

Characterize by light to moderate penetration, and minimal or no discomfort. These peels/exfoliators are excellent at improving the texture of the skin and evening out the skin tone. For maximum results, they can and should be alternated.

### *Alpha Hydroxy Acids:*

While Glycolic and Lactic acid peeling agents have equivalent results, the following shows that lactic acid peels have many benefits over glycolic acid peels. Glycolic Acid is the most commonly used AHA. Because of its small molecular weight and size, it is presumed to have a better capacity to penetrate skin. Lactic acid on the other hand, has a larger molecular weight than glycolic acid but is capable of being converted into pyruvic acid (an alpha keto acid) which is presumed to be a more effective exfoliating agent.

#### Lactic Acid:

- Lactic Acid is a normal metabolite for mammals. It has no toxicity.
- With its longer reaction time, lactic acid is safer than glycolic acid.
- There is a better control of the peel without burning.
- Lactic acid enhances the absorption of other substances and is a superb humectant -- it attracts water molecules already present in your skin to the surface, making it an effective moisturizer.
- There is a minimal chance of adverse effects.

#### Glycolic Acid

- Glycolic Acid is of vegetable origin (non-mammalian).
- There is a rapid reaction time.
- There is less control of peel irritation.
- In working with the higher clinical strengths 70%, there have been many reported incidents of adverse effects, like discoloration and scarring.

**GLYCOLIC ACID** is an alpha hydroxy acid derived from sugar cane. It is nontoxic and well tolerated by most people. Glycolic acid peels are usually very superficial peels. However, they need to be neutralized to terminate their action, otherwise, they may penetrate too deep and "overpeel" the skin. Glycolic acid peels exfoliate dead layers of the skin and, typically, require no downtime. They also help reduce acne related conditions by freeing impacted debris from the pores, improve texture of the skin. Because of the small size of its molecules, which facilitates penetration, results can be faster for people who do not have sensitive skin.

**LACTIC ACID PEEL** Lactic acid is an alpha hydroxy acid derived from sour milk. It is ideal for sensitive skin or skin unable to tolerate glycolic acid. Lactic acid peel helps to eliminate germs, toxins and dead cells. It also helps to maintain the skin's pH factor. Lactic Acid Peel is indicated for the rejuvenation of sun-damaged skin, acne, unwanted pigmentation, fine lines, and actinic damage. It actually increases new cell growth, stimulates collagen production, and new elastic fibers in the deeper dermal layers. Lactic Acid not only is a superior exfoliant, but may be one of the best treatments yet for hyper-pigmentation.

Lactic's water binding capacity exceeds that of glycerol, sorbitol, other AHAs, salicylic acid, and propylene glycol yet functions like other AHA, providing additional benefits. [1] [2] Lactic acid can produce a measurable increase in skin thickness (+43% at week 11 with 21.6% solution). Other findings have correlated well with lactic acids ability to reverse symptoms of skin aging. [3] [4]

### *How important is the percent and pH?*

## *Beta Hydroxy Acid*

**SALICYLIC ACID** or beta hydroxy acid is derived from aspirin. This treatment is particularly helpful in clearing clogged follicles and in promoting exfoliation. Salicylic acid is lipid (oil) soluble solution and is antibacterial, thus giving acne sufferers added relief. In fact, Salicylic acid is considered one of the best peels for relieving acne. This peel is a more dramatic method in obtaining a healthy, bright, clear skin appearance. Salicylic acid works differently than Glycolic or Lactic acids. Salicylic acid works from the deeper layers of the skin and able to penetrate the comedones (blackheads) better than other acids.

### *A closer look at the pH and Percents of AHA's*

How important is the pH of an acid? The concentration of *free acid* is what determines activity (table); Product pH is a critical aspect of efficacy with acids. Although higher concentrations of AHA should be more potent, pH is more important as the following tables illustrates.

