DEUTSCHE GESELLSCHAFT FÜR WISSENSCHAFTLICHE
UND ANGEWANDTE KOSMETIK E.V.

Gegr. 1957
DGK

The Reproducibility of an In-vitro Determination of the UVA Index Describing the Relative UVA-Protection of Sun Care Products

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IFSCC Magazine 5, No. 3, 161-166 (2002)

Due to overexposure to UVA and not only to UVB light significant alterations in and damage to human skin were observed. Accordingly, the protection against UVA is a major additional requirement for sunscreens beside the effective prevention of sunburn. Despite the intensive debate on the appropriate measurement and labelling, up to now, no proposal was officially accepted in Europe and US. The recently published determination of the in-vitro PPD protection factor [1] was discerned as a candidate for future, harmonized UVA measurement. The method combines the merits of *in-vitro* as well as *in-vivo* determinations.

The aim of the present study was to investigate the inter-institutional reproducibility of the new UVA parameter and to determine how to express the UVA protection. Concerning the latter aspect, particular emphasis should be given to the importance of the SPF by describing the UVA protection in relation to the UVB protection efficacy.

Seven laboratories participated in the round robin study and five marketed sunscreen formulations were tested. The sunscreens were selected to represent the major types of sun protection products. The application amount was fixed at 0.75 mg/cm^2 for all samples and for all institutes after ensuring in a pretest that the absorbance does nor exceedthe value of 2.0, because otherwise saturation phenomena could occur.

Regarding the calculation of the *in-vitro* PPD protection factors, a high reproducibility was found. The average standard deviation for all five products was less than 15%. The good correlation between *in-vitro* and *in-vivo* PPD factors confirms the relevance of this method.

The UVA INDEX was defined as the relation between the *in-vitro* PPD factor and the labelled *in-vivo* SPF. Based on the simple transmission measurement and a calculation that takes into account the *in-vivo* effectiveness as references, it provides a rapid and valid procedure to evaluate and to differentiate the UVA protection of sunscreens. According to these findings, the UVA INDEX is seen as a potential candidate for UVA determinations.