

Functional Ingredients

Functional or vehicle ingredients are spreading agents and other chemicals necessary in the formulation of a cosmetic, but they do not necessarily cause the cosmetic to alter the skin's appearance.

Surfactants are chemicals in cosmetics that cause the cosmetic to be able to slip across or onto the skin. They lower the surface tension on the surface of the skin to allow cosmetic products to slip across and adhere to the skin.

Surfactants include soap and detergents. **Detergents** are surfactants that are used for cleaning. They break up the oil, fats, and other debris and cause the debris to separate from the skin. The bubbling is a good example of how surfactants and detergents reduce surface tension and allow water to spread more easily across the skin.

Detergent facial cleansers may vary in strength and concentration. The four types of surfactants vary with the pH of the water being used in the formulation.

The four types of surfactants are:

1. Anionic surfactants, which have a negative charge. They are strong cleaners and are frequently used in household products.
2. Cationic surfactants have a positive ionic charge. They are frequently used in cosmetics and hair shampoos.
3. Amphoteric surfactants may have either positive or negative charge. They will adapt to the pH of the water used in the solution. Because they are adaptable to both acid and alkaline water, they are frequently used in facial lotions and creams. The neutrality of the surfactants is important to the mildness of the cosmetic products.
4. Nonionic surfactants are used for heavier creams such as hand creams.

Surfactant ingredients:

Sodium lauryl sulfate	Sodium cocoyl isethionate
Sodium laureth sulfate	Lauryl glycosine
Disodium lauryl sulfosuccinate	Laureth 4
Ammonium lauryl sulfate	Polyethylene glycol (PEG)
Cocoamphocarboxyglycinate	Alpha-olefin sulfonate
Decyl polyglucoside	

For sensitive and dry skin, cosmetic manufacturers add fatty acid, oil, or wax to cut the contact of the surfactant with the skin.

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Emulsifiers are chemicals that keep water and oil solutions well mixed. They help provide stability and texture to lotions and creams. They make the cream feel smooth and even. If they were not used in moisturizers the lotion would feel wet and oily when applied.

Frequently used emulsifiers:

Amphoteric 9	Sodium hydroxide
Beeswax	Ceteth-20
Polyethylene glycol (PEG)	Carbopol
Polysorbate	Stearamide
Carbomer	

Emollients are ingredients that lubricate the skin and give cosmetics a soft, smooth feeling. They significantly help bind cosmetics to the surface of the skin.

Silicone compounds:

Cyclomethicone	Dimethicone
Phenyl Trimethicone	Petroleum jelly
Mineral oil	

1. **Fatty acids** are derived from plant or animal sources. They help give a soft, firm texture to lotions, creams, lipsticks, and shaving creams and are used as pressing agents in pressed powders and blushes. Fatty acids have many good properties for cosmetic use. They can be comedogenic.

Commonly used fatty acids:

Stearic acid – derived from animal fats and some plants

Caprylic acid – derived from coconut oil, palm oil, or animal sources

Oleic acid – from animal fats and vegetable oils

Myristic acid – from coconut oil, animal fats, palm seed and other vegetable fats

Palmitic acid – from plant and animal sources

Lauric acid – derived from laurel oil and coconut oil

2. **Fatty alcohols** are fatty acids that have been exposed to hydrogen. They have a slightly waxy feel as raw ingredients. They are less sticky and heavy than many fats. They are frequently used to improve the viscosity of lotions and creams. **Viscosity** is the thickness and liquidity of a solution.

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Commonly used fatty alcohols:

Cetyl alcohol – used as an emollient, emulsifier, and opacifying agent (helps to turn a cream an opaque color, which helps protect the product from light exposure), and as a spreading agent. It is derived from animal tallow, but can also be made synthetically.

Lauryl alcohol – derived from coconut and palm seed oil, is used as an emollient spreading agent.

Stearyl alcohol – derived from stearic acids, used as a foam-booster in detergent cleaners, as an emollient and as viscosity-opacity builder.

