TYPES AND IMPORTANT INGREDIENTS OF HAIR SHAMPOOS.

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Abstract: Shampoo is a foam cleanser for hair and scalp. Unlike alkaline soap, it has a neutral or slightly acidic pH. Shampoo is designed to remove fat, dead cells from the hair and scalp. Everything else is the function of conditioners, balms, anti-dandruff products and others.Shampoos are one of the largest products in the cosmetics industry and the market for them is constantly growing. If at first shampoos were treated exclusively as hygiene products, then in the future the market demanded the presence of additional properties - softer care, the absence of irritating properties, the presence of biologically active, functional and aesthetic additives. Today, shampoo is the most used cosmetic product, which is subject to the highest requirements.Shampoo of the new generation has not only excellent washing, but also conditioning properties. It contains a balanced composition of ingredients, useful additives that care for hair, protect it from aggressive external influences, and contribute to its restoration.The purpose of the work is to study the mechanism of action of shampoos on hair, to consider the composition of shampoos depending on the type of hair.

Keywords: Hair, shampoo, anionics, cationics, amphoterics, non ionics, conditioner.

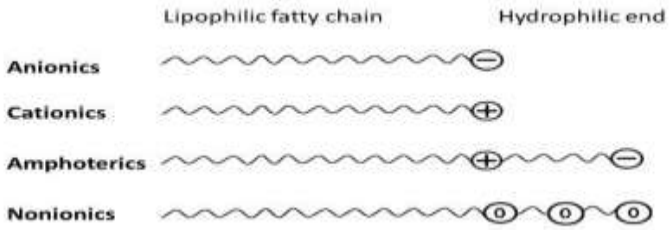
Surfactants used in Shampoos

A surfactant is a blend of surface active agents. They are organic compounds that are both lipophilic and hydrophilic (amphiphilic) and have the ability to orient themselves according to the polarities of two opposing phases. The hydrocarbon fatty chain constitutes the non-polar part of the surfactant and gets in contact with the lipophilic part of the interface (fatty material). The polar group (hydrophilic) which is located at the end of the fatty acid chain strongly interacts with water molecules by dipole or ion-dipole interactions (water-soluble) and removes the dirt that is entrapped.[1]

Surfactants Classification

Surfactants are classified into four different categories according to the type of the polar end: Anionics, Cationics, Amphoterics and Nonionics.

Table 1



Different types of surfactants according to the type of the polar end .

Anionics

The surfactants that have a hydrophilic head carrying a negative charge are defined as anionics. Those types of surfactants have excellent emulsifying, detergent and foaming properties which are the main reason for their use in shampoos. Also, they are divided into five major chemical classes:

- ❖ Acylated Amino Acids
- ❖ Carboxylic Acids
- ❖ Sulfonic Acid Derivatives
- ❖ Sulfuric Acid Derivatives
- ❖ Phosphoric Acid Derivatives

Cationics

These surfactants carry a positive charge on their polar group and are also divided in different

categories, as follows:

- ❖ Quaternarie amines
- ❖ Alkyl Amines
- ❖ Alkyl Imidazolines

Since cationic surfactants show affinity for the hair fibres and provide softness and mildness, the lather is poor and the redeposition of the dirt onto the hair may occur. These surfactants do not clean, being the conditioning of the hair their main function. Also, the incompatibility with anionic surfactants limits their use together in shampoos formulations.

