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In vitro testing to assess the UVA protection performance of sun care products: Members of the DGK (german society for scientific and applied cosmetics) task force 'sun protection'

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The UVA protection delivered by sunscreens is an issue of increasing importance due to the increasing knowledge about UVA-induced skin damage. In Europe there is no officially accepted method available to det. the degree of UVA protection. Therefore, the objective of the present study was to design a protocol combining the merits of an in vitro model, which are simple and reproducible, with aspects known to be relevant from in vivo studies. The principle is: an UV-transparent support to which the test product is applied, a (pre)irradiation. and a transmission measurement. Transpore tape (std. support for SPF detns.) was incompatible with many prepns. on prolonged contact times. Roughened quartz was adopted as a suitable alternative. Transmission measurements on this support are not reliable with a layer of 2 mg cm^{-2} (std. for SPF) due to detection limitations of spectrophotometers, hence a reduced layer of 0.75 mg cm^{-2} was adopted. Overall, it is very difficult to apply products in a reproducible thin layer on appropriate substrates. As a consequence, abs. parameters derived from the transmission profile show relatively large dispersion, whereas relative parameters, such as crit. wavelength λ_c [1] or UVA/UVB ratio are much less sensitive to unavoidable variations in layer thickness. An increase in deviations was obsd. when the samples were irradiated before measurement. It is crucial to control the output carefully (spectral distribution and even more importantly, irradiance and dose delivered) of the light source. By doing so and also taking into account the previous learning steps, a protocol was drafted and tested in a ring-test (4 samples in 6 labs.). The results are encouraging and show that if relative parameters (e.g. λ_c, UVA/UVB ratio) are considered, the intra- as well as interlab. reproducibility is clearly better than can be obtained in vivo. In general, we describe a suitable method, which can be considered in any future official discussions about the methodol. to det. UVA protection.