

## Formulation Development and Evaluation Chlorpheniramine Maleate Containing Nanoparticles Loaded Thermo Sensitive in situ Gel for Treatment of Allergic Rhinitis

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**Abstract :** The aim of the present study was to fabricate a thermo sensitive gel containing Chlorpheniramine maleate (CPM) loaded nanoparticles following intranasal administration for effective treatment of allergic rhinitis. Chitosan based nanoparticles were prepared by precipitation method followed by the addition of developed NPs within the Poloxamer 407 and carbopol 934P based mucoadhesive thermo-reversible gel. Developed formulations were evaluated for Particle size, PDI, % entrapment efficiency and % cumulative drug permeation. NP3 formulation was found to be optimized on the basis of minimum particle size (143.9 nm), maximum entrapment efficiency ( $80.10 \pm 0.414$  %) and highest drug permeation ( $90.92 \pm 0.531$  %). The optimized formulation NP3 was then formulated into thermo reversible in situ gel. This intensifies the contact between nasal mucosa and the drug, increases and facilitates the drug absorption which results in increased bioavailability. G4 formulation was selected as the optimize on the basis of gelation ability and mucoadhesive strength. Histology was carried out to examine the damage caused by the optimized G4 formulation. Results revealed no visual signs of tissue damage thus indicated safe nasal delivery of nanoparticulate in situ gel formulation G4. Thus, intranasal CPM NP-loaded in situ gel was found to be a promising formulation for the treatment of allergic rhinitis.

**Keywords :** chitosan, nanoparticles, in situ gel, chlorpheniramine maleate, poloxamer 407

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