Cetearyl alcohol – is a mixture of cetyl and stearyl alcohols.

Oleyl alcohol – derived from oleic acid, somewhat fattier and greasier than other alcohols. It is often used in superfatted soaps and dry skin emulsions (foam booster).

3. Fatty esters are formed when organic (carbon chain) acid combines with an alcohol. They are used as emollients and conditioning agents. One of their best qualities is that they do not feel as oily to touch as some other types of emollients. They can be used to smooth the surface of the skin or hair, to serve as a protectant, and sometimes used as emulsifier.

Commonly used fatty esters:

Isopropyl myristate
Isopropyl palmitate
Octyl stearate
Glyceryl stearate
Propylene glycol dicaprinate/dicaprylate

Glycol distearate
Octyl palmitate
Isopropyl isotearate
Cetyl palmitate
Decyl oleate

Solvents

Propylene glycol
Arnica (arnica montana) extract
Alcohols of various types

Preservatives are chemical agents that inhibit growth of microorganisms in creams or cosmetic products. Preservatives work by either directly poisoning or releasing other chemicals that poison the microorganisms.

Commonly used preservatives:

Methylparaben
Propylparaben
Imidazolidinyl urea
Ethylparaben

Diazolidinyl urea
Sodium methyl paraben
Benzoic acid
Proxy paraben

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Butylparaben
Methylchloroisothiazolinone
Quaternium – 15

DMDM hydantoin
Methylchlorothiazolinone
Phenoxyethanol

Antioxidants are chemicals that are added to cosmetic formulas to prevent oxidation. They also keep creams and other products from developing color or odor changes caused by oxidation.

Commonly used antioxidants:

Butylated hydroxyanisole (BHA)
Butylated Hydroxytoluene (BHT)
Tocopherol (vitamin E)
Benzoic acid

Chelating agents are chemicals that are added to cosmetics to improve the efficiency of the preservative. Chelating agents work by breaking down the cell walls of bacteria and other microorganisms so that the preservative is more easily absorbed by the microorganisms. Any compound that binds and precipitates metals or removes trace of metals is a chelating agent.

Commonly used chelating agents:

Disodium EDTA (ethylenediaminetetraacetic acid)
Trisodium EDTA
Tetrasodium EDTA

Buffering agents adjust the pH of the product to make it more acceptable to the skin.

Commonly used buffering agents:

Acidic agents:
Citric acid
Tartaric acid

Alkaline agents:
Calcium carbonate
Ammonium carbonate
Potassium hydroxide
Ammonium hydroxide

Gellant and thickening agents are added to a product to give it a gel-like type consistency. They improve the appearance of the product and give it more body, making it stiffer and less runny.

Commonly used thickening agents:

Methyl cellulose
Xanthan gum

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Beeswax
Carbomer
Glycine soya (soy bean) protein

Coloring agents are added to make products more appealing to consumers.

Certified colors are pigments, also called lakes that are certified and regulated by the FDA (Food and Drug Administration). They are named by listing the color name, the number assigned to that color agent by the FDA and the metal associated with the chemical structure (example: No. 4 Aluminum Lake). Some colors are approved for use in drugs, cosmetics and foods. However, in general, you will rarely see F, D, and C listed on a cosmetic ingredients label. The colors certified by the FDA are blue, green, orange, red and yellow. Certified colors are not permitted by the FDA to be used in cosmetics.

Noncertified colors are not metal salts. Most of these are natural plant and animal extracts, mineral pigments and sometimes synthetic colors. Although these colors are certified by the FDA, they do not have a specific certification number. They are commonly used in cosmetics.

