Assessment of the phototoxic hazard of Angelica seed oil

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When substances are developed in the aim to be a constituent of personal care products, and to be applied on the skin, it is necessary to carry out an assessment of potential phototoxic hazard. Phototoxicity is a non-immunological inflammatory skin reaction caused by concurrent topical or systemic exposure to specific molecule and ultraviolet radiation. Most phototoxic compounds absorb energy particularly from UVA light leading to the generation of activated derivates which can induce cellular damage. This type of adverse cutaneous response can be reproduced in vitro using different models of phototoxicity. In this study, we investigated the phototoxic potential of the compounds Angelica seed oil compared to a strong one such as bergamot oil and a chemical reference such as chlorpromazine.
This report describes a tiered testing strategy involving in vitro assays used for the phototoxic hazard assessment of a personal product ingredient. The initial assay was measurement of a UV/visible absorption spectrum to identify absorption at relevant wavelengths. This was followed by in vitro assay for phototoxicity (3T3 cell neutral red uptake phototoxicity test). These in vitro screen gave equivocal results for Angelic seed oil which appeared to suggest a strong phototoxic reaction. To further evaluate the phototoxic hazard of Angelica seed oil to human skin, a phototoxicity assay using a 3-D human skin model was conducted and associated with pro-inflammatory activity (IL-8 release). Compared to Bergamot oil, a well known phototoxic compound, Angelica seed oil did not cause phototoxicity in this assay neither release of IL-8. Overall conclusions from these studies were that although Angelica seed oil showed strong intrinsic potential for photoactivation, it was unlikely to present a hazard to human skin by its relative inability to penetrate the stratum corneum. This report illustrates the value in a step-wise strategy of the use of human skin models to help interpret the results of other in vitro phototoxicity assays.

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