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A comparative evaluation of ethyl cellulose and ethylene vinyl acetate microcapsules of pioglitazone for controlled release

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The objective of the study is to prepare and compare the ethyl cellulose (EC) and ethylene vinyl acetate copolymer (EVA) microcapsules of pioglitazone for controlled release. Controlled release formulations are needed for pioglitazone because of its short biological half life and for better control of blood glucose levels to prevent hypoglycemia, to enhance clinical efficacy and patient compliance. EC and EVA microcapsules of pioglitazone were prepared by an industrially feasible emulsification – solvent evaporation method and the microcapsules were evaluated for permeability and drug release characteristics. The microcapsules prepared are spherical, discrete, free flowing and multi nucleate monolithic type. Microencapsulation efficiency was in the range of 96.34-104.30% in the case of EC and 95.0-101.25% in the case of EVA. Pioglitazone release from the microcapsules was slow over 24 hours and depends on core: coat ratio, wall thickness and size of the microcapsules in both the cases. Drug release from the microcapsules was by non-fickian diffusion mechanism. Good linear relationships were observed between wall thickness of the microcapsules and release rate in both the cases. EC microcapsules were more permeable than EVA microcapsules and gave relatively rapid release of pioglitazone. With very low permeability EVA microcapsules were found to be more suitable for the design of controlled release of pioglitazone.

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PH-sensitive controlled release formulation of sulfasalazine nanovehicles for oral colon specific drug delivery systems

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We have synthesized and formulated a ideal drug delivery system using layered double hydroxide nanoparticles for oral colon-specific delivery with positively charged layers coated with pH-sensitive materials on the nanoparticle surface offers many advantages mainly controllable drug release with improved bioavailability. Sulfasalazine, the drug of choice for IBD (inflammatory bowel diseases) such as rheumatoid arthritis and Crohn's disease, a model drug which was intended to deliver in colon were effectively loaded at 9.5% into these nanovehicle and protected under acidic environment (pH 1-2) with multiple enteric coating strategy using various anionic copolymers based on methacrylic acid and methyl methacrylate esters which offers as a shell gives composite material, When these hydrolyzed complexes were further delivered to the colon's pH, a controlled drug delivery with improvement in drug bioavailability about 20% was observed in comparison with the uncoated delivery system because of increase in the surface area exposure of the nanoparticles that mimic the gastrointestinal (GI) environment. These nanohybrids remained stable at stomach's acidic environment where as the particles released the drug efficiently at intestinal pH (simulated GI fluids). This approach can be affordable because at acidic pH sulfasalazine gets precipitated with minimal release and nanoparticles is not at all stable, that's the reason why the drug gets protected from the acidic environment for the delivery in nearly neutral pH with this, stability study approach gives the confidence regarding this approach for designing the delivery. All the data regarding synthesis and physical characterization that includes Fourier Transmission Infra Red spectroscopy, Transmission Electron Microscopy, Scanning Electron Microscopy, Brunauer, Emmett and Teller for surface analysis, chemical stability by Thermo Gravimetric Analysis and stability test in 0.1 M HCl was obtained and the outcome was admirable.

Biography

Ranjith kumar Kankala finished M.Pharm. from Kakatiya University in the branch of Pharmaceutics and did P.G Project from IIIM (CSIR Labs) Jammu on Prediction *In vivo* Phamacokinetics of Paclitaxel in Mice under the influence of Curcumin Analogue. At present he is a Doctoral Research Fellow in National Dong Hwa University working in the area of formulation and pre-formulation Studies of Nanomaterials and their Applications.

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