

Face Cream

A regular skin care routine has to be followed for the proper maintenance to keep the skin beautiful and radiant for a long duration. To protect and nourish the skin daily, creams are required. Face creams play an important role in the field of cosmetics.

Depending upon the type of an individual's skin i.e oily, dry, normal or sensitive perfect skin creams tailored to the need of the skin should be used.

A variety of creams are available depending upon their use in the form of cold cream, vanishing cream, cleansing cream, day cream, night cream, massage cream, foundation cream, foot cream, suntan cream and all-purpose cream. Special purpose creams like anti wrinkle, anti ageing, urban skin defence, detox, etc are also available in the market.

Creams are basically emulsions of either oil-in-water or water-in-oil types. The raw materials of the creams include water, petroleum oil derivatives, oils, fats, waxes and their derivatives as humectants and emulsifying agents. Since water is the cheapest ingredients, it is better to use the purest water. The mineral oils are hydrocarbons from petroleum oil. Since mineral oils are stable, do not show rancidity, favourable for skin, inexpensive and possess no odour, they are used as ideal cream ingredients.

Petroleum jelly, paraffin wax, ozokerite and ceresin are hydrocarbons of mineral and are used in making of creams. The main waxes that are used for making creams are beeswax, carnauba wax, candelilla wax, ceresin, ozokerite and spermaceti. Beeswax and spermaceti are animal waxes while Carnabua and Candelilla are obtained from vegetables.

A wool derived fat, Lanolin is also used in creams for providing a protective covering to the skin. Lanolin contains 25-30% water.

* Stearic acid is universally used for making vanishing creams. Triple pressed saponified slabs or granules of acid are used for cosmetic creams. Double pressed acids are preferred for brushless shaving creams and other shaving creams.

* Glycerin is the most common humectant used in creams. Other humectants are propylene glycol, sorbitol, glucose, invert sugars and fatty acids esters. Humectants are used to keep the cream soft and give emollient action upon skin.

* The emulsifiers are used in creams to lower the interfacial tension between water and oil or other water insoluble substances mixed to the emulsions. Emulsifying agents can be an inorganic solids, gum and proteins, surface active agents which include soaps, wetting and foaming agents.

Skin Protective cream

S.No	Ingredients	% (W/W)
1	Water	58
2	Octyl Alcohol	10
3	Glycerin	3
4	Glycerol Monostearate	12
5	Lanolin	4
6	White mineral oil	7
7	Titanium Oxide	5
8	Perfume	QS

Vanishing creams

Vanishing spread easily and seem to disappear rapidly when rubbed on skin.

The most important characteristics of vanishing creams are

- ① They are best suitable for hot climate which causes perspiration on face.
- ② The main ingredients is stearic acid as it melts above body temperature and crystallizes in a form so as to invisible (vanish) providing non-greasy feel.
- ③ A part of the stearic acid is saponified with an alkali and rest is emulsified with soap in large amount of water. The various alkalies used are KOH, NaOH, Aqueous Ammonia, Triethanolamine and Borax.
- ④ Glycerin and Glycols are used as humectants. Their purpose is to prevent excessive drying out of cream and provide any harsh reaction from the alkalies or free stearic acid.
- ⑤ Parabens (Methyl parahydroxy Benzoate (0.12%) and Propyl parahydroxy Benzoate (0.12%) are the commonly used preservative to deteriate bacterial or fungal infection action.
- ⑥ Self emulsifying Glycerol Monoacetate is used as an emulsifying agent.
- ⑦ Lanolin and its derivative are used as the oily material.
- ⑧ Perfumes are mixed either as they come or by dissolving in alcohol.

