Research paper

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Film-forming formulations containing porous silica for the sustained delivery of actives to the skin

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Abstract:

The purpose of this study was to develop film-forming formulations facilitating long-term treatment of chronic pruritus with capsaicinoids. To this end, an oily solution of nonivamide was loaded into porous silica particles which were then suspended in the dispersion of a sustained release polymer. Such formulations form a film when applied to the skin and encapsulate the drug loaded silica particles in a dry polymeric matrix. Dermal delivery and permeation of the antipruritic drug nonivamide (NVA) is controlled by the matrix.

The film-forming formulations were examined regarding homogeneity, storage stability, substantivity and ex vivo skin permeation. Confocal Raman spectral imaging proved the stability of silica-based film-forming formulations over a period of 6 months. Substantivity was found to be enhanced substantially compared to a conventional semisolid formulation.

Permeation rates of nonivamide from film-forming formulations through the skin are much lower compared to those achieved with a conventional immediate release formulation with the same drug amount. Due to the drug reservoir in the polymer matrix, a sustained permeation is enabled. Film-forming formulations may therefore improve the treatment of chronic pruritus with capsaicinoids by enhancing patient compliance through a sustained release regime.

Key words:

Dermal drug delivery, Nonivamide, Confocal Raman Microscopy, Film adhesion, Skin permeation, Porous silica

Chemical compounds studied in this article:

Nonivamide (PubChem CID: 2998), Silica (PubChem CID: 24261), Eudragit® RS (Pub Chem CID: 104931)