

Welcome



DENTAL CARE PREPARATIONS



INTRODUCTION

- Dentifrices are the preparations used for cleaning the surfaces of teeth and keep them shiny and to preserve the health of teeth and gums.
- ❖ Other uses
 - ✓ Inhibit formation of unpleasant odour & freshen breath.
 - ✓ Prevent occurrence of tooth decay.
- ❖ Classified into two :
 - Cosmetic dentifrices
 - Therapeutic dentifrices





Common Dental Problems

- Bad Breath
- Plaque formation
- Tooth Decay
- Tooth Sensitivity
- Tooth Erosion
- Gum swelling
- Caries
- Oral Cancer



Forms of dentifrices:-



Toothpastes;



Tooth Powders;



Tooth Gels;

TOOTH PASTES

- ❖ **Definition** - Popular, valuable and widely used preparations for cleansing the accessible surfaces of teeth using toothbrush.
- **Expensive than tooth powders but still more preferred because:**
 - ✓ **Easy to take measured quantity & spread on the tooth brush**
 - ✓ **No spillage or wastage**
 - ✓ **Attractive consistency**
 - ✓ **Proper distribution in mouth**



❖ **Ideal characteristics:**

- **Must clean the dental surface properly without any scratches**
- **Easy to squeeze**
- **Consistency should remain constant**
- **Should not dry quickly**
- **Should not be toxic & should not sensitize buccal membrane**
- **Should not interact with container material**



Different types of Toothpastes

Anti-Caries / Cavity Protection toothpastes	Sodium fluoride and sodium monofluorophosphate	contain fluoride to stop tooth enamel decalcification and protect teeth from tooth decay and cavities	Eg. Colgate cavity protection
Plaque & Gingivitis Prevention toothpastes	Sodium Lauryl Sulphate, Triclosane, Zinc and Stannous ions.	antibacterial and prevent the formation of dental plaque.	Eg. Crest-pro-health clinical gum protection
Tooth Whitening toothpastes	Papain, Dimethicone	have either higher abrasion value than normal toothpastes to mechanically remove food, smoking and other stains from teeth.	Eg. Colgate Optical White and Colgate Pro-clinical White.

Sensitivity toothpastes	Potassium nitrate, strontium chloride, potassium citrate	contain de-sensitising agents to relief those with tooth sensitivity by closing the dentinal tubules.	Eg. Colgate sensitive, Sensodyne
Tartar Control toothpastes	Pyrophosphates	reduce new tartar build-up (but they can't remove the existing tartar).	Eg. Colgate tartar protection with whitening
Fresh Breath toothpastes	Peppermint, spearmint, menthol	enhance flavoring agents along with antibacterials to fight halitosis	Eg. Colgate Max-fresh



TOOTHPASTE

What's In It?



AGENTS

1. Polishing/Abrasives agents

2. Binding/Thickening agents

3. Detergent/Surfactans

4. Humectants

MATERIAL USED

Calcium carbonate
Dicalcium phosphate dihydrate
Alumina
Silica

Water soluble agents
a. Alginates
b. Sodium carboxymethyl cellulose
Water insoluble
a. Magnesium aluminium silicate
b. Colloidal silica
c. Sodium magnesium silicate

Sodium lauryl surface

Sorbitol
Glycerin
Polyethylene glycol

FUNCTIONS

These agents have a mild abrasive action, which aids in eliminating plaque and removing stains from tooth surface.

Agents which controls stability and consistency of a tooth paste.

Produce the foam which aids in the removal of food debris and also despersion of product within mouth.

Aids in reducing loss of moisture from toothpaste.

5. Flavouring agents	Peppermint oil Spearmint oil Oil of wintergreen	They render the product pleasant to use and leaves a fresh taste in mouth after use.
6. Sweeteners and Coloring agents	Saccharin	Sweetener
7. Antibacterial agents	Ticlosan Delmopinol Metallic ions Zinc citrase trihydrate	
8. Anticalculus agents	Pyrophosphate Zinc citrate Zinc chloride Gantrez acid(copolymer of methyl vinyl ether and maleic anhydride)	Anticalculus agents are mostly designed to inhibit the mineralization of plaque. They are also known as crystal growth inhibitors.
9. Anticaries agents	Sodium monofluorophosphate Sodium flouride Stannous flouride	
10. Diesensitizing agents	Sodium flouride Potassium nitrate Strontium chloride	

MISCELLANEOUS OR SPECIAL INGREDIENTS

Various substances additionally incorporated in tooth paste preparations to achieve special functions.

