

Preparation and evaluation of 5-fluorouracil loaded polycaprolactone nanoparticles by double emulsion technique

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5-Fluorouracil (5-FU) entrapped biodegradable polymer polycaprolactone (PCL) nanoparticles (5-FU-PCNs) were prepared by encapsulation of 5-FU into PCL based nanoparticles (PCNs) which were prepared via double emulsion method. First, the inner aqueous phase (W1) was added to dichloromethane solution containing PCL with homogenization to form primary emulsion (W1/O) which was emulsified with the outer aqueous phase (W2) containing polyvinyl alcohol (PVA) as stabilizer to attain the double emulsion (W1/O/W2). Versatile parameters were investigated to reach to the most successful formulation for 5-FU-PCNs such as effect of concentration of PCL for the 1st emulsion and concentration of PVA for 2nd emulsion on drug encapsulation efficiency (EE%)

and particles sizes. The different formulations of 5-FU-PCNs were characterized by X-ray diffraction (XRD), photon correlation spectroscopy (PCS) and atomic-force microscopy (AFM) methods. XRD analysis shows that the drug is dispersed at the molecular level in the polymer matrix. AFM images display great morphological differences between the initial components and 5-FU-PCNs depending on the composition. The various formulations of 5-FU-PCNs are mostly polydispersed in size and, in some cases, besides of uniform spherical nanoparticles, its contain microparticles in which several types of smaller dispersed particles were found.

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