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Novel self emulsifying nanocapsule formulation of curcumin - Optimization, *in vitro*, *in vivo* and cytotoxicity assessment

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The present work aimed to optimize curcumin loaded polymeric self emulsifying nanocapsule formulation for localised delivery in colon cancer. Enteric nanoparticulate formulation with self emulsifying ability was prepared using modified quasi emulsion solvent diffusion method and optimized using the Box Behnken design. Effect of formulation variables, namely, concentration of oil (caproyl® 90), polymeric emulsifier (Hydroxy propyl methyl cellulose acetate succinate -HF) and adsorbent (Aerosil® 200) was optimized, based on its impact on mean globule size and encapsulation efficiency. Drug release studies were performed using change over media (pH 1.2, 6.8 and 7.2 in presence of bile salts). Optimized formulation was analysed by roentgenographic studies in guinea pig to localise the movement of formulation through the GIT. Optimized formulation was also characterized for its cytotoxic efficacy using HT-29 human colon cancer cell lines. Optimized formulation consisting of capryol®90; 250 mg, HPMCAS-HF; 250 mg and Aerosil®200; 75 mg released only 8.12±0.23% curcumin in small intestine in 5 h whereas 80±0.41% drug release was observed in 24 h. Roentgenographic studies supported *in vitro* observations (assessed by the presence of radiopaque material containing curcumin in large intestine upto 24 h). Cytotoxicity studies confirmed enhanced cellular uptake of curcumin from the nanocapsule formulation. Results of the study demonstrated potential application of curcumin nanocapsule formulation in treatment of localised colon carcinoma.

Biography

Jyoti Wadhwa is a Research Associate, Department of Pharmacy, Banasthali University, Banasthali, Jaipur (India). She is pursuing PhD in Pharmaceutics, with specific research interests in lipid based drug delivery system, colon targeting and solubility enhancement of poorly soluble drugs. In her PhD work, she has developed self emulsifying formulation, using curcumin as the model drug. She has presented her research in various national/international conferences. She has been awarded Junior Research Fellowship (JRF) by UGC, New Delhi for the academic year 2009-10 and AAPS membership for young researchers from Catalent Pharma Solutions, U.S.A for year 2013. She wishes to further extend the scope of her work for treating/preventing local gut pathology.

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Rapid and high capacity adsorption of Pb (II) by Fe_3O_4/montmorillonite nanocomposite using response surface methodology

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Fe_3O_4/montmorillonite nanocomposite (Fe_3O_4/MMT/NCs) was synthesized for removal of lead, ion from aqueous systems. The nanoadsorbent was characterized by X-ray diffraction (XRD) and transmission electron microscopy (TEM) and mean diameter of magnetic nanoparticles was obtained about 8.24 nm. The experiments were designed by response surface methodology and quadratic model was used to prediction of the variables. The adsorption parameters of adsorbent dosage, removal time, and initial heavy metal ions concentration were used as the independent variables and their effects were investigated on the heavy metal ions removal. Variance analysis was utilized to judge the adequacy of the chosen models. Optimal conditions with initial heavy metal ion concentration of 510.16 mg/L, 120 s of removal time and 0.06 g of adsorbent amount were given 89.72% of removal efficiency for lead, copper and nickel ions, respectively. Prediction of models was in good agreement with experimental results and Fe_3O_4/MMT/NCs were found successful in removing Pb ions from aqueous solutions.

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