

Product: Alpha-Hydroxy Acid 70% / Glycolic Acid 70%

INCI: Glycolic Acid

Synonyms: hydroxyacetic acid; hydroxyethanoic acid

Derived from: sugar cane

Purity: 70% purity / 30% distilled water

Physical form: clear liquid

Specific Gravity: 1.27 [water = 1]

Ph: 70% solution 1.7%

Solubility: water soluble

Melting Point: 50 f

Properties/Attributes:

- **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-like 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.
- Restore 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).

Application: topical

Formula/Recipe:

### Glycolic Toner

<u>Total End Product:</u>		<u>4 ounces</u>	<u>120 grams</u>
Glycolic Acid 70%	14.5%	.58 oz	17.4 grams
Hyaluronic Acid 1%	50 %	2 oz	60 grams
Distilled water	35 %	1.4 oz	42 grams
Optiphen	.5 %	.02 oz	.6 grams
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Total	100%	100%	100%

Adjust the Ph of the final product with Baking Soda to between 3.5 and 4.5.

**The math formula used for this is:**

**120 grams or 4 oz x 10% (final strength) divided by 70% (strength of acid) equals 17.4 grams or .58 ounce (these can be rounded to make formulating easier)**

### 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).

### Safety Precautions:

- 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