

# Dental and Cosmetic Preparations

→ cosmetics definition

From time immemorial, people have used cosmetics to enhance their personal appeal by using different kinds of preparations. The cosmetics which are widely used now a days include tooth pastes, tooth powders, mouth washes, shampoos, nail polishes and polish removers, face powders, cold creams, vanishing creams and talcum powder, etc.

According to Drug and Cosmetics Act, the cosmetics are defined as the articles which are intended to be rubbed, poured, sprinkled, sprayed, introduced in, or otherwise applied to any part of the human body for cleansing, protecting, beautifying, promoting attractiveness or altering appearance.

A cosmetic only cleans, beautifies, alters the appearance, adds fragrance

concerned about the physical characteristics like texture, consistency, colour, odour, packaging and general appearance of cosmetics than chemical characteristics.

### Classification of Cosmetics

Cosmetics are generally classified as follows :

- (a) According to their functions
- (b) According to their use
- (c) According to their physical nature.

#### (a) According to their functions

- (i) Decorative functions, e.g., nail polishes, eye lashes, lipstick, etc.
- (ii) Corrective functions, e.g., dry creams and heavy face powders.
- (iii) Protective functions, e.g., dry creams and heavy face powders.
- (iv) Curative or therapeutic functions, e.g., antiperspirants and hair preparations.

#### (b) According to their use

- (i) For the skin, e.g., powders, creams, lotions, deodorants, bath and cleansing preparations, make up, etc.
- (ii) For the hair, e.g., shampoos, tonics, hair dressings, hair waving preparations, beard softeners, shaving preparations, hair removers (depilatories), etc.
- (iii) For the nails, e.g., nail polish and polish removers, manicure preparations, etc.
- (iv) For the teeth and mouth, e.g., dentifrices, mouth washes, etc.
- (v) Borderline and kindred products, e.g., eye products, foot powders and applications, insect repellents, etc.

#### (c) According to their physical nature

- (i) Aerosols, e.g., hair sets, perfumes, after-shave sprays, etc.
- (ii) Cakes, e.g., rouge compacts, etc.
- (iii) Emulsions, e.g., cold cream, vanishing cream, liquid cream, etc.
- (iv) Jellies, e.g., hand jelly, wave set jelly, brilliantine jelly, etc.
- (v) Mucilages, e.g., wave set, hand lotion, etc.
- (vi) Oils, e.g., brilliantine, hair oils, etc.
- (vii) Pastes, e.g., tooth paste, deodorant paste, etc.
- (viii) Powders, e.g., face powder, tooth powder, talcum powder, etc.
- (ix) Soaps, e.g., shampoo soap, shaving soap, toilet soap, etc.
- (x) Solutions, e.g., after-shave lotions, hair sets, astringent lotions, etc.
- (xi) Sticks, e.g., lipsticks, deodorant sticks, etc.
- (xii) Suspensions, e.g., liquid powder, cosmetic stockings, etc.

## 1. Dentifrices Formulation of Dentifrices:

Dentifrices are the preparations meant to be applied to the teeth such as tooth paste and tooth powder. Generally they are applied with a tooth brush or fingers of the hand for cleaning the accessible surfaces of the teeth. They enhance the personal appearance of the teeth, reduce tooth decay and bad odour of the mouth and also make the gums healthy.

Now a days dentifrices have become very common and most people consider tooth paste or tooth powder a practical necessity. That is why the advertisers often promote such products with an eye to glamour and sex appeal. In recent years a number of dental products are developed which are capable of reducing tooth decay or diseases of the gums. The ingredients that are commonly used for such preparations include stannous fluoride and chlorophyll. It is claimed that when fluoride tooth paste is used regularly and at an early age, it reduces the incidence of tooth decay.

In the preparation of dentifrices the following ingredients are used :

### (i) Polishing Agents (Abrasives)

Abrasives which are also known as polishing agents are used to remove debris and residual stains from the teeth and for polishing the tooth surface. They are white solid cleansing materials and constitute about half the total weight of the dental preparation. The commonly used abrasives include precipitated calcium carbonate, tribasic calcium phosphate, calcium pyrophosphate, hydrated alumina, magnesium trisilicate, etc.

