

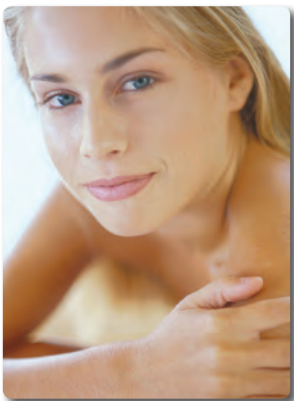
AHCare

**Beauty Creations**  
*The Passion for Beauty*

# AHCare

Amphoteric Hydroxy Complexes:  
all the benefits of **Alpha Hydroxy Acids**  
with enhanced **tolerance**

- ▶ - "Time Release" mechanism prevents irritation,
- **suitable** even for **sensitive** skin (clinical study).

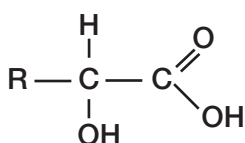


- ▶ Increases **cell turnover** to reveal younger looking skin (clinical study).
- ▶ **Exfoliation** for all skin types, including problem skin and men's skin.  
Also suitable for home-use peels.

Have younger looking skin  
the mild way

# Amphoteric hydroxy acid complexes

Alpha Hydroxy Acids (AHA's) are naturally occurring carboxylic acids with a hydroxyl group on the alpha carbon (see figure 1).



Glycolic Acid: R=H  
Lactic Acid: R= CH<sub>3</sub>

Fig. 1 - Structure of AHAs.

The best known AHAs are glycolic acid and lactic acid. Glycolic acid is derived from sugar cane and lactic acid can be extracted from milk. Other AHAs, such as malic-, citric and tartaric acids are found in fruits. The name fruit acids is therefore also often used for AHAs.

AHAs have a long history of use in cosmetics. Cleopatra is said to have bathed in spoiled milk, containing lactic acid. Women in the court of France used spoiled wine, containing tartaric acid, for cosmetic purposes.

The known benefits of AHA preparations include exfoliation, moisturization, reduction of fine lines and wrinkles, collagen synthesis, firming and skin lightening.

A negative side effect of AHA treatment, however, can be a stinging or burning sensation directly after product application, particularly on people with sensitive skin.

In order to get the same effect as from AHAs, but with less possible irritation, Amphoteric Hydroxy acid Complexes were developed.

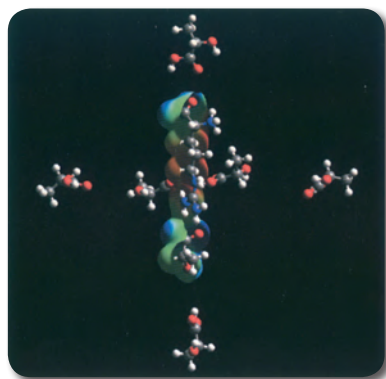


Fig. 2 - Molecular Model of 1:1 lactic acid/ arginine central complex coordinated by six molecules of lactic acid.

Amphoteric Hydroxy Complexes (AHCs) contain the cation form of a complexing agent (e.g. an amino acid), the anion of an AHA and undissociated AHA molecules. Figure 2 shows a 1:1 central complex of lactic acid and arginine coordinated by six molecules of lactic acid.

In this model the distances between the surrounding lactic acid molecules and the central complex have been artificially increased to make the central complex more visible. In reality, the coordinating lactic acid molecules are tightly bound to the central complex by hydrogen bonds, dipole-dipole interactions and van der Waal's forces.

These forces are responsible for the slow release of alpha hydroxy acid from the complex into the skin. This time-release process leads to a lower peak concentration of AHAs in the skin, which is usually below the user's irritation threshold. This is depicted in a schematic model in figure 3.

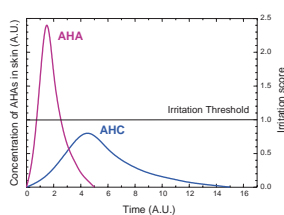


Fig. 3 - Model of time-release mechanism of AHCs resulting in a lower peak concentration of AHAs in skin (hypothetical model) (1).

As a result skin irritation is virtually eliminated, which allows extending the benefits of AHAs even to more sensitive skin.

(1) Kraechter H.U., McCaulley J.A. Edison B, Geen B. Milora D.J. Amphoteric Hydroxy Complexes: AHAs with reduced stinging and irritation. *Cosmetics & Toiletries* 2001; 116 (1): 47-52.

## Definition / Composition

AHCare are amphoteric hydroxy complexes, composed of an amino acid, arginine, and either lactic- or glycolic acid. AHCare L65 is based on lactic acid.

## Skin benefits

- Exfoliation.
- Moisturization.
- Reduction of fine lines and wrinkles.
- Skin lightening.
- Firming/collagen synthesis.

## Cosmetics use

- Exfoliating products (including home-use peels).
- Anti-age face care (reduction of fine lines and wrinkles).
- Products for skin lightening/anti-age spots.
- For hydrating skin care (face and body).

## Dosage / Solubility / Mode of incorporation

**1. Dose of use:** 5 to 10%

**2. Solubility:** soluble in water, insoluble in oils.

**3. Mode of incorporation:** to be incorporated at temperature below 50 °C during the finishing process or at room temperature for cold processed formulations.

## Analytical characteristics

**1. Aspect:** colorless liquid. Slight characteristic odor.

**2. Specifications:** upon request.

## Tolerance

Good.

