



Development and Evaluation of Lamotrigine loaded N-Trimethyl Chitosan Microspheres for Intranasal Administration

Jayshree B Taksande*, Kamlesh J Wadher, Rashmi V Trivedi, Milind J Umekar

**Department of Pharmaceutics, ShrimatiKishoritaiBhojar
College of Pharmacy, New Kamptee, Nagpur (M.S.), India-441 002**

Abstract:In the present study, we have developed and characterized the trimethyl chitosan (TMC) mucoadhesive microspheres of antiepileptic drug, Lamotrigine for intranasal administration. Firstly, TMC was synthesized by reductive methylation of chitosan and characterized by FTIR, DSC and XRD analysis. The lamotrigine loaded TMC microspheres were prepared by ionic gelation method and critically analyzed for appropriate morphological features (scanning electron microscopy), particle size, polydispersity index (PDI), zeta potential, drug entrapment efficiency, thermal behavior (differential scanning calorimetry), in vitro drug release, mucoadhesive nature and biocompatibility studies in excised sheep nasal mucosa and further evaluated for ex vivo permeation of drug through nasal mucosa. Results demonstrated that the microspheres were smooth and spherical in shape with particle size in the range of 36.85 ± 1.78 to $16.8 \pm 0.96 \mu\text{m}$ suitable for nasal administration, with PDI 0.256 and zeta potential 29.8 mV respectively. Prepared microspheres showed high encapsulation efficiency up to $92.34 \pm 0.73\%$, strong bioadhesion potential and devoid of any signs of morphological toxicity in excised sheep nasal mucosa. The permeation of lamotrigine from TMC microspheres of batch TL-8 and TL-9 was 88.80% and 83.24% respectively. Thus the formulation of lamotrigine loaded TMC mucoadhesive microspheres offers promising advantages over conventional dosage forms.

Keywords: N-trimethyl Chitosan, Lamotrigine, Mucoadhesive microsphere, Intranasal administration, Epilepsy.