

3rd International Conference and Exhibition on Pharmacovigilance & Clinical Trials

October 27-29, 2014 Hyderabad International Convention Centre, India

Development and Optimization of Venlafaxine HCl matrix-type transdermal patch by three-factor, three-level factorial design using Design Expert-9.0

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Transdermal drug delivery systems are topically administered dosage forms in the patches form that deliver drugs for systemic effects at a predetermined and controlled rate. The purpose of the present study was to formulate and optimize transdermal matrix therapeutic system for Venlafaxine HCl, a low bioavailable drug. HPMC K100, DMSO and propylene glycol were used as polymer, permeation enhancer and plasticizer respectively to formulate the patch. A three-factor, three-level Box-Behnken design with response surface methodology in Design-Expert Software version-9. was employed to optimize the Transdermal patch. Hydroxypropyl methylcellulose, dimethyl sulphoxide and propylene glycol were varied as independent variables; cumulative Percentage of drug permeated across rat abdominal skin in 12h, flux and Tensile strength were selected as dependent variables. Mathematical equations and response surface plots were used to relate the dependent and independent variables. The statistical validity of polynomials was established, and optimized formulation factors were selected by feasibility and grid search. Validation of the optimization study with five confirmatory runs randomly selected from the Design Expert-9.0 suggestions indicated high degree of prognostic ability of response surface methodology. Optimized formulation F5 showed the best flux which could meet target flux and about 3.6 times improvement ($P < 0.05$) in bioavailability, after administration as a transdermal form of Venlafaxine HCl compared to oral administration. Transdermal matrix therapeutic system for Venlafaxine HCl was developed and optimized using Box-Behnken statistical design and could provide an effective Anti-depressant dosage form.

Biography

Mohammed Azizurrahman has done his Bachelor in Pharmacy from S. R. R. College of pharmacy Affiliated to Kakatiya University and Pursuing Master in pharmacy in Department of Pharmaceutics from Kakatiya Institute of Pharmacy. His field of interest is Research in Formulation development.

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