- a) Colours – Not much preferred much as most toothpaste are white.
 - ❖ Coloured toothpaste – attract customers
 - Pink, red & blue – important colours used
- b) Bleaches – For removal of stains & impart whitening effect.
 - Sodium perborate, Stabilized H₂O₂, Magnesium peroxide
- c) Lubricants – Facilitate paste to come out or for filling purpose.
 - 1 – 2% liquid paraffin

GENERAL METHOD OF PREPARATION

- Large scale manufacture - **Stainless steel mixer container**
- Small scale manufacture – **Glass container**

- ❖ Take half the quantity of **water**, add **tragacanth powder** & heat it in a water bath to get a **gel** .
- ❖ To the remaining quantity of water, add **glycerine, sodium lauryl sulphate , preservative** & mix it thoroughly to get a **clear solution**.
- ❖ Weigh the required quantity of **saccharin** and **calcium carbonate solution** & mix it with the help of mortar and pestle.
- ❖ To this powder, add **gum tragacanth** & mix well.
- ❖ Add glycerine, preservative & sodium lauryl mixture to it and triturate uniformly to get a **paste**.
- ❖ Finally add **flavouring agent** & triturate well.
- ❖ Transfer to a **narrow mouthed plastic tube** , seal & label.

FORMULATIONS

Ingredients	Quantity(%)
Calcium carbonate	56.0
Sodium lauryl sulphate	1.0
Glycerine	22.0
Gum tragacanth	1.5
Water	19.4
Saccharine	0.1
Flavour	q.s
Preservative	q.s

Ingredients	Quantity(%)
Stannous flouride	0.4
Calcium Pyrophosphate	40.0
Glycerine	29.0
Gum tragacanth	1.0
Stannous phosphate	1.0
Sodium lauryl sulphate	1.5
Flavour	0.1
Water	26.9
Saccharine	0.1
Preservative	q.s

Ingredients: Made with natural ingredients. Glycerin, Sorbitol, Water, Silica, Xylitol, Calcium Carbonate, Peppermint Essential Oil, Carboxy Methyl Cellulose Gum, Cocamidopropyl Betaine, FD&C Blue#1, Iodine (EDDI), Nano Silver, Stevia, Tea Tree Essential Oil.

Use: For clean fresh teeth. Promotes good oral hygiene.

Directions: Use a pea-sized amount to avoid swallowing. Recommended to brush 2 to 3 times a day or as directed by dentist or physician. Children under 6, instruct in good brushing and rinsing habits. Children under 2 years, ask a dentist or physician.

Warning: Do not use if irritation occurs and persists. Keep out of reach of children under 6 years of age.

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EVALUATION

❖ Determination of hard & sharp edged abrasive particles

- ❑ The paste was extruded about 15 to 20cm length from collapsible tube of each sample on a butter paper.
- ❑ Then all the samples were tested by pressing it along it's entire length by a finger for the presence of hard & sharp edged abrasive particles

❖ Particle Size – Microscopic study / sieving

❖ Cleansing property – Change in reflectance character of a lacquer coating on a polyester film caused by brushing with a tooth cleaner.

❖ Consistency – Should maintain consistency to enable the product press out from container. Viscosity & rheology also studied.

❖ pH of the product – 10g toothpaste in 150ml beaker + 10ml water – suspension :- pH meter

❖ **Test for arsenic and lead – Limit test**

❖ **Moisture content** : 10g of toothpaste was weighed & dried it in an oven at 105°C , then it was cooled.

▪ **Loss of weight is recorded as percentage moisture content**

$$\% \text{ moisture} = \frac{\text{Original sample wt} - \text{Dry sample wt}}{\text{Original sample wt}} * 100$$

❖ **Determination of spreadability** :

1g of each sample weighed and placed at the centre of glass plate & another glass plate was placed over it carefully.

Above the glass plates, 2kg weight was placed at the centre of plate , avoid sliding of plate.

The diameter of the paste in cm was measured after 30 minutes.

The experiment was repeated 3 times & the averages was reported for all the samples.

❖ **Determination of fineness:**

- ❑ **10g sample in 100ml beaker.**
- ❑ **50ml of water added & allowed to stand for 30minutes with occasional stirring until the toothpaste was completely dispersed.**
- ❑ **This solution was passed through 150micron standard sieve & sieve was washed with water.**
- ❑ **After washing , the residue remained on sieve was collected & dried in an oven at 105°C.**
- ❑ **After drying, the sample was collected carefully & weighed**
- ❑ **Fineness was calculated by using the following formula:**

$$\text{Percentage by mass} = M_1 / M_2 * 100$$

- **M2 = Initial weight, M1 = Final weight**

❖ Foaming Power:-

- ❑ 5g of sample + 10ml of water was added & covered with a watch glass - allowed to stand for 30 min to disperse toothpaste in water
- ❑ Contents was stirred & slurry was transferred to a 250ml graduated measuring cylinder, ensure that no foam was produced & no lump went into the cylinder.
- ❑ Content of the cylinder adjusted to 50ml by adding water & temperature was maintained at 30°C
- ❑ Then the cylinder was stoppered & shaken it 12 times and the cylinder was allowed to stand for 5 min and the volume of foam was noted for all samples

$$\text{Foaming power} = V_1 - V_2$$

- V1 = Final volume after shaking
- V2 = Initial volume before shaking

TOOTH POWDERS

Definition – Mildly abrasive powder used in combination with tooth brush to maintain oral hygiene.

- Oldest, simplest & cheapest preparations

❖ Composition

1. An abrasive
2. A surfactant
3. A sweetening agent
4. Flavour
5. Colour (if required)

Homemade Herbal Tooth Powder & Toothpaste



- ❑ Abrasive used is same as that of tooth paste – Calcium carbonate, dicalcium phosphate, calcium sulphonate, tricalcium phosphate.

