



## Formulation and Characterization of both Hydrophilic and Hydrophobic HPMC based Hydrogels containing Diclofenac Potassium

Kajal GHOSAL <sup>1,2\*</sup>, Rajan RAJABALAYA <sup>3</sup>, Subrata CHAKRABORTY <sup>2</sup>, & Arunabha NANDA <sup>1</sup>

<sup>1</sup> Department of Pharmaceutical Technology, Jadavpur University,  
Raja S. C. Mullick Road, Kolkata - 700 032, West Bengal - India.

<sup>2</sup> Dr B. C. Roy College of Pharmacy and Allied Health Sciences,  
Meghnad Saha Sarani. Bidhannagar, Durgapur, India.

<sup>3</sup> School of Pharmacy & Health Sciences, International Medical University, No. 126,  
Jalan 19/155B, Bukit Jalil, 57000 Kuala Lumpur, Malaysia.

**SUMMARY.** The aim of this study was to develop topical hydrogels containing diclofenac potassium (DP) at 1 % w/v concentration using conventional hydrophilic hydroxypropyl methyl cellulose (HPMC, 50cPs) and modified hydrophobic hydroxypropyl methyl cellulose (HPMC, 90L grade). The differences between *in vitro* release profiles of both types of polymer based hydrogels were studied using model dependent equations. Three formulations were prepared from hydrophobic HPMC at 1 %, 1.5 % and 2 % (w/v) concentration. Other two formulations were prepared from hydrophilic HPMC at 12 % and 15 % (w/v) concentration. Hydrophobic formulations of higher viscosity with small quantity of polymer show higher release compared to hydrophilic formulations of lower viscosity with higher polymer concentration. Combined effect of swelling and erosion leads to anomalous diffusion in case of hydrophobic HPMC based hydrogels whereas only swelling leads to Fickian diffusion in case of hydrophilic HPMC based hydrogels. The formulations follow Higuchi release pattern as well as Weibull model.

**KEY WORDS:** Diclofenac potassium, Hydrophobic, Hydrophilic, Release kinetics, Release models.

\* Author to whom correspondence should be addressed. E-mail: kaju\_3\_ju@rediffmail.com