



Preparation, Characterization and *In Vitro* Evaluation of Stable Mucoadhesive Intranasal Microsphere of L-Dopa

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SUMMARY. Novel stable mucoadhesive chitosan microspheres were developed to explore the possibility of nasal delivery of L-dopa to avoid first pass metabolism and to improve therapeutic efficiency in treating the symptoms of parkinsonism. The mucoadhesive microspheres were prepared by spray drying using 2³ full factorial design with inlet temperature (A), liquid feed flow rate (B), and drug to polymer concentration (C) as independent variable. Then microspheres were characterized in terms of morphology (Scanning Electron Microscopy, SEM), drug content, production yield, particle size and thermal behavior (Differential Scanning Calorimetry (DSC) and mucoadhesion test. *In vitro* drug release studies were performed in simulated nasal electrolyte fluid. Factorial design results indicated that main effect of factor A alone has significant effect on moisture content whereas AC had effect on moisture content. Microspheres containing moisture below 11 % were found to be stable. Treatment of *in vitro* data to mathematical model of different kinetic equations indicated that drug release from the microspheres was best characterized by the Korsmeyer-Peppas model. The results of DSC studies revealed molecular amorphous dispersion of L-dopa into the chitosan microspheres. Stability studies showed that microspheres were stable over a period of three months.

KEY WORDS: Factorial design, L-Dopa, Nasal drug delivery.

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