## Efficacy

Test summaries hereafter.

## Storage

In unopened original containers at 0 - 30°C.

## INCI name

**AHCare L65:** Lactic Acid (and) Aqua (and) Arginine

# Efficacy tests

## Demonstration sting studies

### Facial sting studies

#### Aim

Facial sting studies were carried out to prove that amphoteric hydroxy acid complexes are less irritating than AHAs.

#### Protocol

The stinging potential was evaluated by a panel that was identified in a pre-screening as being sensitive to lactic- or glycolic acid. In a first clinical study the stinging potential of amphoteric hydroxy complexes with a low AHA: arginine ratio was compared to that of the free AHAs. The stinging potential was evaluated on a semi-quantitative scale. In a second study it was investigated if at much higher ratios of AHA to arginine this reduced irritation potential is still maintained. In all cases the acid concentration in the AHC and the free acid solution was equivalent.

#### Results

Figure 4 shows the results of a comparison of a solution containing an amphoteric hydroxy complex with a lactic acid: arginine ratio of 2.5:1 against a solution with 20% lactic acid, neutralized with ammonium hydroxide to pH 3.5. The AHC solution produced a stinging sensation equivalent to that of the negative control, water.

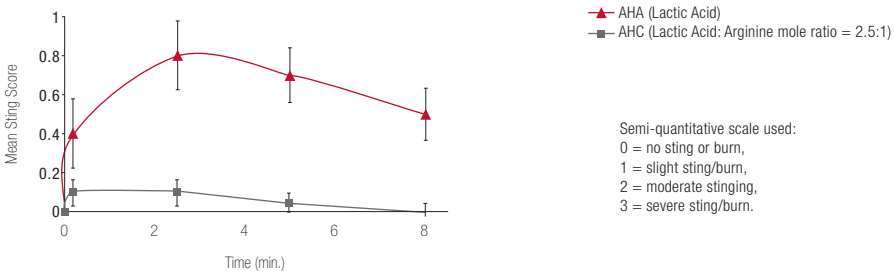


Fig. 4 - Results facial sting study AHC (lactic acid:arginine=2.5:1) and lactic acid.

Figure 5 shows the results of a comparison of lactic acid, adjusted to pH 2.2 with ammonium hydroxide and AHCare, which has a ratio lactic acid:arginine of 20:1. Even at this higher AHA to arginine ratio, the amphoteric hydroxy acid complex clearly has a reduced stinging potential.

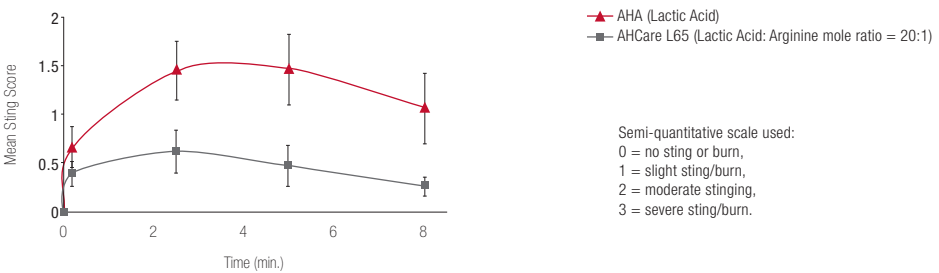


Fig. 5 - Results facial sting study AHCare (lactic acid:arginine=20:1) and lactic acid.

### Conclusion

Amphoteric Hydroxy Complexes are significantly less irritating than AHAs.

# Demonstration of efficacy

## Dansyl chloride cell turnover study

### Aim

To demonstrate that amphoteric hydroxy complexes have the same efficacy as conventional AHAs, dansyl chloride staining was used.

### Protocol

In a clinical study with 17 volunteers aged 25-29 years old, a 10 % lactic acid solution and a 14.7% AHCare L65 solution were compared. The concentration of lactic acid in these two solutions is equivalent. Both the AHA (= lactic acid) and the AHCare solution were adjusted to pH 2.4 with ammonium hydroxide. Dansyl chloride staining of the forearm was followed by visual rating of the fluorescence intensity under a Wood's lamp over a period of 21 days. Product was applied twice a day.

### Results

Both solutions significantly reduce the time it takes for the dansyl chloride stain to disappear (figure 7). This means that the cell turnover rate is increased, by none less than 34% for the AHCare solution, producing younger looking skin. The difference between the AHA and AHC products is not significant.

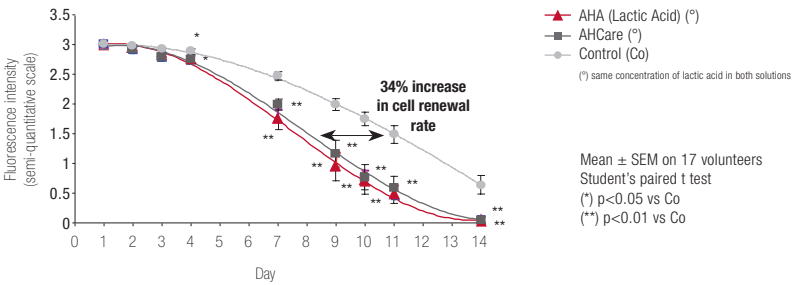


Fig. 7 - Results of dansyl chloride cell turnover study with AHCare and lactic acid.

### Conclusion

The efficacy of AHCare is similar to the efficacy of lactic acid under the same conditions of concentration and pH.



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