

Mucoadhesive *In situ* Nasal Gel of Anticholinesterase Drug for Alzheimer's Disease

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Abstract:

The aim of the study was to formulate and evaluate mucoadhesive *in situ* nasal gel of rivastigmine tartrate for nose to brain delivery in the treatment of Alzheimer disease. Two approaches namely, thermo-sensitive and pH sensitive were used for preparation of *in situgel*. Thermoreversible *in situgel* containing pluronic f-127 (17%w/v) and carbopol 934(0.3%w/v) made by cold method gave the optimum results of clarity, pH(5), gelling temperature(35⁰C), gel strength(57 sec), mucoadhesive force(218 dyne/cm²), drug content(96.67%), % cumulative drug release (92.71% in 8 hours) and had no cellular damage as indicated by histological study. The formulation was stable for 21 days in accelerated conditions. pH induced *in situ* gel containing carbopol 934 (0.5%w/v) and HPMC K4M(0.25%w/v) gave the optimum results of clarity, pH(5), gel strength(44 sec), mucoadhesive force(405.73 dyne/cm²), drug content(96.67%), % cumulative drug release (93.76% in 8 hours) and had no cellular damage as indicated by histological study. The formulation was stable for 14 days in accelerated conditions. ANOVA study for both formulation proved the all responses were significant. The *in situ* gel prepared by both the approaches showed compatible results, but since the pH of the mucosa may vary considerably, thermo-sensitive approach can be considered as more reliable approach. Therefore the thermo-sensitive will better approach as compared with pH-sensitive. Thus *in situ* gel delivered via nasal route could be promising approach for targeting rivastigmine tartrate directly to brain for treatment of Alzheimer disease.

Keywords: Alzheimer disease, nasal *in situ* gel, rivastigmine tartrate, thermo-sensitive, pH-sensitive, pluronic f-127, carbopol 934, HPMC K4M, control release.