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Priyanka Sinha, Ubaidulla Udhumansha, Grace Rathnam, Mani Ganesh, Hyun Tae Jang

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CAPECITABINE ENCAPSULATED CHITOSAN SUCCINATE-SODIUM ALGINATE MACROMOLECULAR COMPLEX BEADS FOR COLON CANCER TARGETED DELIVERY: *IN VITRO* EVALUATION

Priyanka Sinha[a], Ubaidulla Udhumansha*[a], Grace Rathnam, Mani Ganesh[b], Hyun Tae Jang[b]

[a]Department of Pharmaceutics, C.L. Baid Metha College of Pharmacy, Chennai, India

[b]Department of Chemical Engineering, Hanseo University, Seosan-si 356 706, South Korea,

ABSTRACT

The present study aims to investigate the efficacy of the novel biopolymeric complex multiparticulate system consisting of chitosan succinate and alginate for the capecitabine-targeted delivery to colon cancer. A Box-Behnken design was used to optimize the CS-SA beads by considering the effect of three factors: CS (A;X1), $CaCl_2$ (B;X2), and SA (C;X_3), on the response variables Y_1 (EE), Y_2 (Size), and Y_3 (Release). The results of response surface plots allowed an optimized bead to be identified with high drug EE and maximum drug release at colon. The swelling index showed that the beads reached a maximum good swelling at pH 7.4, and nil or little swelling at acidic pH, which proves that the beads completely protect the release of drug. The *in vitro* release portrayed a maximum release at pH 7.4, due to the large swelling force that was created by electrostatic repulsion between the ionized carboxylic acid groups of the CS-SA network. *In vitro* cytotoxicity assay (MTT) of CS-SA beads shows inhibition of the proliferation of HT-29 tumor cell to induce apoptosis over a longer period of time. The above results show that CS-SA beads prolong the release of CP in the colonic region, and also enhance antitumor efficacy.

Keywords: Chitosan Derivatives, Colon targeting, Colon cancer, Capecitabine, Chitosan Succinate