

Letter to the Editor

TO THE EDITOR:

From the original "Comparative studies of skin roughness measurement by image analysis and several *in vivo* skin testing methods," which appeared in the *Journal of the Society of Cosmetic Chemists*, 42, pages 385–391 (1991), only the methylene blue test and image analysis were subjected to statistical comment by Wortmann and Wortmann in "The methylene blue and image analysis tests for determining skin roughness: A critical assessment based on data in the literature" (F.-J. Wortmann and G. Wortmann, *Journal of the Society of Cosmetic Chemists*, September/October 1993).

The selected data used by Wortmann and Wortmann originated from studies that took place in 1986–1987. These studies were submitted in 1989 and, as can be seen above, were published in the *Journal* in 1991 (1). Wortmann and Wortmann have not provided new insights into these methods from experiments of their own. Further work has been carried out on the basis of our findings and experiences with these methods in 1986–1987. In comprehensive studies involving human volunteers, their accuracy and reproducibility have been constantly improved by internal standards and have also been verified by external sources.

For instance, the methods that have been established to assess the raw materials and finished products were rated positively in a multi-center study (2). In another study (3), image analysis is described as a method for determining the fine structure, profile, and roughness of the skin. Other studies (4,5) report positive experiences with image analysis in examining the skin surface.

When Wortmann and Wortmann come to a negative assessment of the above-mentioned methods in their study based on statistical points of view, this is due to a series of misinterpretations that can easily happen to experts giving theoretical comments without experimental experience in this sphere.

Their article is based on the refutable assumption that the methylene blue method and image analysis measure identical aspects of skin roughness. The scatter diagram depicting the correlation that was established between the methylene blue method and image analysis shows that this assumption is unfounded (1). Our description of the methods explains that the methylene blue method is a staining technique. Staining solutions are able to stain the entire stratum corneum disjunctum, i.e., the information obtained with the methylene blue method originates from the entire volume of the stratum corneum disjunctum. In image analysis, however, the surface topography is recorded.

Our 1991 study shows that there is a significant link between the two methods despite the different aspects of roughness that they measure. This is not disputed by Wortmann and Wortmann. However, with a correlation of $r = 0.48$ between the two methods, it is completely unreasonable and misleading to try to predict the results of the one method from the results of the other. The Wortmann and Wortmann analysis suggests that such predictability must prevail for cosmetic products to be tested reasonably with one method or the other. This assumption is incorrect. The two methods provide valuable, complementary information on aspects of skin roughness, as can be seen in the literature (2,3). The validity and reproducibility of the individual methods in their own right are fully unknown to Wortmann and Wortmann, and cannot be deduced from our 1991 publication because no separate data was presented there. Consequently, Wortmann and Wortmann's inferences are unfounded and incorrect. In particular, image analysis, which we have used in commissioned work to measure the skin-smoothing effect of various commercial products, does allow cosmetic skin care products to be tested with regard to their skin-smoothing effect. Even slight smoothing effects of approximately 5% can be proven in a manner that is statistically significant.

Wortmann and Wortmann's classification of products (very good—unacceptable) may be conclusive in mathematical terms but it has no foundation whatsoever as far as science, skin physiology, and the actual test design are concerned.

REFERENCES

- (1) K. Schrader and S. Bielfeldt, Comparative studies of skin roughness measurements by image analysis and several *in vivo* skin testing methods, *J. Soc. Cosmet. Chem.*, 42, 385–391 (1991).
- (2) R. Bimczok *et al.*, A multi center comparison of different test methods for the assessment of the efficiency of skin care products with 368 human volunteers, IFSCC, Yokohama (1992).
- (3) K. Wittern, *Hautpflegeprodukte, Kreuznacher Symposium* (Verlag für die chem. Industrie H. Ziolkowski KG, Augsburg), p. 58.
- (4) P. Corcuff *et al.*, A fully automated system to study skin surface patterns, *Int. J. Cosmet. Sci.*, 6, 167–176 (1984).
- (5) P. Corcuff *et al.*, Evaluation of anti-wrinkle effects on humans, *Int. J. Cosmet. Sci.*, 7, 117–126 (1986).
- (6) F. J. Wortmann *et al.*, The methylene blue and image analysis tests for determining skin roughness: A critical assessment based on data in the literature, *J. Soc. Cosmet. Chem.* (September/October 1993).

Karlheinz Schrader
Stephan Bielfeldt
Creachem GmbH
Forschungsinstitut für die kosmetische Industrie
Postfach 11 43
37591 Holzminden, Germany