

# Update: Alpha-Hydroxy Acids



## Properties of AHAs

- Exfoliation (desquamation of horny cells)
- Moisturization (reducing water loss)
- Anti-wrinkle effect
- Skin-whitening effect
- Smoothing effect
- Improves skin texture & tone
- Unblocks & cleans pores

Alpha-hydroxy acids (AHAs) are naturally occurring organic carboxylic acids. Examples are glycolic acid, a natural constituent of sugar cane juice, lactic acid, found in sour milk and tomato juice, or citric acid, found in various citric fruits. Topical formulations incorporating these acids are now frequently used or prescribed by dermatologists, and they are present in a wide range of cosmetic products. The growth in sales of these products has been phenomenal.

## Mechanism of Action

AHAs exfoliate dead skin cells and moisturize the skin. Their main purpose is to facilitate degradation of the binding structures between cells leading to increased desquamation of the horny skin cells and increased regeneration.

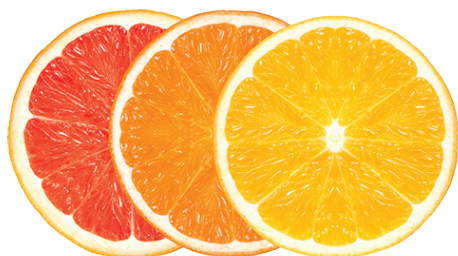
There is also an increase in the skin's content of natural hyaluronic acid. This is because natural hyaluronic acid can hold up to 1000 times its weight in water. And, it might be one of the causes of increased skin plumpness. By normalizing the cohesion of the horny cells, the upper skin layer is somewhat thinned, smoother, and more flexible (even at low relative humidity). Plus, the formation of dry, flaky scales is reduced. The overall result is the skin looking and feeling better. Claims that AHAs reverse photodamage, reduce wrinkles, brown spots, and roughness are somewhat controversial and are currently under review by the CTFA (Cosmetic, Toiletry and Fragrance Association), the FDA, and the FTC (Federal Trade Commission). Several aspects concerning the mechanism of action of AHAs are still unknown. In particular, little is known about the correlation between the structural and functional changes in the upper skin layer induced by AHA treatment. Several studies have found that treatment with AHAs produces a reversal of epidermal and dermal markers of photoaging.

## Therapeutic use:

The dermatological use of AHAs is critical. It can be used as a cosmeceutical, a dermatological application, or as a chemical peel. The formulation is more important than the concentration alone and the bio-availability of the AHA is a determinant. For example, a high concentration of AHA, near-neutral pH, is ineffective because the AHAs are inactive at a neutral pH. At a low pH, even small concentrations of AHAs can be effective because a large amount of the AHAs is available and active. In brief, the free acid in a formulation, the more biologically active are AHAs.

An expert panel of the CIR (US Cosmetic Ingredient Review) concluded:

AHAs are safe in cosmetic products at concentrations of 10% or less, at a pH of 3.5 or greater, and formulated to avoid an increased amount of sensitivity to the skin, or accompanied by directions to use sun protection daily.



AHAs are naturally occurring organic carboxylic acids that can be found in various citric fruits.

AHAs are safe in cosmetics if:

- AHA concentration is < 10%
- pH of the formula is not < 3.5
- Product is not formulated to increase the sensitivity to sun rays
- Sun protection is applied
- AHAs at high concentrations (> 10%) and/or
- Low pH (< 3.5) is applied only by trained
- Cosmetologist or dermatologists (mini-peel)



Sun protection is very important when using AHA products.

Higher formulations of AHAs (concentrations up to 30% and a pH as low as 3.0) are safe if applied by trained professionals. These uses should be brief, discontinuous, followed by thorough rinsing, and accompanied by daily use of sun protection. In some dermatologic diseases, higher concentrations might be needed for the pathologically to be thickened horny skin layer.

When formulations of AHAs are applied daily, chemical buffering or partial neutralization are very important to ensure skin tolerance. However, to maintain the activity of the AHAs, buffering agents should not bring a pH of less than 4.0. Formulations used for peeling purposes perform best when the AHAs are completely bio-available and active at their native low pH. The usefulness of AHAs for acne treatment is unproven and is awaiting further confirmation in clinical studies.

## Adverse effects

AHAs are acids and can cause mild irritation unless they are neutralized in the final product. Low concentrations of AHAs appear to be minimally irritating, and no other adverse effects have been reported, so far. However, long-term studies have not been done. AHAs can sometimes cause stinging, burning, or irritation in the nose and eye areas. If an acid peel has been done, then photo sensitivity is a concern for about two weeks after the peel. The FDA recommends that AHAs should not be used on children.

### New AHA Products:

- Malic acid, citric acid
- Glycolic acid + ammonium glycolate
- Alpha-hydroxyethanoic acid & ammonium
- Alpha-hydroxyethanoate
- Alpha-hydroxyoctanoic acid
- Alpha-hydroxycaprylic acid
- Hydroxycaprylic acid
- Mixed or triple fruit acid
- Tri-alpha hydroxy fruit acids
- Sugar cane extract
- Alpha hydroxy and botanical complex
- L-alpha hydroxy acid
- Glycomer in fatty acids alpha nutrium (3 AHAs).