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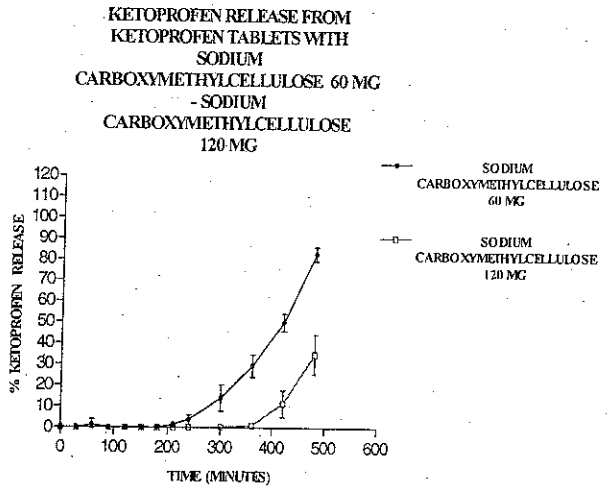

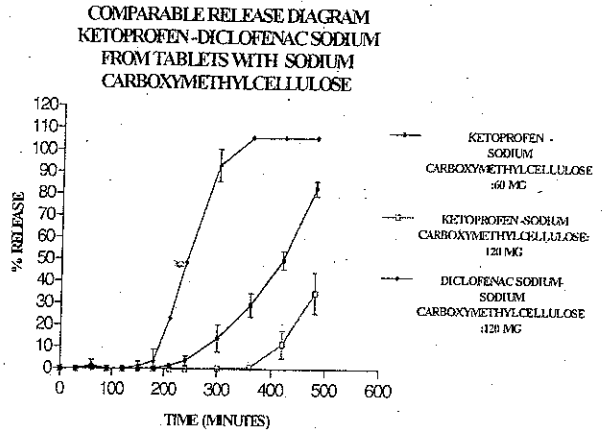

087
IMAGE ANALYSIS STUDIES OF WATER TRANSPORT AND DIMENSIONAL CHANGES IN HYDROPHILIC SWELLABLE POLYMER MATRICES

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The aim of this work was to study the fronts, which are created by the process of swelling, the effect of drug solubility the behaviour of fronts and the effect of front's movement on release mechanisms. Towards this end tablets comprised of alone HPMC (Metolose, 100.000sr-90sh), HPMC with Diclofenac Sodium (relatively soluble) and HPMC with Furosemide (insoluble) were prepared. The tablets were prepared by direct compression with a carver press, subsequently the matrix swelling was studied with the help of optical analysis technique and photographs obtained were analysed using Image Leicaa Q500IW software. The swelling and drug release experiments were carried out using a USP dissolution apparatus II. The amount of Diclofenac and Furosemide released was measured by UV detection at 276 nm. By means of the Image Analysis System method, gel layer thickness was measured, as well as the movement of the swelling, erosion and diffusion fronts at different time points. These allowed the investigation of mechanisms involved in the swelling – release process. The results showed that the rate and mechanism of drug release from swellable matrices are dependent not only on the dissolution and diffusion of a drug but also on the translocation of undissolved drug particles in the gel layer due to polymer swelling. These observations were supported by the following: (a) the diffusion layer thickness, which is observed as a result of the presence of undissolved drug in the gel layer, increased with the decrease in drug solubility, and as a result the diffusion front converged on the erosion front; (b) from the analysis of the dissolution data it appears that diclofenac is released as a result of diffusion via the gel layer as well as due to polymer relaxation and/or matrix erosion, while Furosemide is released only as a result of polymer relaxation and/or matrix erosion.

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IN VITRO EVALUATION OF FUROSEMIDE PERMEATION THROUGH HUMAN EPIDERMIS USING EXPERIMENTAL DESIGN

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Furosemide is a commonly used loop diuretic, in cases in which reduction of body fluids is needed, e.g. acute pulmonary oedema, hypertension, heart failure oedema etc. The usual way of administration is per os or parenteral. Due to its physicochemical and pharmacokinetic characteristics, it seems to be a good candidate for transdermal drug delivery. The purpose of the study was to investigate the in vitro skin permeation of furosemide using a 3^3 factorial design. The factors and the corresponding levels were: the type of permeation enhancer (oleic acid, oleyl alcohol, laurocapram), the concentration of permeation enhancer (0%, 5% and 10%) and the concentration of gelling agent (1%, 1.25% and 1.5%). The prepared gels were placed on Franz diffusion cells. Samples were taken at 6, 12, 24 and 48 hours and analyzed using HPLC. The results were processed using Design Expert V 6.0 software. It was found that the type and the concentration of the permeation enhancer significantly affected the permeation of furosemide, while the concentration of the gelling agent did not ($p>0.05$). The largest amount of drug permeated per unit area was observed from gels containing laurocapram or oleyl alcohol. Moreover, it was found that permeation of the drug was higher as the concentration of the en-