Formula 1

S.No	Ingredients	%(W/W)
1.	Water	64.00
2.	Stearic Acid	24.00
3.	Glycerin	10.56
4.	Potassium hydroxide	0.99
5.	Perfume	0.5

Formula 2

S.No	Ingredients	%(W/W)
1.	Water	71.00
2.	Stearic Acid	17.00
3.	Glycerin	6.00
4.	KOH	0.5
5.	Perfume	0.5
6.	Alcohol	4.5
7.	Sodium Carbonate	0.5

Formula 3

S.No	Ingredients	%(W/W)
1	Water	70.5
2	stearic Acid	17.0
3	Glycerin	5.0
4	Borax	4.0
5	Perfume	0.5
6	Triethanolamine	2.0
7	lanolin	1.0

Cold Creams

Cold creams are one of the oldest cosmetics. They are so designed because it produces a pleasant cooling sensation when applied to the skin. The ideal requirements of a cold cream are that it possesses:

- 1) An emollient action
- 2) It should produce a cooling sensation
- 3) Since they remain on the skin for a considerable period of time, it is also desirable that resultant oil film should be non occlusive.

The Cold cream frequently utilizes a borax-beeswax combination as an emulsifier with mineral oil or vegetable oil as the continuous phase. A protective oil film remains on the skin following evaporation. This slow evaporation of water gives the cooling effect.

Manufacturing Process:-

The manufacturing procedure for making cold creams is as follows: Initially dissolve the borax in hot water. Melt the waxes together and add fatty substance like lanolin, petrolatum, lard, and oils, keeping the temperature at about 70°C . Pour borax solution at the same temperature with constant stirring. When cool (about $45-50^{\circ}\text{C}$) add the perfume.

It is necessary precaution in the manufacture of cold creams to have the molten fats and water solution at the same temperature before mixing them, because the addition of cold water to hot waxes results in partial solidification of some of the wax, in the form of minute particles that will impart grittiness, an unpleasant effect, when applied to the skin.

For making cold cream using lanolin absorption base first melt the waxes. Add the absorption base to the mineral oil and bring the temperature to 80°C . Then slowly add water that is heated to the same temperature, stirring until thoroughly emulsified. When cool, add the perfume.

The manufacture of cold creams containing glyceryl mono stearate is comparatively easier. All the ingredients in the formula are put into a kettle and heated to the boiling point with constant stirring until all of the glyceryl mono stearate has melted. Stirring is continued until cool enough to perfume.

The consistency of the following formulae can be adjusted by increasing or decreasing the wax content.

Formula-1

S.No	Ingredients	%W/W
1	White beeswax	7.0
2	Paraffin	10.0
3	Ceresin	3.0
4	White mineral oil	44.0
5	Borax	1.0
6	Water	34.5
7	Perfume	Q.S

Formula-2

S.No	Ingredients	%W/W
	Spermaceti	5.0
	White beeswax	15.0
	White mineral oil	55.0
	Borax	0.8
	Distilled water	23.7
	Perfume	Q.S

Formula 3

S.No	Ingredients	% (W/W)	% (W/W)	% (W/W)	% (W/W)
1.	Beeswax	25.0	16.67	14.28	20.0
2.	Mineral oil	25.0	33.33	57.14	40.0
3.	Water	48.75	49.17	27.87	39.0
4.	Borax	1.25	0.83	0.71	1.0

In making the cream solely from beeswax, mineral oil, water and borax, the following factors should be considered: Borax should not be less than 5% of the beeswax used and not more than 8% depending upon the acid number of the beeswax. As the proportion of beeswax increases, the cream becomes harder.

Mineral oil, in relationship to water has stiffening effect upon the cream as the proportion is increased. With more than 60% of mineral oils the cream shows signs of instability. Increase of water concentration makes the cream soft until the product becomes definitely liquid. When water is too low, the cream may be of the water-in-oil type rather than the customary oil-in-water.

SUNTAN PREPARATIONS

Depending on the length and frequency of the exposure to sunlight, the human body can have both useful and harmful effects. A moderate exposure of sunlight stimulates blood circulation and increases the formation of hemoglobin and Vitamin D₃ for the absorption of calcium in intestines. However, prolonged exposure can redness and tanning of skin. The amount of tanning depends on individual capability to form melanin pigment. Sunscreen includes Suntanning agents and Sunburn preventive agents.