Amphoterics

If the hydrophilic head behaves as a function of pH, that is, carry a positive charge at low pH and a negative charge at high pH, the surfactants are classified as amphoterics. There are two categories of amphoterics:

- ❖ Alkylamido Alkyl Amines
- ❖ Alkyl Substituted Aminoacids.[2]

NONIONIC DETERGENTS

The nonionic detergents are the second most popular surfactants, behind the anionic detergents, and bear the name nonionic, as they have no polar group. These are the mildest of all surfactants and are used in combination with ionic surfactants as a secondary cleanser. Examples of nonionic detergents currently used in shampoos are

polyoxyethylene fatty alcohols and polyoxyethylene sorbitol esters and alkanolamides.[3]

NATURAL DETERGENTS

The synthetic detergents previously discussed have largely replaced natural detergents, until recently, when botanically based hair care products have made a resurgence. Natural surfactants come from plants such as sarsaparilla, soapwort, soap bark, and ivy agave. These natural saponins have excellent lathering capabilities, but are poor cleansers thus must be present at high concentration. Usually, they are combined with other synthetic detergents that have been outlined earlier.The synthetic detergents providemost of the hair and scalp cleansing, while the botanicals are largely added for marketing purposes.[4]

CONDITIONERS IN SHAMPOO FORMULATIONS

Even as the main intent of a shampoo is to cleanse the scalp and hair, over cleansed hair is not cosmetically acceptable. Hair that is completely devoid of sebum is harsh, difficult to style, and dull. Some persons wish to shampoo daily as a hygiene ritual, whether there has been adequate sebum production or not. Thus, shampoos formulated for dry, damaged, or chemically treated hair frequently contain a conditioner. The conditioner functions to impart manageability, gloss, and antistatic properties to the hair. These are usually fatty alcohols, fatty esters, vegetable oils, mineral oils, or humectants. Commonly used conditioning substances include hydrolyzed animal protein, glycerin, dimethicone, simethicone, polyvinylpyrrolidone, propylene glycol, and stearalkonium chloride.[5] Protein-derived substances are popular conditioners for damaged hair, as they can temporarily mend split ends, also medically known as trichoptilosis. Split ends arise when the protective cuticle has been lost from the distal hair shaft and the exposed cortex splits. Protein is attracted to the keratin, a property known as substantivity, and the protein holds the cortex fragments together until the next shampooing occurs[6].

HAIR KERATIN AND pH OF SHAMPOO

The scalp pH is 5.5 and the hair shaft pH is 3.67. The pH at which a protein or particle does not migrate (moment of charge neutrality) in an electric field is the isoelectric point (3.67 pH). The pH of which a protein or particle has an equivalent number of total positive and negative charges is called the isoionic point (pH-5.6). A protein that is in a pH region below its isoelectric point will be positively charged, and vice versa. Any product applied on hair that has pH higher than 3.67 may increase the negative electrical net charge of the hair fibre surface and, therefore, increase the friction between the fibres increasing the damage to the A-layer and the epicuticle of the hair fibre [7,8]. Rinsing hair with water (pH-7), increases negativity, creates frizz. Water penetrates the scales that open, hydrating the strand and breaking the hydrogen bonds of the keratin molecule. Keratin is a spiral molecule that keeps itself in that shape

due to chemical bonds. To tackle the effects of shampoo with a high pH, it is necessary to choose a shampoo with a pH lower than 5.5 by using a 'pH balancing' shampoo with the addition of an acidic substance such as glycolic acid, adding cationic ingredients to shampoo or by using a conditioner after shampoo. A conditioner of low-pH neutralizes electric charge, reduce the frizz effect and close cuticular cells.A high pH shampoo, will have a positive effect in oily and thin hair, as it can add volume to the hair post shampoo because of the increase in static electricity. However, a pH higher than 5.5 may cause irritation of the scalp [9] . Foaming agents They introduce gas bubbles into the water but have nothing to do with cleansing, a common myth among general population that a product which foams better cleans better. Inclusion of foam boosters like cocodiethanolamide as ingredients in shampoo helps to satisfy the customer psyche which equates good foaming with good cleansing though it does help spread the detergent over the hair and scalp. This helps in the commercial success of a shampoo formulation. Sebum inhibits the bubble formulation; therefore, there is more foam during second shampooing [10,11].

