How to Make Hair Shampoos

MAKING COSMETICS

Surfactants provide a cleansing effect based on the ability to remove fatty particles from the skin in a watery environment.

Effective thickeners are gums, including gaur, xanthan, and cellulose gum.

As compared to emulsion-based products (e.g. creams and lotions) which require multiple phases to produce, formulation of hair shampoos is quite easy. A shampoo is basically a one-phase, water-based blend of cleansing agents (surfactants) that foams. There are many other components that are added to shampoos, but they are included only to achieve a better performance like thickness, fragrance, foam stability, color or pearlizing and conditioning effects. Theoretically, a simple mix of surfactants and water would suffice to clean the hair.

The first thing before starting to formulate a shampoo is to determine who will be using the shampoo (baby, adults, pets) and for which hair type (oily, dry, dandruff, etc.). For babies, for example, only the mild and low-foaming secondary surfactants will be used, whereas for an adult with greasy hair a high amount of the strongly cleansing, primary surfactants with a foam booster will be used.

Surfactants

Like emulsifiers, surfactants (abbreviation of SURFace ACTive Agents) are compounds able to mix oils and water. Their cleansing effect is based on the ability to remove fatty particles from the skin in a watery environment. Based on the cleansing and foaming property surfactants are divided into primary and secondary surfactants (secondary surfactants are also called co-surfactants). The primary surfactants are the key components in shampoos responsible for foam and cleansing. The low-foaming co-surfactants as cocamidopropyl betaine, sulfosuccinate, or glucosides are used to reduce the irritant (eye burning) and drying effect of the primary surfactants. Additionally, some co-surfactants have also conditioning effects like the betaines. Thus, a blend of a primary and secondary surfactant and water is the backbone of a every shampoo.

Thickeners

Nobody wants to use a water-thin shampoo (although they would work as well as thick ones). Thickness is perceived as richness . There are several ways to make a shampoo thick. Very effective viscosity enhancers are salts like simple table salt (sodium chloride) or ammonium chloride which work, however, only with sulfonates or sulfates. Note, too high an amount of salts make a shampoo more harsh. Other effective thickeners are gums including guar, xanthan, and cellulose gum which in-crease viscosity by forming kind of a gel.

Gums have the advantage to act also as foam stabilizer and suspending agent able to keep insoluble particles like pigments or zinc pyrithione (anti-dandruff) in suspension. Gums do not penetrate the skin as other traditional thickeners may do.

Thickness in conditioners and shampoos is viewed as rich as nobody wants watery shampoos.

Colors and fragrances are necessary to make the shampooing experience a complete one.

Conditioners

Nowadays, practically all shampoos contain a conditioner of some type. Consumers expect that their hair is smooth and conditioned after shampooing. Most often conditioning agents are quaternary surfactants (quats) which has a positive charge that neutralize static electricity caused by negatively charged damaged hair cuticles. Quats also have fatty groups improving wet comb and gloss.

Foam Boosters / Stabilizers

Most people equate foaming with cleansing and think that unless large amounts of foam are generated, the hair will not be cleaned. Although this is, of course, not true most of us prefer to make shampoos that foam. Foam boosters or foam stabilizers such as gums (eg. guar or xanthan), sarcosinates and lactylates are used very often.

Opacifiers

Opacifiers (pearlizers) make shampoos pearlescent which is perceived as richness by most consumers. The most widely used opacifiers in shampoos are glycol stearate and glycol distearate. Both agents are also used to hide a cloudy shampoo.

Emollients

Often a form of emollient is added to a shampoo depending on the hair type. An emollient can have a softening effect and acts as a refatting agent. PEG-7 glyceryl cocoate is a popular emollient which also provides emulsifying properties. Other popular emollients are natural oils, such as argan oil.

Preservatives

Every shampoo must be preserved unless it is used up within a few days. Parabens and urea derivatives are preferred .

Colors, Fragrances, Active Ingredients

Although colors and fragrances are not necessary to make a good shampoo, they add to the shampoo experience and form thus a critical part for the overall performance. In addition, active ingredients like vitamins or botanicals can improve further specific properties.

Shampoo Components

Component	Options	Function
Distilled water		Basis
Primary Surfactant	Sulfonates, Sulfates (e.g. alkyl sulfonate)	Cleansing, foaming
Secondary Surfactant	Betaines, Sulfosuccinates (e.g. sulfosuccinate, coco betaine, polyglucose)	Cleansing, foaming Reduces irritation Reduces drying
Thickener	Salts (e.g. sodium chloride) Gums (e.g. Guar, xanthan) cellulose)	Enhances viscosity
Conditioner	Quaternary compounds (e.g. quaternium 87)	Smoothing, detangling

Shampoo Components continued...

Component	Options	Function
Foam booster	Sarcosinate, lactylates	Boosts foam
Foam stabilizer	Gums (e.g. Guar, xanthan)	Stabilizes foam
Suspending agent	Gums (e.g. Guar, xanthan)	
Opacifier	Polyglycol esters (e.g. glycol distearate)	
Preservative	Parabens, urea derivatives (e.g. Paraben-DU, EDTA)	Avoids spoiling
Active ingredients	Vitamins, aloe vera etc.	Depends on substance
Fragrance	Essential oils, artificial fragr.	Fragrance
Color	Approved pigments	Colors