



Resources

Cleansers

by Michael Pugliese, L.E.

If a client asks a skin care professional what the most important part of a good homecare routine is, they will probably tell the client that it all starts with the right cleanser.

Body cleansing most likely dates back to the Stone Age when people used oil and water as cleansing agents. The earliest recorded evidence of the production of soap dates back to around 2800 B.C. in ancient Babylon. An actual formula for soap was found on a Babylonian clay tablet around 2200 B.C. and consisted of water, alkali, and cassia oil. The ancient Egyptians bathed regularly and combined animal and vegetable oils with alkaline salts to create a soap-like substance. Egyptian documents mention that the substance was also used in the preparation of wool for weaving.^{1,2}

In recent history, soap was made by boiling animal or vegetable fat with pot ash, an alkaline material that was usually obtained from wood ashes. Chemically, soap is a fatty acid salt of fat. Fat, a triglyceride, is made up of three fatty acids bonded to a glycerol molecule. When mixed with alkali, the molecule splits and the fatty acids combine with potassium or sodium in the lye – forming soap. The glycerol is a by-product and, in modern war times, was used to make explosive materials such as nitroglycerine. During World War II, as glycerol became scarce, the Germans began synthesizing chemical foaming agents.

Homeostasis of the Skin

Today, a variety of technology is used to keep the face and the body clean, clear, and looking its best. To achieve this, skin must maintain an optimal homeostasis or balance. A primary concern, as it pertains to skin homeostasis and cleansing, is pH. A range of 4.5 to 5.5 is considered normal for healthy skin. This healthy range helps keep the delicate balance of water and oil content throughout the epidermis and is critical in protecting the lipid barrier. Keep in mind that although the pH of the skin's surface is acidic, the pH of the dermis is alkali at 7.4. As the skin level gets deeper, the pH level becomes higher. Regular disruption of the skin's pH, due to cleansing, can create serious irritation, particularly in compromised or sensitive skin. This is an important point to remember when recommending product for clients. High pH cleansers that include many bar soaps can measure between 8 to 10 on the pH scale. To counterbalance this disruption, the use of a toner, though they can exacerbate the problem, might be suggested. Cleansers that fall within a range of 3.9 to 6.9 allow the skin to, in effect, re-pH itself and eliminate the need for a pH-balancing toner.

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Surfactants

The vast majority of facial cleansers used in today's market contain a category called surfactants. Surfactants, short for surface active agent, are what makes a cleanser foam. Their primary purpose is to remove surface oil and debris. Generally, the structure of a surfactant molecule contains a portion that is hydrophilic, or water-loving, and a portion that is lipophilic, or oil-loving. This is the basis for emulsification of lipids. The surfactant binds the water molecules and the fat molecules together, allowing the oil to be washed away. There are four different types of surfactants, grouped on how they are charged:

1. Negatively charged
2. Positively charged
3. Amphoteric, both positive and negative charges
4. Nonionic, or no charge

Negatively charged ionic surfactants are called anionic. They include sodium laurel sulfate, ammonium laurel sulfate, and sodium laureth sulfate, all of which are used abundantly in skin care. However, recent consumer trends have demanded sulfate-free surfactant systems, like sulfosuccinates and sulfoacetate, that are much gentler than their counterparts.

Cationic surfactants are positively charged and have very low skin tolerability, although they are still used in facial cleansers. Dodecyl trimethylammonium bromide and benzalkonium chloride are among the worst offenders and should be avoided. Cationic surfactants are often times paired with amphoteric surfactants to increase their tolerability.

Amphoteric surfactants contain both negative and positive charged portions. While cocamidopropyl betaine, derived from coconut oil, is the most widely used for this purpose it also pairs well with most other surfactants.

By and large, non-ionic surfactants, containing no charge, have become standard cleansing agents in the personal care industry. They are incredibly versatile and are recognized for their safety and low skin irritancy potential.

Exfoliating Agents

Decyl glucoside, lauryl glucoside, and sodium laurylglucoside hydroxypropylsulfonate are all very popular. They also have a broad pH range for the incorporation of exfoliating agents such as alpha and beta hydroxy acids like glycolic, lactic, mandelic, and salicylic acids. The incorporation of these

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agents into foaming cleansers provide immediate skin benefits due to their ability to denature proteins of the stratum corneum, primarily desmosomes that bond keratinocytes together. In addition, each agent adds their own individual benefit to cleansing products with unique properties. Lactic is recognized for its ability to stimulate glycosaminoglycans, a component of the skin's natural moisturizing factors, while mandelic is recognized for its germicidal properties. Both are effective lightening agents due to their ability to function as tyrosinase inhibitors. Together, in a single product, they can help reduce visible pigmentation from many sources, including photo damage and post-inflammatory pigmentation from acne.