Iron oxides (used in foundations)
Zinc oxide
Carmine
Beta-carotene
Chlorophyllin-copper complex
Annatto
Ferric ferrocyanide
Mica
Ultramarine colors
Henna

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Lipid ingredients: (these lipid ingredients can actually be derived from plant and animal sources)

- Soy sterols
- Soy lecithin
- Linoleic acid
- Evening primrose
- Sunflower oil
- Borage oil

Humectants:

- Glycerin
- Propylene glycol
- Butylene glycol
- Hyaluronic acid (sodium hyaluronate)
- Mucopolysaccharides (carbohydrates lipid)
- Collagen and elastin
- Seaweed and algae extract

Emollients:

- Lanolin
- Mineral oil
- Silicones
 - Cyclomethicone
 - Dimethicone
 - Phenyl trimethicone

Ingredients for aging skin:

Alphahydroxy acids (AHA) are mild acids, present in fruits and vegetables.

- Lactic acid
- Tartaric acid
- Malic acid
- Glycolic acid
- Salicylic acid
- Citric acid

Antioxidants

- Superoxide dismutase
- Lecithin
- Liposomal tocopherol (vitamin E)
- Tocopherol acetate
- Ascorbic acid
- Magnesium ascorbyl phosphate
- Grapeseed extract
- Green tea extract
- Retinal
- Coenzyme Q-10

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Special Additives:

Many of these agents are soothing agents that are added because they have the capability of reducing irritation of the skin.

Azulene – derived from chamomile flower

Bisabolol

Allantoin – derived from the comfrey root

Balm mint extract

Calendula extract

Camphor

Chamomile extract

Dipotassium glycyrrhizionate

Mallow extract

Licorice extract

Zinc oxide

Rice starch

Steryl glycyrrhizinate

Cornstarch

Exfoliants:

Alphahydroxy acids

Glycolic acids

Tartaric acid

Malic acid

Salicylic acid

Willow bark

Sugarcane

Passion flower

Apple

Grapes

Benzoyl peroxide

Sulfur

Resorcinol

Enzymes

Papain – papaya

Bromelain – pineapple

Pancreatin – beef pancreas

Masks:

Clays

Bentonite

Kaolin

Silica

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Ingredients

Typical formulation of a cleanser with moisturizing ingredients. The use by consumers of this kind of product in the shower is increasing.

INCI name	Function	
Aqua (water)	Solvent	
Sodium laureth sulfate	Mild cleansing and lathering	
Glycine soja	Moisturizer/occlusive	
Sodium lauroamphoacetate	Mild cleansing and lathering	
PEG-6 caprylic/capric glycerides	Moisturizer/emollient	
Palm kernel acid	Thickener/skin conditioner	
Magnesium sulfate	Thickener	
Glycerin	Moisturizer/humectant	
Cocamide MEA	Mild cleansing and lathering	
Citric acid	Adjusts pH	
Maleated soybean oil	Moisturizer/emollient/occlusive	
Parfum	Fragrance	
Polyquaternium-10	Skin conditioner and emollient	
Disodium EDTA	Chelator	
Sodium benzoate	Preservative	
DMDM hydantoin	Preservative	
BHT	Preservative	

The ingredients of a modern, good-quality moisturizer and their functions.

INCI name	Function	
Aqua (water)	Solvent	
Octyl methoxycinnamate	Sunscreen (chemical)	
Glycerin	Skin conditioning agent/humectant	
Zinc oxide	Sunscreen (physical)	
Isohexadecane	Emollient	
Isopropyl palmitate	Emollient	
Tocopherol acetate	Vitamin E	
Dimethicone	Skin feel agent	
Dimethiconal	Skin feel agent	
Sucrose polycottonseedate	Emollient	
Sucrose polybehenate	Emollient	
Steareth-21	Thickener/stabilizer	
Steareth-2	Thickener/stabilizer	
Cetyl alcohol	Thickener/stabilizer	
Stearyl alcohol	Emulsifier	
Arachidyl alcohol	Emulsifier	
Behenyl alcohol	Emulsifier	
Polyacrylamide	Stabilizer	
C13-14 isoparaffin	Emollient	
Laureth-7	Emulsifier	
DEA-oleth-3-phospate	Emollient	
Disodium EDTA	Chelator	
Parfum	Fragrance	
DMDM hydantoin	Preservative	
Iodopropynyl butylcarbamate	Preservative	
BHT	Stabilizer	

