RESEARCH ARTICLE

Formulation and Evaluation of Lornoxicam Transdermal patches using various Permeation Enhancers

Neha Sharma[1*], S Sharma[2], R Kaushik[3]

[1]*Department of Pharmacy, Ram-Eesh Institute of Vocational & Technical Education, Greater Noida, Uttar Pradesh, India.*
[2]*Department of Pharmaceutics, Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy, Bela, Ropar, Punjab, India.*
[3]*Department of Pharmacy, Ram-Eesh Institute of Vocational & Technical Education, Greater Noida, Uttar Pradesh, India.*

Received: 16th Oct, 19; Revised: 15th Nov, 19, Accepted: 15th Dec, 19; Available Online: 25th Dec, 2019

ABSTRACT

Background: Lornoxicam is a potent non-steroidal anti-inflammatory drug (NSAID) that possesses gastrointestinal tract (GIT) associated problems like gastric irritation. Transdermal patches can overcome the gastrointestinal tract associated problems of the drug and can be an alternate and convenient dosage form as compared to oral dosage forms. Three natural penetration enhancers i.e. Eugenol, Cineole and Limonene, were known to enhance the permeation of drugs from the patch.

Objective: The present study aimed to prepare and evaluate transdermal drug delivery patches for sustained release of Lornoxicam using HPMC E50 as polymer and to study the effects of three potential permeation enhancers viz. Limonene, Eugenol, and Cineole at different concentrations on permeation of Lornoxicam from patches.

Materials & Methods: Limonene, Eugenol, and Cineole at concentrations of 1, 2, 3, and 4% were used as permeation enhancers in the formulation of Lornoxicam transdermal patches. Hydroxy Propyl Methyl Cellulose (1:5 drug: polymer ratio) and plasticizers like glycerine was used to prepare transdermal patches, including three permeation enhancers. A total of 12 formulations (F1-F12) were prepared with each enhancer at four different concentrations and evaluated for various parameters like thickness, weight variation, Water-Vapor Permeability, Tensile Strength, Percent Moisture Uptake, Drug Content, and Diffusion studies.

Results: The partition coefficient was determined in octanol/water system, and it indicates that the drug is suitable for transdermal drug delivery. IR spectroscopy was performed to determine the physicochemical compatibility between drugs and the polymers, and the results suggested no physicochemical incompatibility between drugs and the polymers. The Optimized formulation F4 containing 4% Limonene as a permeation enhancer gave a maximum release 82.85% over a period of 24 hours. Kinetics data of formulations showed that all the twelve formulations followed first-order kinetics and except two formulations (i.e., F3 and F12) follow anomalous transport. Stability studies were carried out as per ICH guidelines, and formulations were found to be Stable. A transdermal patch containing Limonene as a permeation enhancer showed higher in vitro release of Lornoxicam as compared to other penetration enhancers.

Conclusion: All 12 formulations, i.e., F1-F12, showed good physicochemical characteristics and showed an increase in permeation of drugs during their *in vitro* permeation study. This dosage form also showed improved patient compliance due to a simplified therapeutic regimen and comfort via the non-invasive, painless, and simple application. The optimized formulation can be exploited further to overcome the GIT associated drawbacks of Lornoxicam.

Keywords: HPMC E 50, Lornoxicam, Modeling, Permeation Enhancers, Release kinetics, Transdermal patches.

International Journal of Drug Delivery Technology (2019); DOI: 10.25258/ijddt.9.4.14

How to cite this article: Sharma, N., Sharma, S. and Kaushik, R. (2019). Formulation and Evaluation of Lornoxicam Transdermal patches using various Permeation Enhancers. International Journal of Drug Delivery Technology, 9(4): 597-607.

Source of support: Nil.

Conflict of interest: None

INTRODUCTION

Transdermal Drug Delivery Systems (TDDS) are defined as self-contained discrete dosage forms, deliver the drugs through the skin when applied to the intact skin at a controlled rate to the systemic circulation for the input of drugs to maintain prolonged plasma drug levels. Transdermal drug delivery avoids 1st pass metabolism, doubtless decreases Git effects, and improves patient compliance. LORNOXICAM is an effective non-steroidal drug (NSD) used as an anti-inflammatory, analgesic, and antipyretic. It is used in the

**Author for Correspondence: nehasharma18july1989@gmail.com*