

# Effect of Topical Anti-Aging Products on Stratum Corneum Thickness and Barrier Integrity

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## INTRODUCTION

Confocal Raman Microspectrometry (CRM) has become an established *in vivo* technique for determining stratum corneum (SC) thickness<sup>1,2</sup>. This spectroscopic method can non-invasively determine the concentration of specific chemical compounds in the skin as a function of depth. SC thickness is determined via the shape and dimensions of the water concentration profile from the skin's surface to the point it becomes constant in the viable epidermis.

## OBJECTIVE

Determine whether CRM can be used to assess changes in stratum corneum thickness produced by treatment with various anti-aging products and technologies. Commercial formulations tested (vs. no treatment) included:

- ❖ A moisturizing cream containing niacinamide and hexamidine
- ❖ A moisturizing serum containing niacinamide, Lys'lastine<sup>3</sup>, peptides, and caffeine
- ❖ A lotion containing  $\alpha$ -lipoic acid

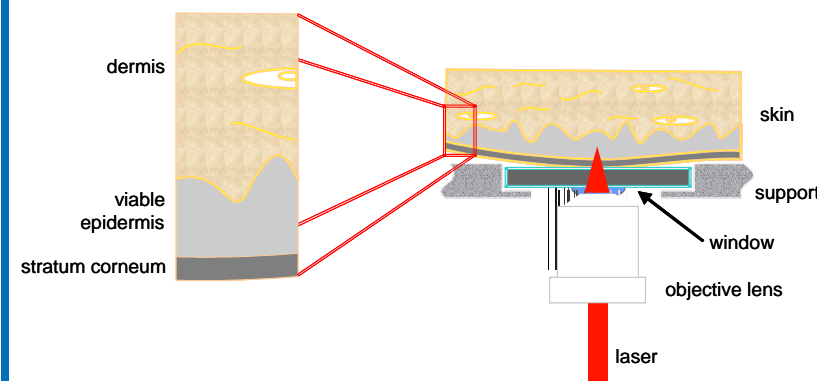
The effect of treatment with these cosmetic products on stratum corneum barrier integrity was also evaluated using TEWL.

## STUDY DESIGN

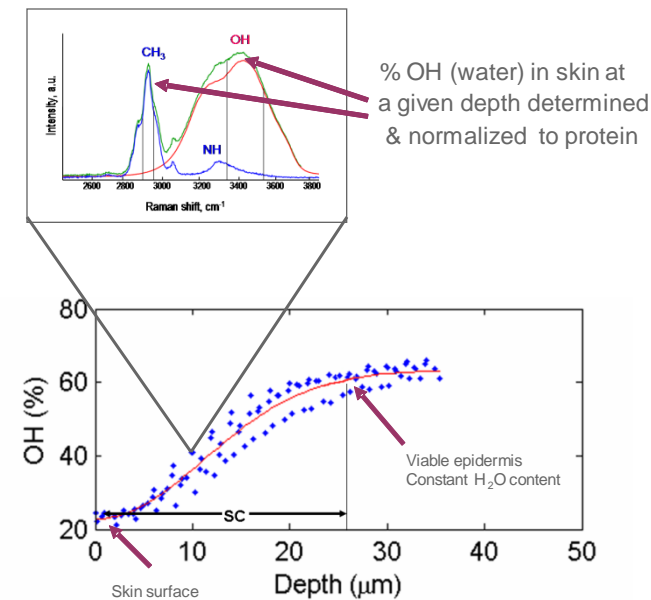
- ❖ Treatments were dosed in randomized, double-blinded manner on four volar forearm sites on each of 36 female subjects, Fitzpatrick skin types II-IV, aged 35-55 years.
- ❖ Products were applied by the subjects to 36 cm<sup>2</sup> sites at a dose of 2 mg/cm<sup>2</sup> twice daily for 4 weeks.
- ❖ SC thickness was measured by CRM (River Diagnostics Skin Analyzer, Netherlands) at baseline & after 4 wks of treatment.
- ❖ Skin barrier was assessed by TEWL (Dermalab®, Cortex Technology, Denmark) at baseline & after 4 wks treatment.
- ❖ Changes from baseline were analyzed using Analysis of Covariance.

