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Preparation and Characterization of Peg-Albumin-Paclitaxel (PAP) Nanoparticles Intended to Treat Breast Cancer

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Abstract : The aim of the present research work is to prepare serum stable long circulating PEGylated paclitaxel-BSA nanoparticles for breast cancer and were prepared by desolvation technique. Prepared nanoparticles were characterized for drug entrapment efficiency (EE), particle size, scanning electron microscope (SEM), zeta potential, fourier transform infrared spectroscopy (FTIR) and differential scanning calorimetry (DSC). *In-vitro* release studies were performed in phosphate buffer saline pH 7.4 at 37˚±0.5˚C for 14 days. The in-vivo animal studies were performed for drug release studies for 21 days and cell viable assay was performed. The entrapment efficiency was about 90.5%, the mean particle size of obtained nanoparticles was 150-400 nm and was apparently spherical in shape, with smooth surface. The zeta potential is found to be -29 mV and the nanoparticles are found to be stable. Drug-excipient interaction studies were conducted by FT-IR studies, it demonstrated that the drug was not changed in the formulation during the fabrication process. The DSC results obtained also showed no significant shift in the endothermic peaks confirming the stability of the drug in the formulations and polymeric peaks revealed that drug is in amorphous state in the formulations. The paclitaxel-BSA nanoparticles exhibit a most interesting release profile with small initial burst followed by slower and controlled release.

Keywords : Paclitaxel, albumin, long circulating polymeric nanoparticles, PEGylation, desolvation, breast cancer.

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