### (ii) Surface-Active Agents (Detergents)

Surface-active agents are added to enhance the action of polishing agents by wetting the teeth, the food particle, if any, and to emulsify the mucous. Examples are dioctyl sodium sulphosuccinate, sodium lauryl sulphate, etc. Soap can also be used for this purpose but to a lesser extent due to incompatibility with calcium salts and flavouring agents.

### (iii) Humectant

A humectant is added to tooth paste which will keep it in the moist form

and will not allow the paste to become dry. Moreover it will help in mixing the solid ingredients. The most commonly used humectants are glycerin, sorbitol and propylene glycol. Glycerin is sweet in taste and is regarded as the best humectant. It is added in the proportion of 5 to 10% by weight of the formulation.

#### (iv) Binders

A binder is added to keep the solids and liquids in the united form and also to maintain the consistency. The most commonly used binders are gum tragacanth, gum karaya, sodium alginate, methyl cellulose, etc. Gum tragacanth is generally used because it maintains the consistency, weather resistant and is not affected by pH changes. It is used in the proportion of 1 to 2.5%.

#### (v) Sweetening Agents

A sweetening agent is added to dentifrices to impart sweet taste to the preparation. It is generally added by blending with flavouring agents. Saccharin in the ratio of 0.005 to 0.25% is the most commonly used sweetening agent for this purpose.

#### (vi) Flavouring Agents

Flavouring agent is one of the most important ingredients of dentifrices and its selection is also very important because the choice of flavour varies from individual to individual. The most commonly used flavouring agents include peppermint, winter green, and cinnamon-mint, etc. The quantity of flavouring agent to be added depends on the type of flavour, type of the base and consumer acceptance. Generally it is used in the ratio of 0.5 to 2%.

#### (vii) Preservatives

The moisture and carbohydrates present in tooth paste lead to bacterial growth so a preservative should be included in the tooth paste to preserve its quality and stability. Generally methyl paraben and propyl paraben are used for this purpose. Sodium benzoate is not used as preservative in tooth pastes.

#### (viii) Therapeutic Agents

Therapeutic agents are included in medicated tooth pastes in order to check dental diseases and to remove bad smell but all tooth pastes do not contain these agents. The therapeutic agents which have bactericidal, bacteriostatic, enzyme inhibiting or acid neutralizing properties are used in medicated tooth pastes. The commonly used medicinal agents are fluorides, chlorophyll, urea, dibasic ammonium phosphate, sodium dehydroacetate, etc.

The dentifrices containing therapeutic agents should not be used daily, it may spoil the tooth structure.

KIE ON THE INORGANIC TOOTH PASTES

(b) **Tooth powders** : These are oldest, cheapest and simple preparations meant for cleaning the teeth. The main ingredients in tooth powders are abrasives, surfactants, sweeteners and flavours. Tooth powders are having very fine particle size. For example:—

Hard soap, in fine powder	5.0 g
Precipitated calcium carbonate	93.5 g
Saccharin sodium	0.2 g
Cinnamon oil	0.2 ml
Peppermint oil	0.4 ml
Methyl salicylate	0.8 ml

*Method* : Divide precipitated calcium carbonate into two halves. Thoroughly triturate the saccharin sodium, the volatile oils and methyl salicylate with one half. Mix the hard soap in fine powder with the second half. Mix the two powders thoroughly and pass through a fine sieve.

(e) **Tooth pastes** : These are most popular and widely used preparations for cleaning the teeth. They are more expensive as compare to tooth powders but still they are more preferred. The main ingredients in tooth pastes are abrasives, foaming agents, sweetening agents, flavours, binding agents, humectants, preservation and therapeutic agents. For example:-

Dicalcium phosphate	35.0 g
Calcium carbonate	14.0 g
Glycerin	20.0 g
Gum tragacanth	1.2 g
Saccharin	50 mg
Sodium lauryl sulphate	10 g
Water	19.8 ml
Flavour, sufficient quantity	

*Method* : Mix glycerin and water. Add the solid substances in it with stirring. Add flavour and mix thoroughly. Transfer into a suitable container and store.

