ABSTRACT

[FABRICATION AND EVALUATION OF TRANSDERMAL SYSTEMS CONTAINING ANTIHYPERTENSIVE AGENTS]

Submitted By: [Mrs. Rupalben K. Jani]
Supervised By: [Dr. Jayvadan K. Patel, M.Pharm. Ph.D. (Pharmaceutics), LLB, FICS, Principal, Nootan College of Pharmacy, Visnagar, Gujarat]
[Name and Address of Work place - Parul Institute of Pharmacy & Research, Waghodia, Vadodara, Gujarat]

The aim of the present investigation was to develop and characterize transdermal matrix patch of Lercanidipine hydrochloride (LH) and Diltiazem hydrochloride (DH) for controlled drug delivery by solvent evaporation method. To achieve controlled drug release, polymers such as psyllium and HPMC K15M were optimized. Moreover, the skin permeation effect of essential oils such as linseed oil, jojoba oil and pumpkin seed oil were investigated on wistar rat skin. A $3^2$ full factorial design applied to optimize two formulation variables: concentration of essential oil as a permeation enhancer and polymer fixed-weight ratio. To study drug-excipients incompatibility Fourier transform infrared spectroscopy (FTIR) had employed, which showed the absence of chemical interaction. All formulations evaluated for physico-chemical parameters, ex-vivo permeation study, in-vivo skin-irritation study on wistar rats and stability study. Developed matrix patch showed optimum physico-chemical properties with absence of skin irritation. Ex-vivo permeation study revealed that both formulation variables show effect on drug release from matrix patches. Effectiveness of the oils as the permeation enhancer was found to be in the following descending order: Pumpkin seed oil > Linseed oil > Jojoba oil. Therefore, pumpkin seed oil selected as a permeation enhancer in the final formulation that shows highest flux of LH (164.09 ± 1.49 µg/cm²/h) and DH (243.96 ± 1.17µg/cm²/h) with desired drug release for transdermal administration. Stability study shows that the patch was stable up to 6 months at 40 ± 2 °C and 75 ± 5 % RH. The present investigation demonstrates that
prepared matrix patch has a capacity to deliver therapeutically effective controlled release dose of lercanidipine hydrochloride (LH) and diltiazem hydrochloride (DH) via transdermal route using pumpkin seed oil as the permeation enhancer.

Key words: Pumpkin seed oil, psyllium, hypertension, lercanidipine hydrochloride, diltiazem hydrochloride, propylene glycol, ex-vivo study, in-vivo skin irritation study