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Formulation and Evaluation of Sustained Release matrix tablets of Propranolol HCl with Gum Karaya

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Abstract: The main aim of the present work is to formulate and develop sustained release matrix tablets of Propranolol HCl. Selected method for preparation of sustained release matrix tablets of Propranolol HCl is wet granulation method by using varying concentrations of natural polymer, is Gum karaya as a release retardant. Total twelve formulations (PK1-PK12) were prepared by using different proportions of drug and Gum karaya (1:0.5, 1:1, 1:1.5, 1:2) with the aid of granulating fluids such as distilled water, ethanol and isopropyl alcohol. Excipients compatibility studies were carried out by FT-IR and DSC. All the matrix tablets of Propranolol HCl formulations were evaluated for pre-compression and post-compression parameters. All the formulations were evaluated for the hardness, friability, thickness, weight variation, drug content, and *in-vitro* drug release studies. Based on *in-vitro* drug release the polymer Gum karaya showed better dissolution control in all formulations, which is result of its release retardant characteristics. From 12 formulations PK4, PK8 and PK12 were optimized based on results from physicochemical evaluation and drug release studies. These formulations have composition of 1:2 ratio of drug and Gum karaya& they have shown more than 95% drug release at 12 hours. Hence based on studies, PK10 was selected for further studies by employing electrolytes (Sodium carbonate, Calcium carbonate, Magnesium carbonate) in different concentrations (25mg, 50mg and 75mg). These electrolytes were employed to examine matrix swelling and gel properties. The results indicated that the drug released at a controlled rate were due to differential swelling rate and matrix stiffening and provides a uniform gel layer. These findings indicated that the swelling and gel formation in the presence of ionisable species within the hydrophilic matrices provide an attractive alternative for controlled drug delivery from a monolithic system. The release kinetics of all formulations showed that the drug release followed fickian and non-fickian transport. The release kinetics of optimized formulation PKE8 showed fickian transport followed by zero order.

Keywords: Electrolyte, Propranolol, Gum karaya, matrix, sustained release.

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