Fabrication, Optimization and Characterization of Paclitaxel and Spirulina Loaded Nanoparticles for Enhanced Oral Bioavailability

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Abstract | References | Citations | Supplementary Data

Background: Paclitaxel and spirulina when administered as nanoparticles, are potentially useful.

Methods: Nanoformualtions of Paclitaxel and Spirulina for gastric cancer were formulated and optimized with Central composite rotatable design (CCRD) using Response surface methodology (RSM).

Results: The significant findings were the optimal formulation of polymer concentration 48 mg, surfactant concentration 45% and stirring time of 60 min gave rise to the EE of (98.12 ± 1.3)%, DL of (15.61 ± 1.9)%, mean diameter of (198 ± 4.7) nm. The release of paclitaxel and spirulina from the nanoparticle matrix at pH 6.2 was almost 45% and 80% in 5 h and 120 h, respectively. The oral bioavailability for the paclitaxel spirulina nanoparticles developed is 24.0% at 10 mg/kg paclitaxel dose, which is 10 times of that for oral pure paclitaxel. The results suggest that RSM-CCRD could efficiently be applied for the modeling of nanoparticles. The paclitaxel and spirulina release rate in the tumor cells may be higher than in normal cells. Paclitaxel spirulina nanoparticle formulation may have higher bioavailability and longer sustainable therapeutic time as compared with pure paclitaxel.

Conclusion: Paclitaxel-Spirulina co-loaded nanoparticles could be effectively useful in gastric cancer as chemotherapeutic formulation.

Keywords: Paclitaxel; gastric cancer; nanoparticle; optimization; oral bioavailability; spirulina

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