



Zinc Oxide and Zinc Oxide nanoparticles as enhancers in topical pharmaceutical and cosmetic products

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Abstract:

Objectives: Scientists have widely investigated the use of chemical enhancers to improve drug transport through the skin. In this study, ZnO and ZnO nanoparticles (ZnO-NPs) has been used as dermal absorption enhancers for Ibuprofen (IP).

Methods: Seven different formulations containing IP, ZnO, or ZnO-NPs were prepared. Dermal absorption experiments were performed at 32°C using a diffusion cell containing phosphate buffer saline (pH 7.4) and a slice of chicken skin. Cumulative amounts of skin permeated IP, ZnO or ZnO-NPs were plotted over time.

Results: After 60 minutes, 90, 8 and 81 mg ZnO, ZnO-NPs and IP were passed through the skin, respectively. This amount for IP was 105, 114, 131 and 183 mg in presence of 100 mg ZnO, 100 mg ZnO-NPs, 200 mg ZnO-NPs, and 500 mg ZnO-NPs, respectively.

Maximum amount of not-permeated IP was seen for formulation 1 (IP without enhancer) and minimum not-permeated IP was seen for formulation 5 (IP with 500 mg ZnO-NPs as enhancer).

Conclusion: ZnO and more strongly ZnO-NPs could act as enhancers for transdermal delivery of IP. Such effect was improved by increase in concentration of ZnO-NPs. Therefore, ZnO-NPs can be used as enhancer in dermal drug delivery formulations.

Keywords: Zinc Oxide nanoparticles, Enhancer, Skin permeation

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Safety

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