

Clear Shampoo: an Important Formulation Aspect with Consideration of the Toxicity of Commonly Used Shampoo Ingredients

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Abstract

Shampoos are products which remove surface grease and dirt from the hair shaft and scalp. The cleansing and conditioning of hair is a primary function of shampoos. Shampoos are formulated to improve the function, structure, shine, lustre, strength, gloss, manageability, thickness, feel and smoothness of the hair for the sole purpose of feeling more attractive. Clear shampoos are more important than other shampoos because they have a market share of about 50% of the total hair care products all over the world. Shampoo is a product which is used by all classes of people, but no one knows about the harmful effects of some ingredients which are used in formulation of shampoo. Some newer materials are used in the formulation of shampoos, such as silicone derivatives (dimethicone and cyclomethicone), proteins and amino acids, panthenol (provitamin of pantothenic acid or vitamins B₅), selenium sulphide and glutamic acid etc. In this article, we discuss recently introduced ingredients which can be used in the preparation of clear shampoo and also include discussion about the harmful effects of some ingredients which are used in the formulation of shampoo.

Introduction

The hair that covers the human head is more important for decorative purposes and people spend a considerable amount of time improving their appearance¹. Shampoo is a relatively new invention – up until the 1930s people used soap for hair cleansing. The main drawbacks of soap are its irritation property and incompatibility with hard water. The first synthetic shampoo detergent was introduced in the 1930s, then shampoos containing sodium lauryl sulphate (SLS) and finally current shampoo technology with silicone as the main conditioning agent was developed². Shampoos are designed to improve the function, strength, structure, shine, lustre, gloss,

manageability, thickness, feel and smoothness of the hair for the sole purpose of feeling more attractive^{3,4}. Today shampoos are the one of the main products in the hair care and cleansing market. They represent more than 70% of the total units sold in the hair products sector, which shows their considerable importance in the market⁵. Shampooing and conditioning are the most common hair treatments. In response to consumer demand, chemists are developing hair care products which will impart repairing and conditioning effects on the hair⁶. Shampoos are formulated to remove dirt materials from the surface of the hair and so depositing ingredients from a shampoo is contrary to the intended function^{7,8}. Shampoos have been primarily used for cleansing the hair and scalp. Selective ingredients of shampoo that have been popular with the consumer are currently under attack because of potential risks associated with their use (e.g. halogenated organic compound, formaldehyde, musk fragrance and crude coal tar are potentially carcinogenic compounds). The foaming characteristic of a shampoo has an important role in its acceptability. A shampoo should produce a stable and sufficient amount of foam (e.g. alkanolamides are used to prepare stable foam, but because of producing nitrosamines they are potentially carcinogenic compounds)⁹. However, nowadays shampoo formulations have become more sophisticated. The majority of the shampoo formulations on the market contain cationic polymers besides the surfactant system and the use of silicones as conditioning agents in shampoos¹⁰⁻¹². They improve many hair attributes, e.g. combability, feel, softness, smoothness, shine, resistance to damage and reduction of split ends¹³.

Structure of Hair

Hair is mainly made of protein. The diameter of a human hair ranges from about 18 μm to 180 μm ¹⁴. The structure of a hair shaft is made of three main layers which are concentric to each other: Medulla, Cortex and Cuticle¹⁵.