

Effect of Ethyl Cellulose and Hydroxy Propyl Methyl Cellulose Polymer on the Release Profile of Diltiazem Hydrochloride Sustained Release Pellets

Authors : Shahana Sharmin

Abstract : In the present study, the effect of cellulose polymers Ethyl Cellulose and Hydroxy Propyl Methyl Cellulose was evaluated on the release profile of drug from sustained release pellet. Diltiazem Hydrochloride, an antihypertensive, cardio-protective agent and slow channel blocker were used as a model drug to evaluate its release characteristics from different pellets formulations. Diltiazem Hydrochloride sustained release pellets were prepared by drug loading (drug binder suspension) on neutral pellets followed by different percentages of spraying, i.e. 2%, 4%, 6%, 8% and 10% coating suspension using ethyl cellulose and hydroxy-propyl methyl cellulose polymer in a fixed 85:15 ratios respectively. The in vitro dissolution studies of Diltiazem Hydrochloride from these sustained release pellets were carried out in pH 7.2 phosphate buffer for 1, 2, 3, 4, 5, 6, 7, and 8 hrs using USP-I method. Statistically, significant differences were found among the drug release profile from different formulations. Polymer content with the highest concentration of Ethyl cellulose on the pellets shows the highest release retarding rate of the drug. The retarding capacity decreases with the decreased concentration of ethyl cellulose. The release mechanism was explored and explained with zero order, first order, Higuchi and Korsmeyer's equations. Finally, the study showed that the profile and kinetics of drug release were functions of polymer type, polymer concentration & the physico-chemical properties of the drug.

Keywords : diltiazem hydrochloride, ethyl cellulose, hydroxy propyl methyl cellulose, release kinetics, sustained release pellets

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