## CONFOCAL RAMAN METHOD

FIGURE 1



**Result: Non-invasive, *in vivo* depth profiles of specific chemical species in skin**



## STUDY RESULTS

FIGURE 2

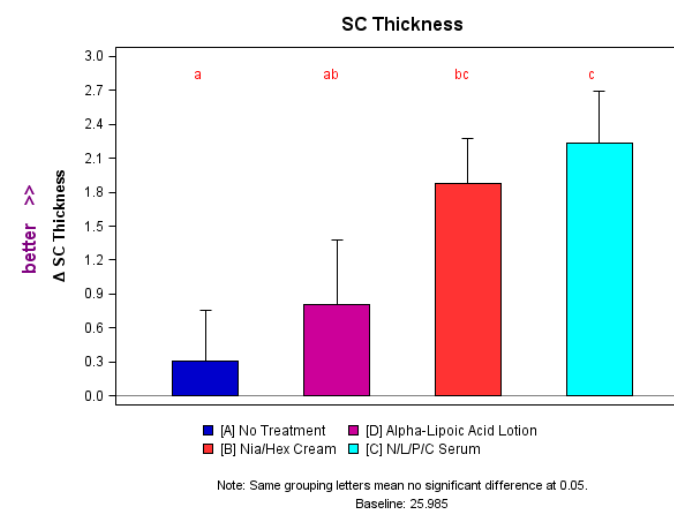
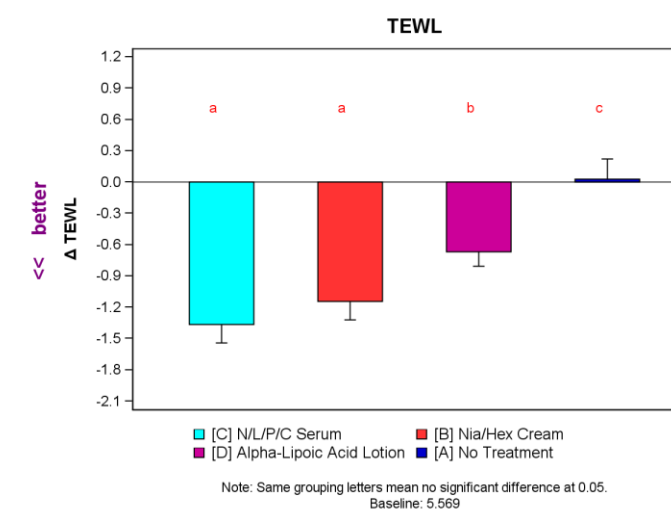


FIGURE 3



- ❖ Data in graphs are changes from baseline after 4 weeks' treatment.
- ❖ Treatments with the same letter are not significantly different at  $p < 0.05$

## CONCLUSIONS

- ❖ Treatment induced changes in SC thickness were detected using CRM (Figure 2).
- ❖ 4 weeks' treatment with the niacinamide-containing products significantly thickened the SC. Thickening from the  $\alpha$ -lipoic acid lotion was not significant relative to no treatment.
- ❖ The niacinamide + peptides + Lys'lastine + caffeine serum thickened the SC more than the other two treatments, significantly more than the  $\alpha$ -lipoic acid lotion.
- ❖ All treatments improved barrier function (Figure 3); however, improvements observed with the niacinamide-containing products were significantly better than with the  $\alpha$ -lipoic acid treatment. These changes correlate strongly with the CRM observed SC thickening.

## REFERENCES

1. Caspers PJ, et al. *J. Invest. Dermatol.* 116(3), 434-442 (2001).
2. Crowther JM, et al. *Brit. J. Dermatol.* 159, 567-577 (2008).
3. Cenizo V, et al. *Exp. Dermatol.* 15, 574-581 (2006).