

SYMPOSIUM: SURFACTANTS IN COSMETICS

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Introduction

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The surfactant industry is clearly a key supplier to the cosmetic industry. Indeed, the success of some of our modern cosmetics is directly attributable to the surfactant in them. But it is also true that cosmetics are an important outlet for the surfactant industry, not only from the standpoint of dollar volume, but also from that of the technical challenge which leads it to continually develop new surfactants. There is a very close inter-relationship between these two industries and the present symposium reflects it clearly.

It would be useful to state just what we mean by the terms cosmetic and surfactant. A surfactant is a compound which exhibits unusual surface activity and possesses the ability to impart wetting, foaming, emulsification or detergency. A cosmetic is not as crisply defined. In one sense, it is a fashion product such as lipstick which gives the user an improved or fashionable appearance. The term toiletry denotes a product which is used as an aid to grooming, such as a shampoo or deodorant. Common usage within the industry, however, has tended to fog this difference so that today the term cosmetic has come to include external grooming preparations as well as fashion products. Indeed, the Federal Food, Drug and Cosmetic Act defines a cosmetic to include all types of fashion products and all types of grooming aids except soap.

The earliest evidence of cosmetic use has been found in Egyptian burial sites which are over 5000 years old (1). Cosmetic oils, colors and fragrances were often placed beside the deceased, presumably for use in the next world. The ancient Egyptians were ardent practitioners of the cosmetic arts and they conceived many of our present day cosmetic concepts such as hair colors, skin conditioners, nail colors, deodorants and even dandruff remedies. Some of these products were based on mysterious recipes and were totally ineffective, but as the centuries passed, new ingredients and methods were discovered which improved their performance and even gave rise to new products. Somewhere between 1000 B.C. and 600 A.D., soap was discovered and with it the seed of the surfactant industry. With soap, new and improved cosmetics were possible and so at a very early date an interrelationship between surfactants and cosmetics had been established, and it has lasted to our present day.

In 1966, retail sales of cosmetics were 3.1 billion dollars, an increase of about 9% over that of the previous year (2). Table I shows the composition of this market.

Practically all cosmetic products use surfactants for one purpose or another, and the necessary variety and quality are a challenge to which the surfactant industry has responded. In 1965, this industry sold over 1.6 billion pounds of bulk surfactant valued at 300 million dollars, an increase of 6% over the previous year (3). It is difficult to determine just how much surfactant is sold specifically for use in cosmetics; based on several figures from industry sources, a fairly good estimate appears to be 50 to 55 million pounds or 3% to 4% of the total pounds sold. Because of its quality and specialty status, however, the cosmetic surfactant is somewhat more expensive than the average, so that in dollar volume cosmetic surfactants probably account for about 10% to 12% of the total market.

The uses for surfactants in cosmetics are many and varied, and the cosmetic chemist has literally

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TABLE I
Cosmetic Market—1966

	Millions of retail dollars
Skin cosmetics	969
Hair preparations	946
Oral hygiene	509
Fragrance	265
Deodorants	223
Shaving	195

hundreds to choose from. He formulates with all types of surfactants, but from the standpoint of total pounds, he uses the anionics most heavily.

By far the major use for anionics is for cleansing. Shampoo surfactants account for over half of the total surfactant consumed by the cosmetic industry, and the lauryl sulfates are the most widely used. In permanent hair color products, ammonium oleate is used extensively for thickening, dye leveling and wetting. Anionics of all types are also used to some extent as emulsifiers.

The second class of surfactant used in cosmetics is the nonionic. Although the total amount of nonionics used is not as great as that of anionics, the variety of its uses is greater than the uses for any other surfactant class. Some of these uses are discussed below.

Emulsification. Probably the major use for nonionics in cosmetics is emulsification. Their excellent compatibility with most types of cosmetic materials makes them ideal for this purpose. Various types of glycerol monostearates and fatty acid sorbitan esters are the most widely used emulsifiers.

Solubilization. Nonionics are used extensively as perfume solubilizers and as emollient solubilizers in water based clear gel hair dress products. Polyoxyethylene esters and ethers are commonly used for these purposes.

Conditioning. Lanolin derivatives are often used in hair dress products to impart luster and soft feel, and in skin products as emollients.

Cleansing. Lipophilic nonionics are used as skin cleansing ingredients, particularly in make-up removers.

Thickening. In cosmetic emulsions and shampoos, nonionics are commonly used as thickeners. The alkanolamides are widely used as shampoo thickeners.

Opacifying. An important aesthetic function performed by many stearate-containing nonionic emulsifiers is for opacifying and imparting pearlescent effects.

Plasticizing. Many hair spray resin plasticizers come from the nonionic surfactant family.

Dye Leveling. Polyoxyethylene ethers and esters are often used in hair dye products to assist in dye leveling. In oxidation color products, nonionics are often used in both the dye base and peroxide developer.

Therapeutics. Finally, the literature has described the use of certain nonionics for therapeutic purposes. Compounds such as ethoxylated oleyl alcohol are used for regulating the output of overactive sebaceous glands (4), and ethoxylated lauryl alcohol is sometimes used as a skin drying ingredient in acne products.

Another class of surfactants used in cosmetics is cationics. They are widely used in hair conditioning products to impart good combing properties and soft feel. They are also used as germicides and dandrificides in hair grooms and rinses.

Finally a class of surfactant finding increasing usage in cosmetics is the amphoteric. The use of certain amphoteries in shampoos and skin products provides cleansing and some conditioning along with mildness. Amphoteries are also used as emulsifiers. In the future, they are certain to be used for an increasing variety of purposes.

In providing this list of uses for surfactants in cosmetics, I don't mean to stifle the imagination by giving the impression that certain surfactants can be used only for certain purposes. Indeed the basis for product novelty might well lie in a non-conventional use of a surfactant. As we begin the present symposium, we ought to keep in mind that surfactants in themselves can lead to new or improved cosmetics. Syndet detergents gave us syndet shampoos; the polyoxyethylene surfactants led to clear gel hair dresses containing both water and oil, and the protein hydrolysates led to new hair conditioning products.

These are examples from the past. Our concern is the future. I am sure that this symposium will provide us with new ideas and information to help us shape that future.

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