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Controlled Release Drug Delivery Systems Containing Diltiazem HCl: Effect of Polymer Concentration on *In Vitro* Drug Release Profiles

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***SUMMARY*. In this study, controlled release matrix tablets of diltiazem HCl were prepared by direct compression method using Ethocel as rate controlling polymer. The CR tablets of diltiazem HCl were formulated at different drug to polymer ratios to see the effect of polymer concentration on the release of drug during *in vitro* drug dissolution studies. Different physico-chemical tests were performed on matrix tablets to evaluate their suitability for *in vitro* and *in vivo* drug release performance. *In vitro* dissolution studies were performed in phosphate buffer pH 7.4 with PharmaTest Dissolution Apparatus, using USP method-I (rotating basket method) at a rotation speed of 100 rpm by maintaining the temperature constant at 37 ± 0.1 °C. Several kinetic models were used for evaluating the dissolution data to find out the drug transport mechanism from the polymeric tablets into dissolution medium which were found to be occurred both by swelling controlled mechanism as well as diffusion mechanism, exhibiting nearly zero order kinetics. *In vivo* evaluation of diltiazem HCl CR tablets was determined in rabbit serum according to randomized two-way crossover study design. Several pharmacokinetic parameters including plasma concentration time curve ($AUC_{0-\infty}$), maximum plasma concentration (C_{max}), time to reach peak plasma concentration (T_{max}), elimination half life ($T_{1/2}$), and apparent volume of distribution (Vd/f) were estimated from the plasma concentration-time profile of individual rabbit. An optimized C_{max} and extended T_{max} were produced and a good correlation of *in vivo* and *in vitro* drug absorption ($R^2 = 0.952$) was observed.**

KEYWORDS: CR tablets, Diltiazem HCl, Ethocel, *In vitro* and *In vivo* evaluation, Stability.

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