**4. Cold creams :** Cold cream is an emulsion, which when applied on the skin, a cooling effect is produced due to slow evaporation of water present in the emulsion. They are generally prepared by emulsification of oils and water. In olden days cold cream was prepared from animal fat and vegetable oil. Vegetable oils have the tendency to become rancid, they are replaced by mineral oil which gives a more stable product. Cold creams are o/w type emulsion but after application on the skin, sufficient water evaporates to permit phase inversion to w/o type.

#### FORMULA FOR COLD CREAMS

(1) Beeswax	5.0 g
Liquid paraffin	45.0 g
White soft paraffin	10.0 g
Hard paraffin	7.0 g
Borax	0.2 g
Water	32.8 ml
Perfume and preservative	q.s.
(2) Beeswax	16.0 g
Liquid paraffin	50.0 g
Borax	0.8 g
Water	33.2 g
Perfume and preservative	q.s.
(3) Beeswax	8.0 g
White soft paraffin	30.0 g
Liquid paraffin	30.0 g
Lanolin	10.0 g
Glyceryl monostearate	2.5 g
Borax	0.5 g
Water	19.0 g
Preservative and perfume	q.s.

**General method of preparation** Melt the wax, hard paraffin, white soft paraffin on a water bath. Add liquid paraffin and heat the mixture to  $70^{\circ}\text{C}$ . Dissolve the borax in water at  $75^{\circ}\text{C}$  and add to melted fats with continuous stirring. Cool with stirring to  $40^{\circ}\text{C}$ . Add the required quantity of preservative and perfume. Transfer the cream to the container while hot.

Cleansing creams are used to remove facial

not cause eye lashes to stick together.

**10. Lipsticks :** Lipsticks is the most widely used cosmetic item by the women to give an attractive colour and appearance to the lips. Lipsticks can change the apparent facial characteristics of the woman. These are usually manufactured as moulded sticks and consist of colouring pigments dissolved or dispersed in a fatty base consisting of a suitable blend of oils, fats and waxes suitably perfumed..

#### *Qualities of an ideal lipstick*

- (1) It should be non-irritant.
- (2) It should be non-toxic.
- (3) It should be stable both physically and chemically.
- (4) It should not dry on storage.
- (5) It should be free from gritty particles.

- (6) It should maintain the lip colour for longer period after its application.
- (7) It should be easily applicable and removable after its application.
- (8) It should not break during use.
- (9) It should maintain its firmness till it is fully used up.
- (10) It should give shiny and smooth appearance.
- (11) It should be free from sweating.

*Formulation of lipsticks* The following ingredients are required to make lipstick:—

- (i) *Bases* : The bases used are mixtures of oils, fatty materials and waxes such as mineral oil, vegetable oil, butyl stearate, cocoa butter, petrolatum, lanolin, lecithin carnauba wax, beeswax, spermaceti etc.
- (ii) *Colouring materials* : Colour used for lipstick are water soluble eosin and halogenated derivatives of fluorescein and tetra bromofluorescein. Certain pigments like titanium dioxide are also used to intensify the colour.
- (iii) *Perfumes* : Only those perfumes are selected in lipsticks which should be non-irritant and having an agreeable taste. Floral fruity and light spicy fragrances are generally used for this purpose.
- (iv) *Antioxidants* : These are used to prevent rancidity which occurs due to oxidation of some ingredients. The antioxidants commonly used are butylated hydroxy anisole, butylated hydroxy toluene, propyl gallate etc.

**FORMULA (1)**

Carnauba wax	1.0 g
Bees wax	15.0 g
Lanolin	5.0 g
Cetyl alcohol	5.0 g
Castor oil	65.0 g
Colouring matter and perfumes	q.s

### **3. Antiperspirants and Deodorants**

Bad odour emitted by the body of both men and women is a great problem. Women are more peculiar about it. So the substances which are used to overcome this bad smell are known as antiperspirants and deodorants. The sweat glands secrete perspiration which varies from person to person. Some

individuals secrete sweat which is of offensive odour and in certain cases it is considerably coloured. The correction of body odour is carried out by antiperspirants and deodorants.

