



Formulation and Evaluation of Thermoreversible Mucoadhesive Nasal Gels of Metoclopramide Hydrochloride

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SUMMARY. The prolonged residence of drug formulation in the nasal cavity is of utmost importance for intranasal drug delivery. The objective of the present investigation was to develop a mucoadhesive *in situ* gel with reduced nasal mucociliary clearance in order to improve the bioavailability of the antiemetic drug, metoclopramide hydrochloride. The *in situ* gelation upon contact with nasal mucosa was conferred via the use of the thermogelling Pluronic flake 127 (18%). Mucoadhesion was modulated via the use of hydroxy propyl methyl cellulose (HPMC), sodium carboxy methyl cellulose (Na CMC) and sodium alginate (Na-alginate) whereas drug release was modified by varying concentrations of polyethylene glycol 6000 (PEG 6000). The results revealed that the different mucoadhesives increased the gel viscosity but reduced its sol gel transition temperatures. The increase in viscosity was highest in formulations with Na-alginate and lowest in formulations with HPMC. PEG 6000 significantly decreased mucoadhesive strength of formula containing 0.3% HPMC (776.6 ± 19.55 to 713.6 ± 5.03), 0.2% Na CMC (656 ± 11.13 to 575 ± 9.07) and 0.2% Na-alginate (659 ± 11.13 to 618.3 ± 9.45) whereas the gelation temperature increased by 3 to 4 °C. 100% of drug diffusion was found at four hours for formulation F5, F9, and F12. Formulation F5 showed maximum permeability (0.00949 ± 0.00021 mg.cm/min) than other formulation containing PEG6000. This study concluded the potential use of mucoadhesive *in situ* nasal gel in terms of ease of administration, accuracy of dosing, prolonged nasal residence and improved nasal bioavailability.

KEY WORDS: Metoclopramide hydrochloride, Mucoadhesive, Nasal drug delivery, Pluronic F 127, PEG 6000.

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