

HEB



JOHP

Journal of Hospital Pharmacy
An Official Publication of Bureau for Health & Education Status Upliftment
(Constitutionally Entitled as Health-Education, Bureau)

Development and Optimization of a Carbohydrate-Based Sustained Release Trifluridine In-Situ Gel for Treatment HSV Keratitis

^{#1}Bhavesh Akbari, ^{*#1}Vimal Patel, ²Hetal Bhenjaliya, ²Kaushal Viradiya

¹Department of Pharmaceutics, School of Pharmacy, P P Savani University, Kosamba, Surat, Gujarat, India

²Department of Pharmaceutics, Shree Dhanvantary Pharmacy College, Kim, Surat, Gujarat, India.

*Corresponding author:

Dr. Vimal Patel, PhD, Associate Professor, Department of Pharmaceutics, School of Pharmacy, P P Savani University, Kosamba, Surat -394125, Gujarat, India.

Highlights

- Developed an in-situ gel system for sustained release of trifluridine, enhancing ocular bioavailability.
- Optimized formulation parameters to achieve superior physicochemical properties.
- Improved therapeutic efficacy and patient compliance, reducing dosing frequency for HSV keratitis treatment.

Email Id: serviceheb@gmail.com

Abstract:

Keratitis is a very severe inflammation of the cornea and conjunctiva caused by herpes simplex virus type 1. In developing countries, it is more prevalent often convert blindness due to corneal ulceration. Even untreated dendritic keratitis may cause permanent scarring of the cornea with impaired vision or blindness. Conventional ocular treatment has major drawbacks such as frequent dosing which compromises patient compliance. The purpose of this study was to develop a newer in-situ hydrogel ophthalmic delivery system of the antiviral drug, Trifluridine and evaluate its prospective for ocular delivery. In-situ gel was prepared by ion-activated gelation method using HPMC K4M as hydrogel polymer which could increase the drug residence time and bioavailability, Sodium Alginate as gelation agent, and NaCl was incorporated to regulate the ocular osmotic pressure. 3² factorial design was elected to optimize the formulation for different levels of polymer composition where gelling time, viscosity, and in-vitro drug release were taken as dependent parameters. The all-designed batches were further for, swelling behavior, muco-adhesion, drug entrapment, and ex-vivo permeation studies. The optimized batch was found to be A5 because of its desired drug release pattern and muco-adhesion. The formulations were therapeutically efficacious, and stable and provided sustained release of drug throughout 8 hrs. These results demonstrate that a newer

developed in-situ hydrogel system is the best alternative to the conventional ophthalmic drug delivery system.

Keywords: Keratitis, in-situ gel, Trifluridine, HPMC K4M, muco-adhesion, corneal permeation.

Access this Article Online	Quick Response Code: 
Website: http://www.journalofhospitalpharmacy.in	
Received on 29/05/2025	
Accepted on 9/06/2025 © HEB All rights reserved	