Are We Using the Wrong Soap?

For decades, scientists have known that the outer layer of the skin is supposed to have an acid pH that wards off infection by preventing the growth of bacteria. As early as the 1920s, scientists called this layer the "acid mantle." Recent discoveries indicate that the acid layer is produced when enzymes break down fat-like molecules in skin cells (called phospholipids) into small, acid-tipped fat molecules called fatty acids.

A majority of soaps, including handmade varieties, are altering the pH of the acid mantle due to the fact that they are made from oils and lye or potassium hydroxide. This short introduction to acid/base basics will help you choose the correct soap.

Archaeological evidence indicates that the earliest recorded formula for soap dates back to 2,200 B.C. Excavations of ancient Babylon uncovered cylinders with inscriptions for making soap from water, potassium hydroxide and cassia oil.

Potassium hydroxide is also called lye, a word that may be familiar if you've ever watched a television show about American frontier characters who make their own soap. Examples include Daniel Boone's wife Rebecca Boone and The Beverly Hillbillies' Granny. Early settlers used wood ashes for the potassium hydroxide ingredient and beef or pig fat as the oil component. When soap manufacturing moved to factories, potassium hydroxide remained an ingredient in most soap-making recipes.

On a pH scale, potassium hydroxide (also called lye) is a 14 which is at the very end of the alkaline range. In nature, there is nothing more alkaline than lye. Healthy skin is meant to have a pH in the range 5.4 to 5.9. and a soap made from nature's most alkaline material neutralizes the skin's acid layer.

Why Should I Know About Acids, Bases and pH?
Judging from popularity of television's Big Bang Theory, science is now sexy. At least it is with the record-breaking millions who listen to Big Bang's comedy stars talk about particle physics.

Acid-base knowledge is not only helpful for learning about how to take care of your skin, acid-base food chemistry can explain your energy level and ability to fight off infections.

What Are Acids and Bases?
In 1884, the Swedish chemist Svante Arrhenius defined an acid as a compound that increases the concentration of H+ ions that are present when added to water. Arrhenius defined a base is a compound that increases the concentration of OH- ions that are present when added to water.

When an acid and alkaline collide, a neutralization reactions occurs forming salt and water. When this happens, the pH of your skin is no longer in the range needed to protect against invading viruses and bacteria.

In order to maintain an acid pH on the outer layer of your skin, you will need to use a soap that has a neutral pH (7 on a pH scale), or a soap that is slightly acid.

Recent Acid Mantle Research
Early acid mantle research was focused on protection from microbes. Recently, this classical knowledge of acid mantle has expanded due to dermatological, biochemical and molecular biological studies. Very recent research indicates an acidic environment on the skin is important
for:

- Activation of the enzymes responsible creating fat or lipid molecules in the skin
- Creation of a critical bilayer lipid membrane that forms around skin cells
- Restoration of the skin following damage

Soaps That Won't Harm Your Acid Mantle
To protect your acid mantle, look for the following products:

- **Glycerin Soap**
  Glycerin soap that is not made with lye is pH neutral. Pears Soap, created by Andrew Pears in London, in 1789, is an example of a delicate, transparent bar that does not strip what some scientists call a permeability barrier.

- **Goat Milk Soap**
  Goat milk soap contains capric and caprylic acid that will prevent a neutralization reaction.

- **Miracle II Liquid Soap**
  Miracle II is a pH neutral soap that is available through mail-order distributors and some retail stores.

- **Nature’s Plus Dream Quest Soap**
  Nature’s Plus Dream Quest soap has a slightly acidic pH. Although Nature’s Plus does not advertise that their Dream Quest soap has a pH in the acid range, the company’s ad copy says the bar “preserves the acid mantle.”

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**Extras For Experts**
Here is a list of Web resources that go beyond the scope of this article.

- **Rhyme and Learn Chemistry Rap**
  The Rhyme and Learn site, created by Joe Ocando, has a rap song devoted to acids and bases. Joe explains that the rap songs he created are mnemonics or learning aids that use word associations to make terms or facts easier to remember.

- **"Why Goat's Milk?"** A goat milk soap manufacturer in Kansas City, Missouri explains why goat milk soap has a pH close to the pH of human skin.

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**References**


3. Notes on Acids and Bases, Gwen Sibert, Roanoke Valley Governor’s School for Science and Technology, Roanoke, Virginia.