

SCIENCE & INDUSTRY

kosmetikos*

Too Much, Too Little

Treatment cosmetics. "Cosmeceuticals." Anti-aging products. Regardless the term, this category is dominating the industry.

By Steve Herman

Tis here!

Tis here!

Tis gone!

—Hamlet, Act I, Scene 1

Time magazine recently had an outside laboratory analyze the active ingredients in selected anti-aging creams.¹ Like the guards at Elsinore attempting to summon the ghost of Hamlet's father, the analytical chemists found it hard to grasp measurable amounts of some advertised materials. So, maybe there isn't a big dose of actives in some treatment cosmetics—but wait, the FDA has again realized² there are actives, the famed AHAs! The European Union has also noticed them recently.³ Depending on the point-of-view, it is bad if products have actives, and bad if they don't...



Emphasis on treatment products that produce recognizable results has dominated cosmetic counters since the concept of "cosmeceuticals" arose. Since the FDA has never recognized "cosmeceuticals," the industry has walked a fine line between creating effective products and avoiding drug claims. Of course, no one gets old anymore: these are "age-specialist products," and money is currently flowing in this direction at a hefty \$2 billion a year. The

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Time article analyzed (using Chemir/Polytech Laboratories) ten products. The results are summarized in Figure 1, sans product or company names.

Currently, most treatment products hinge on Vitamin C and E, principally functioning as free radical scavengers. Vitamin C (Figure 2) should be the perfect ingredient, being both a hydroxy acid and anti-oxidant. Unfortunately, Vitamin C is not stable under cosmetic conditions, so esters are sometimes substituted; alternately, some form of encapsulation is used for protection. Of course, the esters aren't the real thing, so esterases on the surface of the skin are evoked to return the vitamins to their native form. The action of these esterases has not been proven powerful enough to effectively split the esters under typical consumer use.

Lately, the safety of AHAs, the most popular skin-treatment of the last decade, has been called into question. The most common AHAs, glycolic and lactic acids, are shown in Figure 3. The small size of these two molecules allows them to penetrate skin, which is necessary for their activity. AHA products have existed for many years: The presence of lactic acid in milk dates AHAs back at least to the time of Cleopatra. Introduced in limited-distribution in 1989, the current mass-market popularity began in 1992, and now hundreds of products are on shelves. For safe-use of glycolic and lactic acids, the 1997 CIR suggestions called for levels up to 10 percent at pH 3.5 in general consumer products, and 30 percent at pH 3.0 for salon products. The current suggestion in Europe is for glycolic acid up to 4 percent with a pH no lower than 3.8, and a maximum level of 2.5 percent lactic acid with a pH no lower than 5. The irritation of these materials has always hinged on the extreme pHs involved.

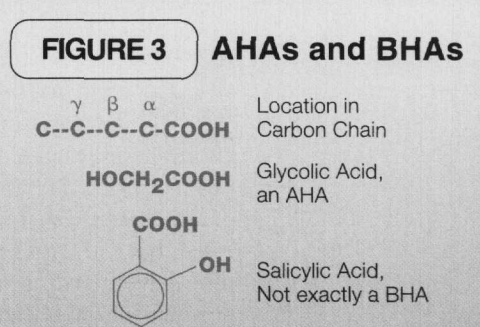
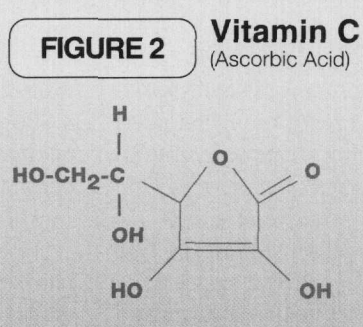
FIGURE 1 Anti-Aging Products Found in Creams (Reference 1)

CLAIM	LABEL	FOUND
"Antiwrinkle and firming cream"	Vitamin A, E esters	Less than 0.2% each, inactive forms
"Wrinkles and fine lines appear diminished"	Vitamin A, E esters	0.01% A, 0.56% E, both inactive
"Enhances skin's condition"	Vitamin A, E esters	0.05% A, 0.69% E, inactive forms
"Smooths the appearance of fine lines and imperfections"	Glycolic acid	6.9% glycolic
"Visibly improves quality and appearance of the skin"	5% Vitamin C	2.3% C
"Skin...looks virtually creaseless"	Vitamin E ester	Barely detectable active E
"Energizes skin so it looks and acts years younger"	C and E esters 0.48%	E, barely detectable C
"Reduces the appearance of fine lines"	Beta-hydroxy and glycolic acids, vitamin E ester	0.23% beta, 1.6% glycolic, 0.52% inactive E
"Smooths the appearance of fine lines"	Vitamins C and E	Minimal C, 0.87% inactive E
"Younger looking skin begins in 8 days"	Vitamin E (active) in nanocapsules	0.05% active Vitamin E

Current wisdom advises two criteria for safe AHA use: to use less than 10 percent active, and to use a sunscreen in or with the product. Many products use low levels of glycolic, but the effectiveness is nil under 6 percent. Hydroxy acids increase the skin's sensitivity to UV, a side-effect overlooked by many cosmetic manufacturers in the past. The CTFA, in a June 29, 2000 letter to the FDA, has proposed a "Sun Alert" warning for AHA products.²

As soon as AHAs lost their initial novelty, along came the betas, in particular, salicylic acid (Figure 3). The fun starts on the FDA Website: "From a chemist's perspective, salicylic acid is not a true BHA. However, cosmetic companies often refer to it as a BHA and, consequently, many consumers think of it as one." Definitions aside, salicylic acid is a well-known active ingredient, and it found a formidable proponent in Al Kligman.⁵

AHAs are water-soluble; salicylic acid is oil-soluble. Salicylic acid can thus penetrate pores, which partly accounts for its use as an acne treatment. Salts of salicylic acid can make it water-soluble, returning to its lipophilic state during application. It has also been used in medicated shampoos and facial peels. Kligman's study found salicylic acid at 1.5 percent to be less-irritating and more efficacious than AHAs. With all acid products there is a pH factor, with lower pH increasing both efficacy and irritation. If the pH is increased with NaOH, by pH 5, the active becomes sodium salicylate, which is no longer effective as an exfoliant. The CIR review of salicylic acid⁶ found it "safe to use when formulated to avoid irritation



and...increased sun sensitivity." BHAs thus require the same use of sunscreens as AHAs.

*Readers Digest*⁷ also took aim at the industry in *The Cosmetic Comedy*. "To find out what women are getting for their money, I consulted prominent skin specialists, and had a number of widely used preparations subjected to laboratory tests. The results showed that the advertiser's version of skin health bears as much relation to facts as the green cheese fable does to the moon." The author concludes: "The intelligent woman, however, will not pay too high a price for hope. She will realize that the cosmeticians claims are too lofty to be a reliable buying guide." You can read the rest in the March issue—March 1939, that is! ■

References

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