SHAMPOO TYPES

There are many types of shampoos, too numerous to mention in this article, however, it is worthwhile discussing shampoos by basic type. The basic shampoo groups are listed in . Shampoos have been formulated in liquids, gels, creams, aerosols, and powders. Only the liquids will be discussed, as these are the most popular.

- ❖ Basic shampoo types
- ❖ Normal hair shampoo
- ❖ Dry hair shampoo
- ❖ Damaged hair shampoo
- ❖ Oily hair shampoo
- ❖ Everyday shampoo
- ❖ Deep cleaning shampoo
- ❖ Baby shampoo
- ❖ Medicated shampoo
- ❖ Two-in-one shampoo
- ❖ Hair dyeing shampoo

ADVERSE REACTIONS

Adverse reactions to shampoos are rare, as the product is rinsed away from the skin quickly allowing insufficient time for the development of allergic or irritant contact dermatitis. Probably the most common problem with shampoo is accidental contact with the mucous membranes, such as the nose and eye. The possible causes of allergic contact dermatitis are listed in Table[10]

- ❖ Causes of shampoo-induced allergic contact dermatitis

- ❖ Formalin
- ❖ Parabens
- ❖ Hexachlorophene
- ❖ Miranols

If patch testing to a shampoo is required, the shampoos should be diluted to form a 1-2% aqueous solution for closed patch testing and a 5% aqueous solution for open patch testing. However, it should be recognized that false positive reactions due to irritation may still occur. A better assessment may be obtained by patch testing individual ingredients separately.[12]

Sumarry

Shampoos are a complex formulation of ingredients selected to clean the scalp, as well as beautify the hair. The right choice of shampoo not only helps to streng then the hair, but also makes them shiny.

References

1. Bouillon 1988. Development of Solid Organic Shampoo formulation November 2018;106/27https://fenix.tecnico.ulisboa.pt/downloadFile/563345090416473/MasterThesis_InesBrilhante.pdf
2. Rieger & Rhein 2017. Development of Solid Organic Shampoo formulation November2018;106/28 https://fenix.tecnico.ulisboa.pt/downloadFile/563345090416473/MasterThesis_InesBrilhante.pdf
3. Powers DH. Cosmetics Science and Technology. In: Balsam MS, Gershon SD, Reiger MM, Sagarin C, Strianse SJ, editors. Shampoos. New York: Wiley-Interscience; 1972. pp. 73–116. [Google Scholar]
4. Zviak C, Vanlerberghe G. Scalp and hair hygiene. In: Zviak C, editor. The Science of Hair Care. New York: Marcel Dekker; 1986. pp. 49–86. [Google Scholar]
5. Harusawa F, Nakama Y, Tanaka M. Anionic-cationic ion-pairs as conditioning agents in shampoos. Cosmet Toilet. 1991;106:35–9. [Google Scholar]
6. Karjala SA, Williamson JE, Karler A. Studies on the substantivity of collagen-derived peptides to human hair. J Soc Cosmet Chem. 1966;17:513–24. [Google Scholar]
7. Robbins CR, Crawford RJ. Cuticle damage and the tensile properties of human hair. J Soc Cosmet Chem. 1991;42:59-67.
8. Sinclair RD. Healthy hair: What is it? J Investig Dermatol Symp Proc. 2007;12:2-5.
9. Gavazzoni Dias MR, De Almeida AM, Cecato P, Adriano AR, Pichler J. The shampoo pH can affect the hair: Myth or Reality? Int J Trichol 2014;6:95-9.
10. Draelos ZD. Essentials of hair care often neglected: Hair cleansing. Int J Trichology. 2010;2:24–9. [PMC free article] [PubMed] [Google Scholar] Last accessed on 2014 sep20].: http://www.cyclopaedia.de/wiki/Coconut_diethanolamide
11. De Groot AC, Weyland JW, Nater JP.Amsterdam: Elsevier; 1994. Unwanted Effects of Cosmetics and Drugs Used in Dermatology; pp.473-6. [Google Scholar]