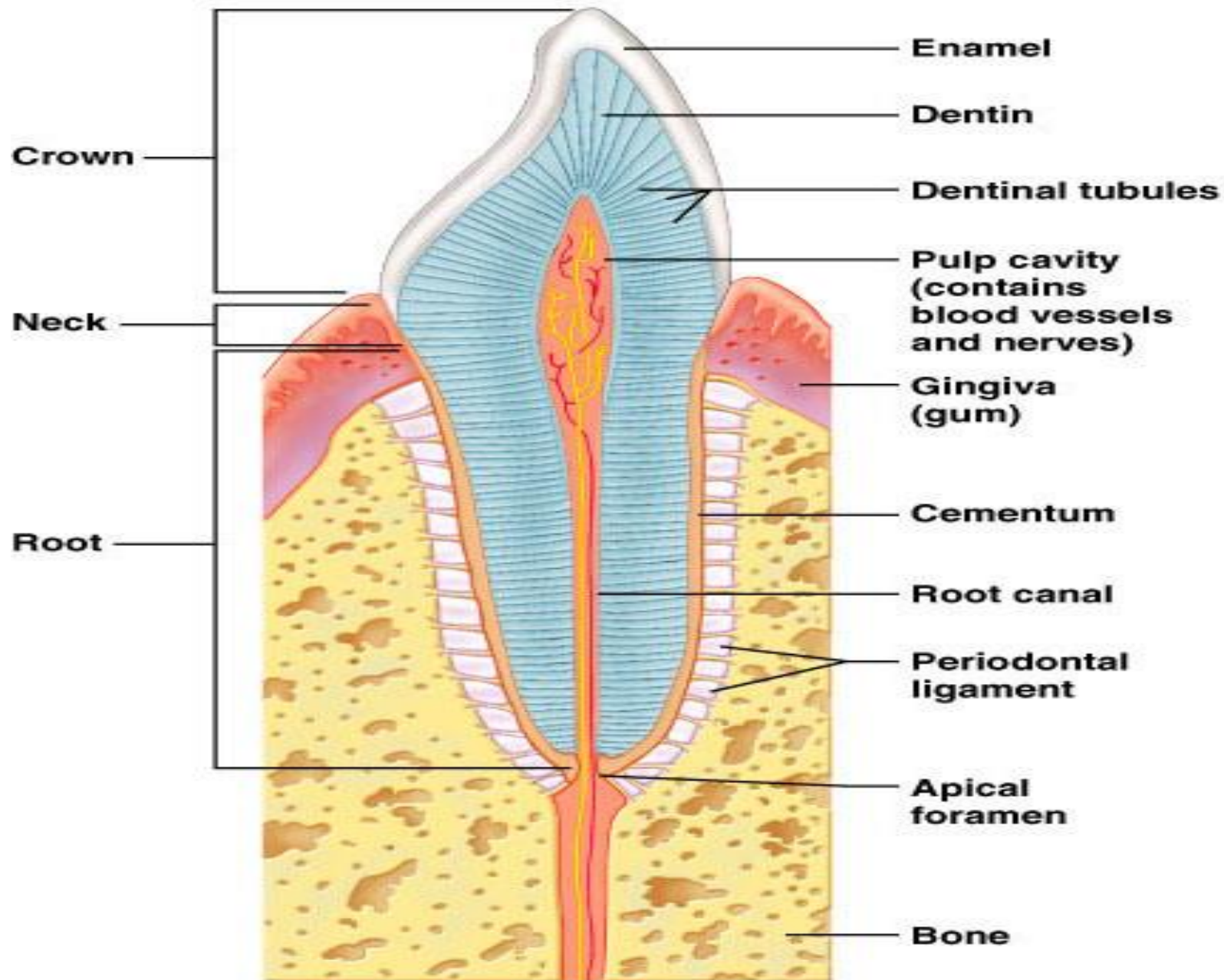
Biocides

- ◉ Chlorhexidine
- ◉ Triclosan

ANTI TARTAR OR ANTI CALCULUS

- ◉ Tetra sodium pyrophosphate
- ◉ Tetra potassium pyrophosphate
- ◉ Disodium hydrogen pyrophosphate
- ◉ Disodium ethidronate

SENSITIVE TEETH



SENSITIVE TEETH

- ◉ Sr Stearate
- ◉ Formaldehyde
- ◉ Hydroxy Apatite
- ◉ KNO_3
- ◉ KCl

THANKS FOR YOUR ATTENTION

You can send your question to

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Good luck