

In vitro sun protection factor: still a challenge with no final answer

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In the past, several attempts have been made to develop in vitro methods for determining protection against UV radiation. To date however, there is no broadly accepted method. Various known and unknown parameters influence the transmission measurements of scattering films, such as the multifaceted compositions of sunscreens, the technical limitations of measurement devices as well as the difficulty to apply very thin films of sunscreen in a reproducible manner throughout different laboratories. In vitro data were measured in this multicenter study to compare possible methodologies and strategies for an in vitro approach to the sun protection factor (SPF). This publication will not present a final in vitro SPF test method, but it will point out which technical side effects may influence such a method. Influential factors such as the quality of spectrophotometer used, the amount of product applied, pretreatment of samples, time and temperature of equilibration, size of the measured surface, the application process or the calculation on the basis of standardized data are presented and discussed. Finally, a reduction of the standard deviations within single laboratories could be realized for in vitro SPF testing, but no improvement of the interlaboratory comparison was obtained. The development of a valid and reliable SPF in vitro test still remains a challenge, and further work is necessary to develop a satisfactory method.