

Original Article

Design and development of hydroxypropyl methycellulose (HPMC) based polymeric films of sertraline hydrochloride: Physicochemical, *in vitro* and *in vivo* evaluation

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Abstract

Transdermal patches of sertraline hydrochloride were prepared using different ratios of hydroxypropylmethylcellulose (HPMC) K4M, K15M and K100M by solvent evaporation technique. The possible drug and polymer interaction was studied by Fourier transmission infrared spectroscopy. The effect of the polymers on the technological properties, i.e., drug release, water vapor transmission rate, and percentage moisture loss, percentage moisture absorption, folding endurance and thickness was investigated. *In vitro* release studies showed zero-order release of the drug from all the patches, and the mechanism of release was diffusion mediated. Moreover, the release of the drug was sustained and it extended over a period of 24 hr in all formulations. Further, release and permeation of the drug from the most satisfactory formulation (K15MD) was evaluated through biological barrier (albino mice). The effect of permeation enhancer's i.e. oleic acid, span 80 and limonene was also investigated. However, the formulations containing oleic acid depicted the higher flux, higher diffusion coefficient and permeability coefficient. The skin irritation test of the transdermal formulation showed a skin irritation score of 0. The antidepressant activity and sustaining action of the drug loaded matrix patches were evaluated by performing forced swim test and tail suspension test. The results indicated that sertraline hydrochloride elevated struggling behavior of the albino mice. However, the floating behavior was decreased. The immobility behavior is seen increased during tail suspension test, in case of transdermal patch as compared to oral administration. It can therefore be concluded that the patch containing HPMC K15M in the ratio 1:1.5 has achieved the objectives of transdermal drug delivery system, such as avoidance of first pass effect, extended release, and reduced frequency of administration.

Keywords: Transdermal; antidepressant; sertraline hydrochloride; permeation enhancers; forced swim test; tail suspension test.

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