Preparation and characterization of nasal ondansetron muco-adhesive gel

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Abstract: Nowadays nasal drug delivery has found interest for both local and systemic drug delivery. Large surface area, high blood flow, avoidance of First Past Metabolism, ease of usage and ready accessibility have made the nasal drug delivery an effective method. Nasal muco-adhesive gel is one of the dosage forms that are applied through nasal route. Muco-adhesive gel has benefit of lowering frequency of usage, increasing drug absorption, and increasing bioavailability. Ondansetron is a 5HT3 receptor antagonist that is used therapeutically for the prevention of nausea and vomiting associated with emetogenic cancer therapy. The aim of this study was preparation and characterization of nasal ondansetron muco-adhesive gel.

Different polymer including HPMC, MC, Carbomer 934, Carbomer 980 and Na CMC were examined for the preparation of ondansetron gel. In addition preservative (chlorobutanol, benzalkonium chloride, cetrimonium) and humectant (PEG 400, glycerin, propylene glycol) were also evaluated for the preparation of gel formulations.

All formulations prepared were examined using different quality control tests, including appearance, color, thermal cycle, determination of pH, mechanical stability, invitro drug release, determination of muco-adhesive strength and duration of muco-adhesion. Complimentary tests including assay of active ingredient and kinetic release were performed in order to choose the best formulation.

The final formulation (containing 1.5% HPMC and 0.5% carbomer934) which showed the greatest of muco-adhesive strength and longest duration of muco-adhesion was chosen as the best formulation, as well as a desirable profile (more than 95%) of drug release over a period of 12 hours. This formulation followed the Higuchi model of drug release and pseudoplastic viscosity, which is predictable in such drug delivery system. In conclusion the prepared gel formulation seems to be a suitable nasal carrier for delivering ondansetron.

Keyword: ondansetron - muco-adhesive - polymer - release