World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Stomach Specific Delivery of Andrographolide from Floating in Situ Gelling System

Authors : Pravina Gurjar, Bothiraja Pour, Vijay Kumbhar, Ganesh Dama

Abstract : Andrographolide (AG), a bioactive phytoconstituent, has a wider range of pharmacological action. However, due to the intestinal degradation, shows low oral bioavailability. The aim of the present work was to develop Floating In-situ gelling Gastro retentive System (FISGS) for AG in order to enhance its site specific absorption and minimize pH dependent hydrolysis in alkaline environment. Further to increase its therapeutic efficacy for peptic ulcer disease caused by H. pyroli. Gellan based floating in situ gelling system of AG were prepared by using sodium citrate and calcium carbonate. The 32 factorial designs was used to study the effect of gellan and calcium carbonate concentration (independent variables) on dependent variable such as viscosity, floating lag time and drug release. Developed system was evaluated for drug content, floating lag time, viscosity, and drug release studies. Drug content, viscosity, and floating lag time was found to be 81-99%, 67-117 Cps, and 3-5 sec, respectively. The obtained system showed good in vitro floating ability for more than 12 h using 0.1 N HCl as dissolution medium with initial burst release followed by the controlled zero order drug release up to 24 hrs. In vivo testing of FISGS of AG to rats demonstrated significant antiulcer activity that were evaluated by various parameters like pH, volume, total acidity, millimole equivalent of H+ ions/30 min, and protein content of gastric content. The densities of all the formulation batches were found to be near about 0.9 and floating duration above 12 hr. It was observed that with the increase in conc. of gellan there was increase in the viscosity of formulation but all formulations were in optimum range. The drug content of optimized batch was found to be 99.23. In histopathology study of stomach, the villi at the mucosal surface, the intercellular junction, the intestinal lumen were intact; no destruction of the epithelium, and submucosal gland in formulation treated and control group animals as compared to pure drug AG and standard ranitidine. Gellan-based in situ gastro retentive floating system could be advantageous in terms of increased bioavailability of AG to maintain an effective drug conc. in gastric fluid as well as in serum for longer period of time.

Keywords : andrographolide, floating drug delivery, in situ gelling system, gastroretentive system
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020

Open Science Index, Mathematical and Computational Sciences Vol:14, No:12, 2020 publications.waset.org/abstracts/4099.pdf