

Hair conditioner is different from *creme rinse* (sometimes spelled "cream rinse"). A creme rinse is simply a "detangler" that has a thinner consistency than conditioner, as its name implies. Hair conditioner is a thicker liquid that coats the cuticle of the hair.

Mechanism of action

The outermost layer of a hair follicle is called the cuticle and is composed largely of keratin. This is rich in cysteine groups which are mildly acidic.^{[4][5]} When the hair is washed these groups can deprotonate, giving the hair a negative charge. Positively charged quaternary ammonium species, such as behentrimonium or polyquaternium, can then become attached to the hair via electrostatic interactions.

Once attached these compounds have several effects. Their long hydrocarbon backbone helps to lubricate the surface of each hair follicle, reducing the sensation of roughness and assisting combing. The surface coating of cationic groups means that the hairs are repelled from each other electrostatically, which reduces clumping. The compounds can also act as antistatic agents, which helps to reduce frizzing.



A bottle of modern day hair conditioner by Clairol (right).

Types

- **Pack** conditioners are heavy and thick, with a high content of surfactants that are able to bind to the hair structure and "glue" the hair surface scales together. These are usually applied to the hair for a longer time. The surfactants are based on long, straight aliphatic fatty acid chains similar to saturated fatty acids. Their molecules have a tendency to crystallize easily, giving the conditioner higher viscosity, and they tend to form thicker layers on the hair surface.
- **Leave-in** conditioners are thinner and have different surfactants, which add only a little material to the hair. They are based on unsaturated fatty acid chains, which are bent, not straight. This shape makes them less prone to crystallizing, making a lighter, less viscous mixture and providing a significantly thinner layer on the hair. The difference between *pack* and *leave-in* conditioners is similar to the difference between fats and oils, the latter being less viscous. Leave-in conditioner is designed to be used in a similar way to hair oil, preventing the tangling of hair and keeping it smooth. Its use is particularly prevalent by those with naturally curly or kinky hair.
- **Ordinary** conditioners combine some aspects of *pack* and *leave-in* conditioners. Ordinary conditioners are generally applied directly after using shampoo, and manufacturers usually produce a conditioner counterpart for different types of shampoo for this purpose.
- **Hold** conditioners, based on cationic polyelectrolyte polymers, hold the hair in a desired shape. These have a function and composition similar to diluted hair gels.

Ingredients

There are several types of hair conditioner ingredients, differing in composition and functionality:

- Moisturizers, whose role is to hold moisture in the hair. Usually these contain high proportions of humectants. These could also be provided by natural oils such as almond oil^[6]

- Reconstructors, usually containing hydrolyzed protein. Their role is supposedly to penetrate the hair and strengthen its structure through polymer crosslinking.
- Acidifiers, acidity regulators which maintain the conditioner's pH at about 3.5. In contact with acidic environment, the hair's somewhat scaly surface tightens up, as the hydrogen bonds between the keratin molecules are strengthened.^[7]
- Detanglers, which modify the hair surface by pH as acidifiers, or by coating it with polymers, as glossers.
- Thermal protectors, usually heat-absorbing polymers, shielding the hair against excessive heat, caused by, e.g., blow-drying, curling irons or hot rollers.
- Glossers, light-reflecting chemicals which bind to the hair surface. Usually polymers, usually silicones, e.g., dimethicone or cyclomethicone.
- Oils (EFAs – essential fatty acids), which can help dry/porous hair become more soft and pliable. The scalp produces a natural oil called sebum. EFAs are the closest thing to natural sebum (sebum contains EFAs).
- Surfactants – approximately 97% of hair consists of a protein called keratin. The surface of keratin contains negatively charged amino acids. Hair conditioners therefore usually contain cationic surfactants, which don't wash out completely, because their hydrophilic ends strongly bind to keratin. The hydrophobic ends of the surfactant molecules then act as the new hair surface.^[8]
- Lubricants, such as fatty alcohols, panthenol, dimethicone, etc.
- Sequestrants, for better function in hard water.
- Antistatic agents
- Preservatives
- Sunscreen, for protection against protein degradation and color loss. Currently benzophenone-4 and ethylhexyl methoxycinnamate are the two sunscreens most commonly used in hair products. Cinnamidopyltrimonium chloride and a few others are used to a much lesser degree. The common sunscreens used on skin are rarely used for hair products due to their texture and weight effects.

pH

Conditioners are frequently acidic, as low pH protonates the keratin's amino acids. The hydrogen ions gives the hair a positive charge and creates more hydrogen bonds among the keratin scales, giving the hair a more compact structure. Organic acids such as citric acid are usually used to maintain acidity.

See also

- Anointing
- Brilliantine
- Brylcreem
- Pomade
- Shampoo

References

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External links

- [How Hair Conditioner Works](http://h2g2.com/A851627) (<http://h2g2.com/A851627>)
 - [How to Apply Hair Conditioner](http://www.wikihow.com/Apply-Conditioner-to-Your-Hair) (<http://www.wikihow.com/Apply-Conditioner-to-Your-Hair>)
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