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Tolerability profile of topical cannabidiol and palmitoylethanolamide: a compilation of single-centre randomized evaluator-blinded clinical and in vitro studies in normal skin

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Abstract

Background: An increasing number of studies have investigated the adverse effect profile of oral cannabinoids; however, few studies have provided sufficient data on the tolerability of topical cannabinoids in human participants.

Aim: To assess the tolerability profile of several commercial topical formulations containing cannabidiol (CBD) and palmitoylethanolamide (PEA) on the skin of healthy human participants.

Methods: Three human clinical trials and one in vitro study were conducted. The potential for skin irritation, sensitization and phototoxicity of several products, were assessed via patch testing on healthy human skin. The products assessed included two formulations containing CBD and PEA, one containing hemp seed oil and four concentrations of CBD alone. Ocular toxicity was tested using a traditional hen's egg chorioallantoic membrane model with three CBD, PEA and hemp seed oil formulations.

Results: There was no irritation or sensitization of the products evident via patch testing on healthy participants. Additionally, mild phototoxicity of a hemp seed oil product was found at the 48-h time point compared with the negative control. The in vitro experiment demonstrated comparable effects of cannabinoid products with historically nonirritating products.

Conclusion: These specific formulations of CBD- and PEA-containing products are nonirritating and nonsensitizing in healthy adults, and further encourage similar research assessing their long-term safety and efficacy in human participants with dermatological diseases. There are some limitations to the study: (i) external validity may be limited as formulations from a single manufacturer were used for this study, while vast heterogeneity exists across unregulated, commercial CBD products on the market; and (ii) products were assessed only on normal, nondiseased human skin, and therefore extrapolation to those with dermatological diseases cannot be assumed.

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