The use of manual exfoliants in cleansing products has become a huge source of controversy and legality in the last few years. Last year, Illinois became the first state to ban polyethylene beads, tiny pieces of plastic often used in facial cleansing scrubs. The move was taken in response to growing concern among ocean activists about marine damage caused by plastic waste, particularly in the Great Lakes. Petroleum-based microbeads are not sifted out from wastewater during the sewage-

treatment process, but instead end up being released into large bodies of water where they have been found to accumulate. One California-based institute found almost 470,000 pieces of plastic per square kilometer in the Great Lakes and most of them, 81 percent, were cosmetic microbeads. New York, Ohio, Pennsylvania, New Jersey, and California are expected to follow Illinois' lead in the coming months. This has spurred the use of more eco-conscious, natural, and biodegradable alternatives such as hard waxes like carnauba and bee waxes that are also gentler on the skin. Hydrolyzed silica, which is the chemical equivalent of sand and refined marble, are also being used.

Milky Cleansers

Milk or creamy cleansers have also found a prominent place in today's skin care market. Although most of the products in this category are formulated not to foam, the purpose remains the same as those that do foam. These cleansers are typically emulsions, meaning they consist of both a water and an oil phase. To form the emulsion both phases are heated to around 60 degrees and then mixed together with the addition

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of an emulsifier that chemically combines both phases without the product separating once it has cooled. Most creams and lotions fall into this process as well, but cleanser viscosity is much lower, creating a thinner consistency. The water phase will be much greater, 70 to 80 percent, while creams and lotions contain water phase content around 50 to 60 percent. The incorporation of actives, including botanicals, essential oils, and exfoliating acid, is more effective with milky cleansers due to their staying power, meaning more of the product tends to remain on the skin after each use. Because of a lack of foaming surfactants in these products, they are considered gentler and are often marketed as helping to calm sensitive skin.

Oil Cleansing

In recent years, the Internet has helped to popularize the oil cleansing method, although the use of oils for skin cleansing is certainly nothing new. Greeks and Romans used olive oil for skin cleansing. The philosophy is that oil dissolves oil, which is partially true, but since certain oils can be very effective at helping to dissolve sebaceous material and boost

natural moisture due to their composition, it is not a one-size-fits-all concept. However, properties from oil to oil will vary greatly. As with alpha hydroxy acids, each will provide a different set of properties and benefits to the skin. Soybean oil and rice bran oil have become recognized as being incredibly effective at, not only dissolving skin surface oil, but also having great inherent antiaging properties. Both contain high concentrations of an enzyme modulating peptide that can inhibit the activity of collagenases, enzymes meant to break down collagen, and a unique form of vitamin E called tocotrienol, great for addressing the ravaging effects of skin glycation. Cleansing oils have the best staying power so the oil molecules can continue to function within the skin for longer periods of time.

In the last 20 years, a great deal has been learned about the physiology of the skin. In particular, the complexity of the lipid barrier has revealed some of its secrets. It is remarkable that only 15 to 20 microns of a protein and lipid structure protect us from countless environmental insults. Skin care professionals have begun to appreciate that their protective mechanism is not like the bark on a tree, but has multiple functions,

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one of which is to interact with metabolic processes deep within the skin. As a result, professionals have to understand that any applied cleansing agent can interact and upset this delicate balance. They also need to appreciate that in an industrial environment, many types of organic compounds in the atmosphere can adhere to our skin and have adverse effects. This is one of the reasons that proper cleansing is important, as it not only removes oxidative sebum and soil contamination, but also the organic contaminants that rest on the surface of the skin daily.

We must carefully consider the effects of certain harsh-cleansing methods and weigh the risk-benefit ratio before we decide to use them. Cleansers that tend to disrupt the stratum corneum and remove too many cells can present immature corneocytes to the atmospheric surface, which are not sufficiently prepared to deal with the unfriendly environment. Keep in mind that the stratum corneum is designed to flake off at a given rate and regular cleansing is sufficient to reduce these dead cells to an appropriate level.

References:

- 1 A Willcox, Michael (2000). Soap. In Hilda Butler. Poucher's Perfumes, Cosmetics and Soaps (10th ed.). Dordrecht: Kluwer Academic Publishers. 453.
- 2 Martin Levey (1958). "Gypsum, salt and soda in ancient Mesopotamian chemical technology". Isis, 49(3), 3.



Michael Q. Pugliese, B.S., L.E., became the third-generation CEO of Circadia by Dr. Pugliese, Inc. in 2006. Under his leadership, the Circadia brand has grown to achieve international recognition and distribution. Pugliese is a licensed aesthetician and a member of the Society of Cosmetic Chemists. He regularly attends their education events to stay on the cutting edge of new product development. His compelling original lectures honor the tenets of modern skin science discovered by his grandfather. Today's application of that information creates an ever-changing business and scientific environment.



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