

Effect of cross linking agent on sustained release microbeads formulation containing immunosuppressant drug

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Purpose of the study is to determine the effect of calcium chloride on release kinetics of micro beads formulation. Microbeads was developed by ionic gelation of mixed alginate and chitosan solutions in aqueous media containing calcium chloride. To prepare drug-loaded beads, Tacrolimus was added to the initial aqueous polymer solution. These prepared beads were characterized and evaluated for surface morphology and shape by scanning electron microscopy, % yield, microencapsulation efficiency and in vitro drug release. A full factorial experimental design was employed to evaluate the effect of CaCl_2 concentrations on drug release behavior of the beads in simulated gastrointestinal tract fluid. It was found that rate and extent of drug release decreased significantly with increase of concentration of calcium chloride, because sodium alginate as a linear copolymer consisting of β (1 \rightarrow 4) mannuronic acid and α (1 \rightarrow 4) L-guluronic acid residues; a tight junction is formed between the residues of alginate with calcium ions. However, in case of higher calcium chloride concentration due to increased surface roughness and poor entry of dissolution medium into the polymer matrix may be delayed drug release. Drug release profile of Tacrolimus microbeads were studied in phosphate buffer In-vitro pH 6.8 and exhibited zero order kinetics. Based on the results, the alginate-chitosan beads prepared with high CaCl_2 concentration could be potentially suitable carriers for sustained released microbeads containing immunosuppressant drug. The goal of study is to reduce the dosing frequency and there by improve the patient compliance.

Keywords— Calcium chloride, Ionotropic gelation, Microbeads.

Biography

Dr. Mullaicharam is Professor of Pharmaceutics at College of Pharmacy, National University of Science and Technology (Formerly known as Oman Medical College (OMC)), Oman She has 24 years of teaching and research experience in the pharmacy field and has received awards at national and international level She has Google scholar citation of 366 and published more than 80 research articles in peer reviewed journals and presented many papers in various conferences.