# Acids and Useful Information!

- Increased exfoliation

There appears to be some evidence that low-concentration AHAs facilitate shedding of the outer layer of the epidermis (exfoliation) by interfering with intercellular ionic bonding, thereby reducing corneocyte cohesion at the lower level of the stratum corneum (Clark, 1996; Jackson, 1997; Ridge et al., 1990).

Higher concentrations of AHAs further reduce corneocyte cohesion and cause the thickened, hyperkeratotic stratum corneum to shed in sheet-tike fragments, becoming thinner and more compact (Newman et al., 1996; Van Scott et al., 1996).

AHA products in very high concentrations and low pH may cause epidermolysis (splitting of the epidermis from the dermis), or chemical "peeling." In general, lower-concentration AHA products simply accelerate cell loss and increase exfoliation, resulting in cosmetically improved skin. AHA peels may also increase the growth of normal, undamaged cells underneath actinic lesions (Newman et al., 1996).

- Increased moisturization

Moisturization. AHAs are useful as moisturizers on the face and body (Brody et al., 1996). The moisturizing qualities of cosmetic AHA formulations help diminish the appearance of fine lines and maintain the skin's proper moisture level. Moisturization helps relieve rough and flaky skin conditions; softens dry, cracked or sun-damaged skin; and maintains the proper moisture level in healthy skin.

- Restores a radiant, youthful glow to the skin
- Improve skin tone and texture.
- Diminish the appearance of fine lines and wrinkles.

## Factors Influencing the Efficacy of AHA Products

The effects on the skin of alpha-hydroxy acid products are influenced by the:

* Concentration of the acid.
* Ph of the product.
* Amount of free acid present. (explanation below)
* Type of acid.
* Vehicle used.
* Duration of exposure.

* Patient's skin type.
* Concentration

NOTE: After 2 years of study, an independent Cosmetic Ingredient Review (CIR) panel unanimously reaffirmed the safety of AHAs in retail products at concentrations up to 10%. The panel concluded that glycolic and lactic acids, their common salts and their simple esters, are safe for use in cosmetic products at concentrations less than or equal to 10%, at phs greater than or equal to 3.5, when formulated to avoid increasing the skin's sensitivity to the sun, or when directions for use include the daily use of sun protection (Schwartz, 1997).

## Free Acid Definition

The acid in AHA preparations may be free or it may be partially neutralized or buffered. In solution, AHAs are present partly as free acid (neutral molecules that penetrate skin) and partly dissociated as the anion (charged molecules that do not penetrate skin). The proportions of free acid and anion are determined by pH (Johnson et al., 1997). The objective of neutralization is to raise the pH from below 2 to a value of 3.5, to provide a safe, effective product that approximates the skin's natural pH of 4.2 to 5.6. The pH is not given in the product literature, but product literature does indicate if it is partially neutralized. In partially neutralized AHA solutions, the acid and a lesser amount of base are combined in a reversible chemical reaction that yields unneutralized acid and a salt. The resulting solution has less free acid and a higher pH than a solution that has not been neutralized. In partially neutralized formulations, the salt functions as a reservoir of acid that is available for second-phase penetration. This means that partially neutralized formulas can deliver as much, if not more, alpha-hydroxy acid than free acid formulas, but in a safer, "time-released" manner.

AHA preparations designed for home use generally are neutralized or buffered to a pH of 3.5 to 4.5. Agents used for superficial office peels may be more acidic (pH 0.9 to 2.75). Peeling solutions with a pH below 2 have the potential to induce crusting and necrosis, which is not seen with the partially neutralized solutions. There is no evidence that creating necrosis or epidermolysis leads to a more favorable result of the peel. Therefore, the use of partially neutralized glycolic acid solutions seems prudent, since they have a better safety profile than low-pH solutions containing only free glycolic acid (Becker et al., 1996).

In clinical and in vitro studies, partially neutralized glycolic acid and other AHA preparations were beneficial to the skin, in terms of rejuvenation or remodeling of tissue. Clinical studies have shown that a partially neutralized lactic acid preparation improves the skin, both in appearance and histologically. Other studies using skin tissue cultures showed that partially neutralized glycolic acid stimulates fibroblast proliferation -- an index of tissue regeneration (Rubin, 1996).

Looking at electrical conductance of the skin (an indicator of water content or moisturization), higher pH products (those that have been partially neutralized) are better moisturizers than lower pH preparations (Rubin, 1996).

## BHA [beta-hydroxy acid / Salicylic Acid]

**Medicinal and cosmetic uses:**
Also known as Beta Hydroxy Acid (compare to AHA), salicylic acid is the key additive in many skin-care products for the treatment of acne, psoriasis, callouses, corns, keratosis pilaris and warts. It treats acne by causing skin cells to slough off more readily, preventing pores from clogging up. This effect on skin cells also makes salicylic acid an active ingredient in several shampoos meant to treat dandruff. Use of straight salicylic solution may cause hyperpigmentation on unpretreated skin for those with darker skin types (Fitzpatrick phototypes IV, V, VI), as well as with the lack of use of a broad spectrum sunblock. The medicinal properties of salicylate (mainly for fever relief) have been known since ancient times. The substance occurs in the bark of willow trees; the name *salicylic acid* is derived from *salix*, the Latin name for the willow tree.

**Main adverse effects**

Salicylic acid is a gastric irritant and because of the serious damage it may cause to the stomach lining, it has not been used orally. Topical use of Salicylic acid may induce allergic contact dermatitis (Davies, 1985). Salicylic acid may cause excessive drying and irritation in some people (Parish, 1991). Some individuals, especially asthmatics exhibit sensitivity to salicylates. Urticaria, angioneurotic oedema, rhinitis, severe and even fatal paroxysmal, bronchospasm and dyspnea may occur (Reynolds, 1996).

**Conditions to Avoid:**
Avoid contact with heat, sparks, flames, or other sources of ignition.
**Materials to Avoid:**
Oxidizing materials, iron

## Safety Precautions [applicable to ALL acids]:

- DO NOT breathe vapors
- DO NOT get in eyes, on skin, or on clothing
- Keep container closed and out of the Reach of Children
- Use adequate ventilation when formulating
- Wash thoroughly after using
- Wear impervious protective clothing, including boots, gloves, lab coat, apron, chemical safety goggles and a full face shield

**It is not known whether salicylic acid will be harmful to an unborn baby. But it is recommended that you should not use salicylic acid without first talking to your doctor if you are pregnant or could become pregnant.

Garden of Wisdom carries the following acids:

Alpha-lipoic Acid
Ascorbic Acid
Beta-hydroxy Acid aka Salicylic Acid
Citric Acid
Glycolic Acid
Lactic Acid
Malic Acid
Sodium Hyaluronate Powder