Antiperspirants and deodorant are cosmetic products which are used to reduce underarm and body odour. Antiperspirants inhibit the flow of perspiration and deodorants inhibit the formation of malodour in perspiration by suppressing bacterial growth or cover the malodour with a more pleasing one. Many products have both antiperspirant and deodorant action.

Antiperspirants contain substances which have astringent action and react with proteins of the skin, causing coagulation accompanied by a swelling at the opening of the sweat glands thus blocking the openings and reducing the flow of sweat. Antiperspirants and deodorants are available as clear liquids for direct, spray or aerosol application, powder sprays, sticks, creams and lotions.

Salts of various metals such as aluminium, iron, chromium, lead, mercury, zinc and zirconium have astringent properties which precipitate the proteins but all of them cannot be used because of either discolouration or toxic effects but salts of ammonium and zinc are most commonly used. To protect the skin from toxic effects and cloths from rotting a combination of salts may be used. The liquid antiperspirants consist of an aqueous or hydroalcoholic solution of an astringent salt to which a small amount of humectant, a perfume, a dispersing agent for the perfume and a deodorant is added.

#### Formula for deodorant powder

Salicylic acid	2.0 gm
Boric acid	40.0 gm
Talc	48.0 gm
Zinc stearate	10.0 gm

#### Formula for liquid antiperspirant

Alcohol	50.0 ml
Propylene glycol	5.0 ml
Hexachlorophene	0.1 gm
Aluminium chlorohydroxide	15.0 gm
Water	29.9 ml
Perfume, sufficient quantity.	

#### Method of preparation

Mix alcohol and propylene glycol. To this dissolve hexachlorophene and perfume. Separately dissolve aluminium chlorohydroxide in water. Add this solution slowly to the alcoholic solution. Keep the mixed solutions in a closed container for at least 48 hours, then filter the solution and fill in suitable containers.

#### 4. Shampoos

A shampoo may be defined as a preparation containing surface active agents which when used will remove grease, dirt and debris from the hair and scalp without seriously affecting the hair, scalp and other parts of the body.

Apart from cleansing action it must leave the hair fragrant, lustrous, soft and manageable. Though the shampoos act as detergents like that of detergent cakes but along with these properties they behave as cosmetics.

Generally shampoos are water soluble solutions or suspensions prepared by dissolving cleansing agents in a suitable liquid to which other agents are added to improve the functions of the shampoo. Mostly synthetic detergents are used for this purpose to which soap is also added but good shampoos do not contain any soap.

#### Properties of a shampoo

A good shampoo should have the following qualities :

1. It should be effective in small amounts.
2. It should remove grease, dirt and skin debris from the hair and scalp.
3. It should be non-toxic, non-irritant and should not damage the skin and sensitive organs like eyes if accidentally comes in contact with the eyes.
4. It should produce adequate foam in soft as well as hard water.
5. It should give pleasant flavour after its use.
6. It should be easily washable with water.
7. It should leave the hair lustrous, soft and manageable.

Since time immemorial both men and women have used different types of preparations for cleaning their hair. Now a days it has become essential socially and personally for men and women to keep their hair healthy looking and aesthetically pleasing because good looking and properly dressed hair add to one's beauty and charming personality, specially to the women. Therefore, shampoos are widely used for this purpose which are available in different forms as described below :

1. Clear liquid shampoos
2. Baby shampoos
3. Medicated dandruff shampoos
4. Soap shampoos
6. Liquid cream or lotion shampoos
7. Powder shampoos
8. Gel shampoos
9. Cream or paste shampoos.

Various types of additives used in shampoos include :

### 1. Opacifiers

Opacifiers are used to make the shampoo opaque. Such substances include esters such as glycol and glyceryl stearate and higher alcohols such as cetyl and stearyl alcohol, stearate soaps and waxy alkylamides such as stearic amides.

### 2. Solubilizing Agents

Solubilizing agents are used to solubilize poorly soluble substances so as to get a clear shampoo. Solubilizing agents used include ethyl alcohol, glycerol, propylene glycol and diethylene glycol monoethyl ether. Surfactants are also used as solubilizing agents.