The efficacy of alpha hydroxy acids depends less on the specific AHA that is being used, but rather on the concentration of the AHA and the pH of the medium in which it is used. For skin renewal, a lower (more acidic) pH and higher concentration of acid are more effective. Lactic acid both pH and concentration are critical. At a fixed lactic acid concentration (lactic acid 10%), the desquamative (exfoliation) effect was highly pH dependent. At a fixed pH (lactic acid percentage 5%, 10%, 15% at fixed pH of 3.0), the turnover rate of skin was concentration dependent. The desquamative and proliferation-stimulating effects of lactic acid are very pH and concentration dependent.[5]

In determining what you want to accomplish, the *free acid* value of the AHA is responsible for cell renewal stimulation. A 4% *free acid* is usually the threshold minimum for this effect.

Free Acid Value	Effect
0% - 2%	Increased moisturization
2% - 4%	Smoother, softer skin. Moderate increase in glycosaminoglycans (GAGs).
4% - 8%	Moderate increase in squamous cell turnover. Significant increase in GAGs.
8% - 12%	Significant increase in squamous cell turnover. Moderate increase in collagen deposition
12% - 15%	Significant increase in collagen deposition. Thicker, less fragmented elastic fibers
20%	Reversal in basal cell atypia. More uniform melanin pattern

The following table demonstrates how the pH effects the Free Acid Values of AHA's. It will help you determine the Free Acid Value of an AHA that you might elect to work with, or have worked with in the past along, and how Free Acid Values relate to accomplishing skincare goals.

Percent of Glycolic on Label	pH	Free Acid Value

7%	1.8	6.9%
8%	3.67	4.7%
12%	3.3	8.5%
15%	3.77	8%
20%	4.3	4.8%
20%	3.4	14.6%
20%	2.55	18.6
50%	1.3	50%

As demonstrated in the above tables, working with a 20% AHA at 4.3 pH will have less effect on squamous cell turnover and less collagen deposition than working with a 7% solution at 1.8 pH.

If you are not well versed in working with acids, application of 15% AHA or higher should be performed by a professional.

- Never assume all acids are equal and ALWAYS patch test any new acid to determine any sensitivities prior to treating the area.
- Never assume, having used other acids previously, that your skin can readily handle the acid and you can allow the same time on the skin with a new acid product.
- Never use an acid when you cannot completely pay attention to what you are doing.
- Always follow directions

The FDA and dermatologists advise consumers who use AHA products to follow these precautions:

- Always use a sunscreen of at least SPF 15.
  - Wide-brimmed hats and shade-seeking behavior are also advised.
  - Buy products with adequate labeling including a list of ingredients, the name and address of the manufacturer, the product's AHA concentration, and the products pH. The first two are mandatory; the third is optional.
  - If you are a first-time user of the product, **do a patch test**.
  - Stop using the product if you experience an adverse reaction. If you have a reaction, see a dermatologist.
1. Berardesca E, Distant F, Vignoli GP, Oresajo C, Green B. Alpha hydroxy acids modulate stratum corneum barrier function. Br. J. Dermatol 1997;137:934-8.
  2. Green B, Tseng C, Wildnauer R, Herndon J, Rizer, R. Safety and Efficacy of a Gluconolactone (Poly Hydroxyacid) Containing Regimen on Sensitive Skin and Photodamage Following Controlled Consumer Use. Amer Acad of Derm Poster Exhibit: New Orleans, March, 1999.
  3. Ditre CM, Griffin TD, Murphy GF, Sueki H, Telegan B, Johnson WC, Yu RJ, Van Scott EJ. Effects of a-hydroxy acids on photoaged skin: A pilot clinical, histologic, and ultrastructural study. J Am Acad Dermatol 1996;34:187-95.
  4. Bernstein EF, Underhill CB, Lakkakorpi J, Ditre CM, Uitto J, Yu RJ, Van Scott EJ. Citric Acid increases viable epidermal thickness & glycosaminoglycan content of sun-damaged skin. Dermatol Surg 1997; 23: 689-94.
  5. Thueson DO, Chan EK, Oechsli LM, Hahn GS, The roles of pH and concentration in lactic acid-induced stimulation of epidermal turnover, Dermatol Surg 1998 Jun;24(6):641-5