UV radiation in sunlight can be divided into several ranges depending on the wavelength. UVB radiation covers the wavelength range between 290 + 320 nm and UVA radiation covers the wavelength range between 320-400 nm. Sunburn is primarily caused UVB. Both UVB and UVA can cause sunburn, skin cancer and premature aging of skin.

A sunscreen can be labeled "Broad Spectrum" if it provides UV protection across both UVB and UVA wavelength ranges.

The US Broad Spectrum Test is an in vitro (laboratory) test that measures a sunscreen product's transmittance/absorbance of ultraviolet (UV) radiation across both UVB and UVA regions of the spectrum. The test is referred to as the critical 'wavelength' test. For a sunscreen product to pass the test it must be demonstrated that it has a critical wavelength of at least 370 nm or greater.

Effectiveness of Sunscreen

It depends on a number of factors including the Sun Protection factor (SPF) value, if the product provides broad spectrum protection, level of water resistance and whether the product is used as directed. The amount of protection derived from a particular sunscreen also depends on factors such as:

1. The skin type of the user:- whatever the colour of our skin is we all are potentially susceptible to sunburn and other harmful effects of exposure to UV radiations.

Classification of skin

S.No	Type of skin	Colour of skin	Reaction after exposure to Sun
1	I	Pale White	Always burns - never tans
2	II	White to light beige	Burns easily - tans minimally
3	III	Beige	Burns moderately - tans gradually to light brown
4	IV	Light Brown	Burns minimally - tans well to moderately brown
5	V	Moderate Brown	Rarely burns - tans profusely to dark brown
6	VI	Dark Brown or Black	Never burns - tans profusely

2. The amount applied and frequency of reapplication - FDA recommends to apply sunscreen 15 min before going out in the sun and reapply it every 2 hours - more often if sweating or jumping in out of the water.
3. The water-resistance of the product - FDA regulations now require that if a product's front label makes claim of being water resistant, it must designate whether it is protective for 40 or 80 min while swimming or sweating.

(6)

Suntanning agents are those which absorb a minimum of 85% UV radiations of wavelength of 290-320nm but transmit UV rays longer than 320 nm.

Sunburn protective agents are those sunscreens which absorb more than 95% or more of UV radiations of wavelength of 290-320 nm. Some sunburn protective agents are titanium dioxide, kaolin, talc, zinc oxide, CaCO_3 and magnesium oxide. Sunscreens work by scattering the incident light effectively and absorbing erythrogenic radiation (290-320nm).

They should be stable, odourless or have mild odour, non irritant and nonsensitizing. They should be resistant to water perspiration and nonvolatile in nature. They should not produce stains

The Sun Protection Factor (SPF) has been ^{used} to express the effectiveness of the sunscreen products to protect the skin. It is the ratio between the UV exposure required to produce a minimal erythmal dose (MED) on protected skin (ps) and the exposure that will produce the erythema on unprotected skin (us)

$$\text{SPF value} = \text{MED (ps)} / \text{MED (us)}$$

* The SPF of a sunscreen is a clinical test measure of the effectiveness of a sunscreen products against sunburns; the higher the SPF, the more sunburn protection a sunscreen offers. The SPF indicates how long a person can be exposed to UV radiations before getting sunburn.

with a sunscreen applied compared to how long they can be exposed before getting a sunburn without sunscreen. For example, some who would burn after 10 min in the sun without sunscreen would expect to burn after 5 hours if protected by a sunscreen with SPF 30.

* Sunscreens are topically applied products that protect the skin from the sun's damaging UV radiations. Sunscreens work by including active ingredients that remain on the surface of the skin that absorb, scatter, or reflect the UV radiations before it reaches the skin. By filtering out harmful UV rays, sunscreens help to reduce the risk of skin cancer and premature ageing, as well as help prevent sunburns. While there are many different forms (lotions, sprays etc) and types (water resistant, fragrance free, oil free etc) of sunscreen available, finding one that is best suited for an individual's need and proper use are the key factors for protecting the skin.