### 3. Thickening Agents

Thickening agents are used to increase the viscosity of the shampoos and provide the desired consistency to the preparation. Sodium stearate and stearic amides are excellent thickening agents for cream type shampoos. Polyvinyl alcohol, methyl cellulose and sodium alginate are also used for this purpose.

### 4. Conditioning Agents

Conditioning agents are used to improve the manageability and the texture of the hair. Various oils, fatty alcohols, glycol esters, humectants and protein derivatives are used for this purpose. Lanolin and its derivatives are also extensively used as hair conditioners. Certain surfactants are also used as hair conditioners.

### 5. Preservatives

Shampoos prepared with surfactants must be suitably preserved because such preparations lead to bacterial and mold growth. Methyl paraben and propyl paraben are commonly used preservatives in shampoos.

#### Formula for coconut oil shampoo

Coconut oil	37.0 gm
Potassium hydroxide	29.0 gm
Water	5.0 ml
Glycerin	29.0 gm
Perfume, sufficient quantity.	

#### Formula for cream type shampoo

Sodium lauryl sulphate	25.0 gm
Stearic acid	6.5 gm
Lanolin	0.25 gm

### **(viii) Shaving Media**

Shaving media are really not the cosmetics for the hair but they are used to remove unsightly hair particularly from men's faces. Women also use them in limited amounts to remove hair from legs, under the arm and other conspicuous places with or without the help of a razor.

Various types of shaving media include :

- (a) Preshave products, e.g., beard softeners and pre electric shaving lotions.
- (b) Shaving products include brushless shaving creams, lather shaving creams and shaving soaps. Shaving soaps are employed as cakes, sticks, powders, creams and liquids in wooden or plastic bowls of various designs and sizes. For a long time soaps were quite commonly used as a shaving media but now a days they are largely replaced with brushless and lather shaving creams.
- (c) After shave products include lotions and gels used to refresh the skin after shave.

### **Lather Shaving Creams**

Lather shaving creams are semisolid preparations which are used by men to help in removing the hair from the face. These creams are packaged in collapsible tubes and are used with the help of shaving brush to produce a lather on the face thus soften the beard and hold individual hair erect for close shaving. They also provide lubricity for the razor, making the shaving process smooth and comfortable.

Lather shaving creams are generally formulated as heavy, concentrated (40 to 60%) soap solutions in glycerol and water. The soap is formed by the saponification of fatty acids and oils with alkalies. Glycerin is extensively used as humectant in these types of shaving creams. The ingredients commonly used in the preparation of shaving creams include

stearic acid, tallow, stearin, coconut oil, olive oil, peanut oil, caustic soda, caustic potash, glycerin, alcohol, lanolin, borax, boric acid, propylene glycol, aromatic water and water. Colouring and flavouring agents may be added according to choice and depending on the nature of other ingredients.

### Qualities of a good lather shaving cream

A good lather shaving cream should have the following qualities :

1. It should be non-irritating to the skin.
2. It should not change its viscosity according to temperature.
3. It should be smooth, soft and non-lumpy.
4. It should have good wetting properties.
5. It must produce rich lather composed of small bubbles that do not dry on the face too rapidly.
6. Only small quantity of cream should be required to produce good lather, i.e., it should be economical.
7. It should be non-corrosive to the razor blade and easily rinsed from the razor and face.

### Formula for lather shaving cream

Stearic acid	38.8 gm
Coconut oil	9.7 gm
Potassium hydroxide	8.0 gm
Sodium hydroxide	1.6 gm
Glycerol	11.6 gm
Water	30.3 ml
Preservative, sufficient quantity.	
Perfume, sufficient quantity.	

### Method of preparation

Melt half of the stearic acid with coconut oil over water bath. To this add alkalies with continuous stirring to saponify the oils. After saponification add the remainder of stearic acid. Separately warm the glycerol and half of water to about 65°C and add slowly to the saponified liquid with continuous stirring until a creamy paste is formed. Heat the remaining amount of water to about 44°C and add quickly to the cream with continuous stirring. Add the preservative and perfume, stir so as to mix thoroughly.