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Effect of polymer and formulation variables on properties of self-assembled polymeric micellar nanoparticles

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Chemotherapy is having various side effects and toxicities, and to overcome these problems nanoparticles are formulated. Nanoparticles accumulate in the tumor cells due to enhanced permeation and retention effect. A series of poly (d, l-lactide-co-glycolide) PLGA and bovine serum albumin (Fraction V) BSA formulations were fabricated and used as nanocarriers for delivery of a promising anticancer drug paclitaxel (PTX). The eight formulations of nanoparticles of PTX-PLGA and PTX-BSA were prepared by using 2^3 factorial designs. PLGA (A,) poly vinyl alcohol (PVA) (B) and stirring speed (C) was used as independent variables where particle sizes (Y1), entrapment efficiency (Y2) and % drug release (Y3) were taken as dependant variables. PTX was efficiently encapsulated into the micelles by de-solvation technique. The mean diameter of PTX-BSA and PTX-PLGA nanoparticles ranged from 104 to 1150 nm and 110 to 1023 nm respectively. The entrapment efficiency and *in vitro* drug release also depends on the solubility of drug and polymer in solvent. The use of design expert software is a systematic tool for optimization technique, and also helps to reduce number of runs. Hence, in the present work, an attempt was made to formulate, evaluate and optimize particle size and entrapment efficiency of PTX-BSA and PTX-PLGA nanoparticles.

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