Gomal Univ. J. Res. Vol.18: pp 195-209 , 1998 [Printed in June, 2001] ISSN 1019-8180

FORMULATION AND MECHANISTIC STUDIES ON IBUPROFEN RELEASE BEHAVIOR FROM SWELLING-CONTROLLED MATRIX TABLETS USING CARBOPOL® 971P ALONE AND IN COMBINATION WITH CARBOPOL®974P

Gul Majid Khan* and Jia-Bi Zhu**

Department of Pharmaceutics, Faculty of Pharmacy, Gomal University, Dera Ismail Khan, N.W.F.P., Pakistan.
Zhong Kun Pharmaceutical Research Institute, School of Pharmacy. China Pharmaceutical University, Nanjing 210009, P.R. China.

ABSTRACT:

Controlled release (CR) matrix tablets of a slightly water-soluble drug, ibuprofen (IBF) and a swellable matrix material, Carbopol® 971P-NF, alone or in combination with Carbopol® 974P-NF, were prepared at different drug -to-polymer (D:P) ratios, by direct compression method. The investigation focuses on the IBF release rates and the elaboration of kinetic behavior of the drug release profiles from the matrix tablets. The influence of D:P ratios and several filler excipients (lactose, microcrystalline cellulose(MCC), and starch) on IBF release from the tablets was also evaluated. *In vitro* dissolution experiments were performed in pH 7.2 phosphate buffer solution. The f_2-metric technique for the determination of the dissolution equivalency and various types of kinetic models for the analysis of release profiles data were employed, through multiple linear regression computer programs. In general, the polymer swelled in the dissolution medium and the drug release rates were considerably prolonged in the polymer level dependent manners. The drug release could occur both by diffusion and swelling-controlled mechanisms; and the release rates & kinetics could be modified and tailored by incorporating Carbopol®974P in the form of blended mixtures with Carbopol®971P. All the filler excipients used in the investigation exhibited an increase in the release rate of IBF from the matrix tablets. However, microcrystalline cellulose showed the fastest, while starch demonstrated the slowest release rate. Lactose exhibited slower and more linear release behavior.