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‹ Development of Colon Targeting Tablet of a JAK Inhibitor to Combat Chronic Ulcerative Colitis: A Novel Approach for Local Drug Delivery up Polyacrylamide Grafted Gum Acacia (GA-g-PAM) Graft Copolymer as Efficient Polymeric Scaffold ›

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Curcumin Loaded Eudragit S100/PLGA Nanoparticles in Treatment of Colon Cancer: Formulation, Optimization, and in-vitro Cytotoxicity Study

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Abstract:

Introduction: Polymeric nanoparticles provide a promising strategy for site-specific delivery of dietary phytochemicals in the treatment of colon cancer. Curcumin (CU) is a dietary phytochemical with well-proven anti-cancer activity in colon cancer. However, its clinical application is confined because of its hydrophobicity, lack of selectivity towards tumor tissues, and poor bioavailability. **Objectives:** The main objective of the study was to enhance the selectivity and cytotoxicity of poorly water-soluble curcumin by fabricating polymeric nanoparticles (NPs). **Methods:** In the present investigation, localized delivery of CU to the colon was achieved by employing a combination of Eudragit S100 (ES100), as a pH-sensitive polymer and polylactic-co-glycolic acid (PLGA), as a biodegradable polymer. The curcumin loaded dual-functional NPs were prepared by nanoprecipitation method and optimized using Box-Behnken experimental design. Results: The *in-vitro* cytotoxicity study of Curcumin Nanoparticles (CU-NPs) in CT26 murine colon carcinoma cells showed higher cytotoxicity in comparison to free drugs. The IC_{50} values of free curcumin and NPs containing curcumin was found to be 1.43±0.08 *µ*g/ml and 0.25± 0.12 *µ*g/ml, respectively (p <0.05). **Conclusion:** The results of the study suggested that the dual functional polymeric NPs exhibited a remarkably promising carrier system for effective delivery of such poorly water-soluble dietary phytochemicals in colon cancer.

Key words: Colon cancer, Curcumin, Nanoparticles, Cytotoxicity, Nanoprecipitation, Box-Behnken.

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