

GASTRO-RETENTIVE NANOFIBRE FORMULATION

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Abstract

Gastroretentive drug delivery serves as alternative for the drugs having narrow absorption window for the treatment of stomach cancer as the system will increase the gastric retention time in the stomach. the gastro-retentive nanofibre formulation comprises of: i) a core consisting of 5-fluorouracil (5-FU) and ii) a layer for coating the core having two release rate control polymers which include Eudragit and methyl cellulose respectively [1], [2].

Key words: Gastro-retentive, 5-fluorouracil, Eudragit

Introduction

Gastric cancer is a leading cause of death worldwide. 5-Fluorouracil is a major anticancer drug used in the treatment of gastric cancer. It is usually given by in-vitro route because of the poor absorption and variable oral bioavailability. The in-vitro route leads to systemic toxicity when the drug reaches to the unwanted sites. Thus, there is a need to provide a multilayered composite nanofibre formulation and a method thereof for controlled release of the drug into the stomach with improved efficiency of drug release performance for therapeutic management of anti-cancer drugs in gastric cancer [3].

Working

The formulation comprises of: a) a core consisting of an anticancer drug, 5- fluorouracil and b) a layer for coating the core, including at least two release rate controlling polymer such as Eudragit and methyl cellulose

The method of preparation of the formulation comprises of the following steps: a) Eudragit and methyl cellulose are mixed in the solvent containing ethanol and water to obtain the polymer

mixture, b) 5-fluorouracil is mixed in the solvent to obtain the drug solution c) the drug solution is added to the polymer mixture and stirred at room temperature to obtain a homogeneous solution, d) the homogeneous solution is filled in a syringe with flat end metal needle and the syringe is placed horizontally on a syringe pump e) the homogeneous solution is subjected to electrospinning method to obtain the gastro-retentive nanofibre formulation.

The positive electrode of a high-voltage power DC supply is connected to the metal needle tip. The grounded electrode is connected to a metal collector wrapped with aluminum foil. Electrospinning is carried out under ambient conditions for preparation of gastro-retentive nanofibre. An electrical potential of 20 kV is applied across a fixed distance of 12 cm between the tip and the collector. The feed rate is maintained at 0.5 ml/h using a syringe pump [4], [5].

After preparation of the nanofibres, the fibers are stored over silica gel beads in a desiccator to facilitate the removal of residual solvents and moisture.

Result

The gastro-retentive nanofibre drug formulation obtained is in the form of tablet which may be administered orally.

Conclusion

The gastro-retentive nanofibre drug formulation is advantageous as it provides decreased dosing of the active ingredient with better patient compliance as the route of administration is oral and controlled release of the drug reduces the systemic toxicity and also prevent nocturnal awakening.

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