

In vitro safety evaluation of palm tocotrienol-rich fraction nanoemulsion for topical application

ABSTRACT

The application of nanotechnologies in cosmetics industry has resulted in the introduction of new nanomaterials for topical applications. Nanomaterial overcomes issues of limited penetration and low bioavailability of non-soluble bioactive agents. While there are many advantages of using nanomaterials, recent development in using submicron particles for enhance skin penetration has raised the concern of safety including the increase potential to induce skin irritation and allergic reactions on the skin. The studies on irritation potential of palm tocotrienol-rich fraction (TRF) nanoemulsion using in vitro ocular and dermal irritation assays, reconstructed human epidermis and human corneal epithelium tests were investigated. Palm TRF nanoemulsion did not exhibit any potential skin irritation in the in vitro ocular and dermal irritation assessment. The studies showed that when reconstructed human corneal epithelium and human epidermis models were treated with the tocotrienol macroemulsion and nanoemulsions, no indication of irritancy to the eyes or dermal tissues were observed giving a mean tissue viability of more than 60% and 50%, respectively. The non-irritant category is classified as Category 1 according to United Nations Globally Harmonised System of Classification and Labelling of Chemicals. In vitro studies showed no ocular or dermal irritation potential indicating possible topical application of palm TRF nanoemulsion.

Keyword: Safety evaluation; Tocotrienol-rich fraction; Nanoemulsion; Ocular irritation; Dermal irritation; Reconstructed human epidermis; Reconstructed human corneal epithelium