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Formulation and Evaluation of the Curcumin Hydrogel Under the Influence of Natural Chemical Enhancer

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Abstract: Curcumin (CUR) is a natural compound extracted from turmeric (Curcuma longa L.) used to cure acne, wound healing, etc. Nanoemulsion (NE)-based drug delivery systems have gained popularity due to their advantages. This study aimed to optimize a CUR-NE-based gel and evaluate its physicochemical and biological properties. A NE was prepared using the catastrophic phase inversion method and optimized using the Design Expert 12.0 software. The CUR-NE gel was characterized in terms of visual appearance, pH, drug release, antibacterial and wound healing effects. The aim of the present investigation was to develop and study topical gel delivery of Curcumin for its anti-inflammatory effects. Carbopol 934P (CRB) and hydroxy propyl cellulose (HPC) were used for the preparation of gels. The penetration enhancing effect of menthol (0-12.5% w/w) on the percutaneous flux of Curcumin through the excised rat epidermis from 2% w/w CRB and HPC gel system was investigated. The percutaneous flux and enhancement ratio of curcumin across rat epidermis was enhanced markedly by the addition of menthol to both types of gel formulations. Both types of developed topical gel formulations were free of skin irritation. In antiinflammatory studies done by carrageenan induced rat paw oedema method in wistar albino rats, antiinflammatory effect of CRB, HPC and standard gel formulations were significantly different from control group (P < 0.05) whereas this effect was not significantly different for CRB and HPC gels formulations to that of standard (diclofenac gel) formulation (P > 0.05). CRB gel showed better % inhibition of inflammation as compared to HPC gel.

Keywords: curcumin, nanoemulsions, optimization, wound healing, gel



