

# Publication Summary

## The use of polyhydroxy acids (PHAs) in photoaged skin

**Publication Reference:** Grimes P.E., Green B.A., Wildnauer R.H., Edison B.L. The use of polyhydroxy acids (PHAs) in photoaged skin. *Cutis* February 2004;73(suppl 2):3-13.

### Summary

Numerous combinations of PHAs with cosmetic and over-the-counter (OTC) ingredients exist and there is some data available to suggest that combining AHAs or PHAs with drug substances can enhance the therapeutic effect more than when either ingredient is used alone. The two studies below demonstrate the strong anti-aging benefits of PHAs when combined: (1) with topical retinyl acetate (pro-Vitamin A), and (2) when combined in a regimen that included hydroquinone (OTC strength).

### PHAs plus Retinyl Acetate

#### Method

- This was a single center, 12 week, controlled use study.
- The study completed with 22 healthy female subjects between the ages of 35-55 years with Fitzpatrick skin type I, II, or III and exhibiting moderate photodamage on the face.
- Each subject applied the test cream twice daily to their face and three times daily to one forearm. The other arm served as an untreated control. The cream tested was the Renewal Cream and contains 12% gluconolactone and 1% retinyl acetate (pH 3.2).

#### Results

- Clinical grading showed statistically significant improvement ( $P < .05$ ) in all photoaging parameters and silicone replicas showed significant improvements providing strong support for the clinical grading
- Product use on the forearms showed a statistically significant increase ( $P < .05$ ) in skin thickness measurements compared to the untreated control arm, and in comparison to baseline. The untreated control arm was not different from baseline. Increases in skin thickness are attributed to plumping of the skin in part by increasing epidermal thickness and the amount of dermal glycosaminoglycans. Thus the skin becomes more smooth, with a corresponding reduced appearance of fine lines and wrinkles on the face.
- 76% of the subjects self assessed their skin to look and feel younger after just 2 weeks of product use.
- The irritation grading showed the product to be well tolerated at the recommended use of once daily.

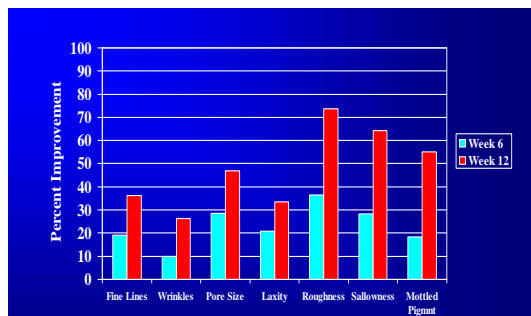


Figure 2. Percent Improvement in clinical grading of photoaging using PHA plus Retinyl Acetate (pro-Vitamin A) cream. All attributes are significantly improved at Weeks 6 and 12 compared to baseline ( $P < .05$ )

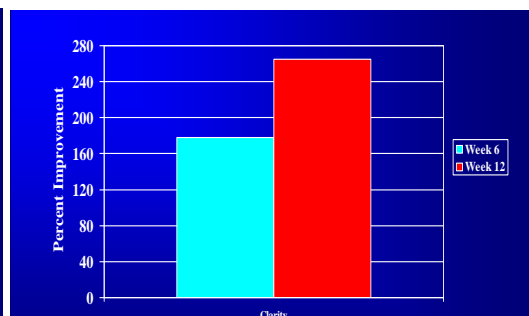


Figure 3. Percent Improvement in Visual Clarity using PHA plus Retinyl Acetate (pro-Vitamin A) cream. Significant improvement at Weeks 6 and 12 compared to baseline ( $P < .05$ )

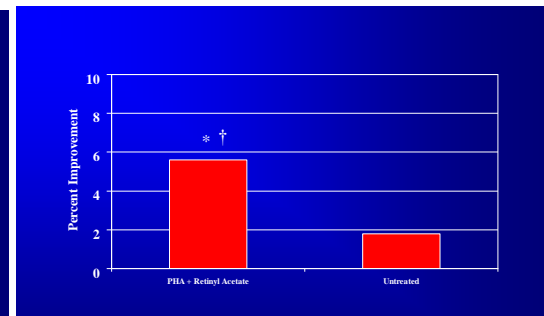


Figure 4. Percent Improvement in double skin thickness measurements. PHA plus Retinyl Acetate (pro-Vitamin A) cream was significantly improved compared to \*baseline and †untreated ( $P < .05$ )

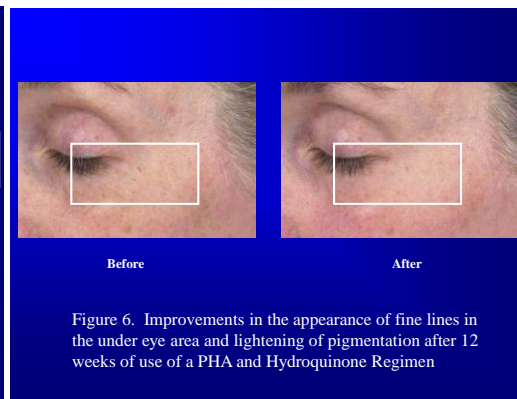
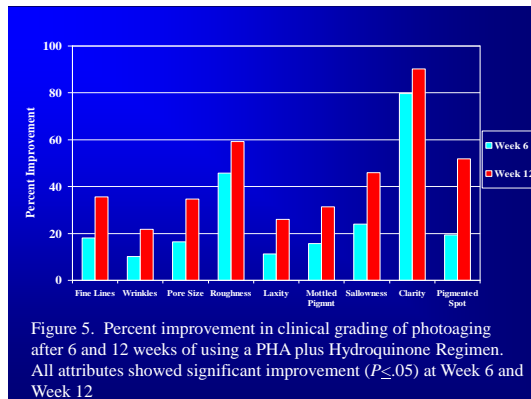
## PHAs plus Hydroquinone

### Method

- This study was a single center, 12 week, controlled usage study.
- Thirty-five healthy female subjects between the ages of 35-60 years with Fitzpatrick skin type I, II, or III and exhibiting moderate photodamage on the face completed the study.
- The regimen included the PHA Facial Cleanser with 4% gluconolactone (pH 3.4); HQ Skin Lightening Gel with 5% gluconolactone, 5% lactobionic acid, 3% kojic acid, and 2% hydroquinone (pH 3.9); a day lotion SPF 15 with 4% gluconolactone (pH 3.9); and Biohydrating Cream at night with 15% gluconolactone (pH 3.3). Products were applied twice daily to the face.

### Results

- The regimen showed significant improvement for clinical grading ( $P \leq .05$ ) for all photoaging attributes.
- The targeted pigmented spot showed a 52% improvement and mean scores showed an improvement of an entire grade after 12 weeks of use (from moderate to slight pigmentation on average).
- After 12 weeks, 83% of the subjects self assessed that their pigmentation spot was lighter and 74% noticed improvement in skin elasticity.
- Pinch recoil, as a measure of skin elasticity, was also significantly improved ( $P \leq .05$ ), providing further support for the clinical grading and consumer perception.
- This product regimen was very well tolerated.
- Photography showed a smoothing in skin texture, especially in diminishing the appearance of fine lines and wrinkles in the eye area. Notable improvements were also seen in lightening of dark spots and skin clarity.



### Discussion

The combination of PHAs with other topical dermatological ingredients into one product formulation provides added benefits and simplicity for the consumer. This, in turn, enhances compliance and gives the physician better control over product usage at home and a better result can be achieved for both physician and consumer.