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Research article

Development and physicochemical evaluation of bilayered transdermal patches of Ondansetron hydrochloride

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Abstract

Bilayered transdermal patches for delivery of ondansetron hydrochloride were developed by-using polymers HPMC E15 (2.5 gm) and Eudragit RLPO (0.35gm) for the treatment of chemotherapy-induced nausea and vomiting. Different formulations were prepared by varying the grades of polymers by solvent casting method. Prepared patches were evaluated for physicochemical characteristics, mechanical properties, ex vivo permeation study, etc. Optimum formulation consisted of drug (0.395gm), HPMC E15 (2.5gm), PEG 400 (0.75 mL) and oleic acid (0.25 mL) in primary layer and Eudragit RLPO (0.35gm) and PEG 400 (0.105 mL) in secondary layer. The optimized formulation containing showed 109.1 µg /hr/cm^2 linear diffusion of drug, 6.33 kg/mm^2 tensile strength and 120.33 folding endurance. Drug and polymers interactions were investigated by FTIR studies. FTIR of ondansetron has shown intense band at 3486.61 cm^{-1}, 2922.38cm^{-1}, and 1651.99 cm^{-1} corresponding to presence of functional groups such as NH group, C-C-Aromatic group and C-C-Aliphatic group. FT-IR of optimized batch had intense bands at 3498.22 cm^{-1}, 2929.13 cm^{-1}, and 1635.88 cm^{-1} which indicate no change in the functional groups such as NH group, C-C-Aromatic group, C-C-Aliphatic and confirmed undisturbed structure of ondansetron, which indicate no drug-excipients interaction. Thus, Ondansetron hydrochloride can be effectively formulated as bilayered transdermal patch, and it is possible to achieve adequate physicochemical parameters and desired drug diffusion profile with the optimum combination of polymers.