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Effect of solvents on thedevelopment of biodegradable Polymeric nanoparticles of Nevirapine

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Abstract : The present research work was carried out with an objective of preparing Polycaprolactone nanoparticles for the brain targeted delivery of Nevirapine(an antiretroviral drug). The Nevirapine loaded Polycaprolactone nanoparticles were prepared by Emulsion solvent evaporation technique in three organic solvents (Ethyl acetate, Dichloromethane and Chloroform). In this aspect, the effect of organic solvents on the physicochemical characterisations such as Particle size, Zeta potential, Percentage drug entrapment efficiency (%EE), Percentage drug loading (%DL), Scanning electron microscopy(SEM) , Transmission electron microscopy(TEM)and *in vitro* release study of polymeric nanoparticles were carried out.On the basis of physicochemical characterisations, the appropriate solvent was chosen for preparing Polycaprolactone nanoparticles for Brain targeted delivery of Nevirapine. The percentage drug entrapment efficiency (%EE) was 39.4±0.48% for Ethyl acetate, 32.7±0.4%forDichloromethane and 19.8±0.16% for Chloroform. The SEM and TEM photomicrographs obtained showed smaller size below 50 nm in Ethyl acetate while between 50 nm to 100 nm in Dichloromethane and Chloroform. The result showed that the %EE, %DL and the Particle size distribution was directly proportional to the aqueous solubility of the organic solvents. Polycaprolactone nanoparticles prepared using Ethyl acetate showed smaller particle size (125.57±7.66) nm, having Polydispersity index (PDI) of 0.295±0.005 with an optimum zeta potential (-72.1mv) as compared with Dichloromethane and Chloroform.The nanoparticles prepared in Ethyl acetate showed the highest release of 84.8% than that of Dichloromethane and Chloroform. It can be concluded that the choice of solvents plays an important role in the physicochemical characterisation of Polymeric nanoparticles.

Keywords : Nevirapine, Nanoparticles, Polycaprolactone, Ethyl acetate, Brain delivery, Neurocognitive disorder.

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