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Formulation of optimized floating microspheres of Furosemide from ethylcellulose and hydroxypropyl methylcellulose polymer blends

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Introduction: Furosemide is a potent and commonly used loop diuretic. It is absorbed largely in the stomach and upper small intestine. This narrow absorption window results in its low (~50%) and variable (10-100%) bioavailability from conventional dosage forms. The object of the study was to develop an optimized controlled release floating microspheres of furosemide capable of floating on the gastric fluid releasing the drug over a period of 12 h.

Method: Floating microspheres were prepared by the solvent evaporation method using fixed weight (1 g), but at varied proportions, of EC and HPMC dissolved in 16 ml of (1:1, v/v) dichloromethane and ethanol at room temperature, and adding weighed amount of furosemide to the polymers solution. Optimization was conducted from factors of drug loading and EC/HPMC ratio, and responses drug release rate and buoyancy.

Result: The most desirable optimal point of the response variables was obtained at release rate of 27 $h^{-1/2}$ and buoyancy of 58.45%, with corresponding factor levels of 344 mg furosemide and 4.84 EC/HPMC ratio.

Conclusion: Optimized furosemide floating microspheres formulation of extended release and buoyancy, over a period 12 h was prepared using EC and HPMC polymer blends. Evaluation of the optimized formulation showed good flow property, good yield, and excellent drug entrapment efficiency.

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