❖ General procedures for manufacture

• Simple Mixing

- First ingredients of small quantity are premixed and then mixed with other ingredients in **ribbon – type or agitator type of mixer.**
- Flavour sprayed onto bulk or premixed with abrasive and add polishing agent and then mixed with the bulk.

➤ Main problems :-

- 1) floating of powders in air
- 2) formation of cake on storage
- 3) uneven distribution in mouth



MOUTHWASH

- ❖ **Definition** – Concentrated clear aqueous solution with a pleasant taste intended to clean and deodorise the mouth or buccal cavity.
- ❖ **Function** – Deodorants, antiseptics, cleansing teeth surfaces.

➤ **Characteristics of a good mouthwash**

1. Good & quick antiseptic action at the dilution
2. Attractive flavour to impart odour to the mouth
3. Non – irritant to mouth & mucous membrane
4. Sweet taste
5. Not much expensive
6. Non - toxic



COMPOSITION

❖ Mouthwashes are mainly alcoholic or hydroalcoholic solutions used in oral cavity, which may be suitably diluted.

➤ Components

- Antiseptic / anti-bacterial substances
- Astringents
- Deodorizing agents
- Drug extracts
- Flavours
- Surfactants
- Sweeteners
- Colours
- Vehicle



Agents	Examples
Antiseptic	Phenol & its derivatives, Thymol
Astringent	Zinc chloride, zinc acetate, aluminium sulphate, Tannic acid, acetic acid, citric acid, lactic acid
Deodorizing Agents	Quartenary ammonium compounds, chlorophyllin
Drug extracts	Tincture of myrrh / cinchona, benzoic tincture

Agents	Examples
Flavours	Peppermint oil, menthol, thymol, aniseed oil, clove oil, eucalyptus oil, cinnamon oil
Surfactants	Tweens
Sweeteners	Saccharine or other synthetic sweetener extracts
Colours	Saffron, Carmine, Phloxine, Erythrosine
Vehicle	Alcohol alone or in combination with water is widely used solvent

FORMULATION

Ingredients	Quantity(%)
Anethol	0.6
Methyl Salicylate	1.0
Menthol	0.2
Propylene Glycol	20.0
Glycerine	30.0
Tween 80	20.0
Saccharine sodium	2.0
Ethyl alcohol	26.2
Colour	q.s

Ingredient	Quantity(%)
Phenol	3.6
Solution of Sodium hydroxide	9.5
Conc. orange flower water	2.0
Conc. Rose water	1.0
Glycerine	12.5
Water	71.4
Colour	q.s

Drug Facts

Active ingredients

	Purpose
Eucalyptol 0.092%, Menthol 0.042%	Antigingivitis, Antiplaque
Methyl salicylate 0.060%, Thymol 0.064%.....	Antigingivitis, Antiplaque

Use helps control plaque that leads to gingivitis

Warnings

Do not use if you have painful or swollen gums, pus from the gum line, loose teeth or increased spacing between the teeth. See your dentist immediately. These may be signs of periodontitis, a serious form of gum disease.

Stop use and ask a dentist if gingivitis, bleeding, or redness persists for more than 2 weeks

Keep out of reach of children. If more than used for rinsing is accidentally swallowed, get medical help or contact a Poison Control Center right away.

Directions

What's in YOUR Mouthwash?

DIY Natural Peppermint Mouthwash

Other information cold weather may cloud this product. Its antiseptic properties are not affected. Store at room temperature (59°-77° F)

Inactive ingredients water, alcohol 21.6%, sorbitol solution, flavor, poloxamer 407, benzoic acid, sodium saccharin, sodium benzoate, FD&C green no. 3

"The ADA Council on Scientific Affairs has concluded that this Mouth Rinse is based on its finding that it is effective for the treatment of gingivitis."

EVALUATION

- ❖ Antiseptic property
- In – vitro antiseptic activity – Can be carried out against suitable oral micro-organisms in a suitable liquid media or agar media against a control and determining their effectiveness against the growth.
- In – vivo antiseptic activity – Done by collecting representative bacterial samples, before and after the use of mouthwash, and culturing and counting colonies on agar plate.
- ❖ Deodorizing effect – Using chemical analysis, surface tension effects. Level - Gas chromatograph, Fair-wells osmoscope etc.
- ❖ Stability Study – Stability study or accelerated stability study.
- ❖ Other special tests – Clinical trials – effect on dental caries, cleaning, astringent, oral soft tissues.

REFERENCE

1. **A handbook of cosmetics ;B.M. Mithal & R.N. Saha; Page No : 203 – 223.**

Thank You

The text "Thank You" is rendered in a highly decorative, cursive script. The letters are filled with a deep red color and outlined with a bright gold border. The text is embellished with clusters of vibrant red roses and green foliage. Two white doves are depicted in flight, one positioned above the letter 'h' and the other above the letter 'o' in "You". The entire graphic is set against a plain white background.