- * The following ingredients are used as sunscreens substances
- 1) p-Aminobenzoic acid and its derivative
 - 2) Azoles and its derivative
 - 3) Salicylates (Such as phenyl, benzyl, methyl, amyl and glyceryl esters)
 - 4) Cinnamic acid and dihydroxy cinnamic acid derivatives
 - 5) Coumarin derivatives
 - 6) Hydroquinone, Quinolone derivative, Quinine salts (Sulfate, bisulfate, chloride, oleate, tannate)

7. Naphthosulfonates
8. Tannic acid and its derivatives
9. Anthranilates and its derivatives
10. Uric acid and Violuric acid
11. Lower esters of p-dimethyl benzoic acid are appreciably soluble in water and as such are easily removed from the skin by perspiration or by water during bath.

The Sunscreening agents are commonly market in the form of lotions with thickening agents & oils etc.

Formula 1

S.No	Ingredients	%(W/W)
1	Water	18
2	Alcohol	60
3	Glycerin	10
4	Propylene Glycol Ricinoleate	8
5	Glyceryl p-aminobenzoate	3
6	Perfume and colour	QS

Formula 2

S.No	Ingredients	%(W/W)
1	Water	40
2	Alcohol	45
3	Tween 20	10
4	Isobutyl p-aminobenzoate	5
5	Perfume	QS

LATHER SHAVING CREAM

They are based on a mixture of sodium and potassium soaps. Potassium soaps are more readily soluble than sodium soaps and they help to generate foam more quickly. The formation of bubbles ensure a ready supply of water to the beard hairs. Keeping them in hydrated condition. Shaving creams normally contain 30-50% of soaps. Formulations based on stearic acid alone do not give sufficient lather. It is therefore usual to combine it with some coconut oil fatty acid. The satisfactory ratio of stearic acid to coconut oil is 75:25. An acceptable sodium hydroxide/potassium hydroxide would be 1:5. A humectant like glycerol, sorbitol or propylene glycol is usually included at 10-15% to minimize drying out of cream and to make the cream slightly softer. Lather shave creams have some free fatty acid although their pH is about 10. The raw materials needed for shaving cream include stearic acid, coconut oil, olive oil, peanut oil, NaOH, KOH, alcohol, glycerin, lanolin, borax, boric acid, propylene glycol, distilled water. Since the colour, odour and consistency of the finished product depends upon the quality of raw materials used to a great extent

these should be selected with discrimination and uniform types should be chosen for the formulations

* A small percentage of free fatty acids in excess of the calculated amount of alkalis (need for neutralisation) are added to lather cream formulation to ensure complete saponification, to help overcome from the harshness of soap on the skin to act as plasticizers.

Formula 1

S.No	Ingredients	% (W/W)
1	Stearic Acid	36.0
∴	Coconut oil	9.0
2	Potassium hydroxide	3.75
∴	NaOH	1.5
∴	Glycerol	10.0
∴	Water	36.5
3	KOH	3.5
4	Stearic Acid	5.0
5	Perfume	0.5

Procedure

- (i) Melt the stearic acid with coconut oil (1) in a jacketed pan with steam heat and raise the temperature to 80°C and maintain that temperature.
- (ii) Mix the NaOH and KOH of (2) with the glycerol and water and heat to 50°C.
- (iii) Add (2) into (1) with slow stirring and gradual mixing.
- (iv) Add (3) with further mixing. The addition of potassium lye in two equal amounts ensures that the harder sodium lye is all saponified first.
- (v) Heat (4) to 70°C and add to the batch.
- (vi) Cool slowly while mixing to 45°C and add perfume

The essential requirements of a lather shaving cream are non-smarting on the face, rapid to clean, rinsing, long shelf-life, proper perfuming and packaging. There may be other essential characteristics like hair softening abilities, lotion or cooling properties, antiseptic property and slight astringency.

Formula 2

S.No	Ingredients	%(N/W)
1.	Stearic Acid	33.6
2.	Coconut oil	6.4
3.	Triethanolamine	1.0
4.	Glycerin	8.0
5.	KOH	7.1
6.	NaOH	0.35
7.	Water	43.0
8.	Perfume	QS