Full factorial design optimization of anti-inflammatory drug release by PCL–PEG–PCL microspheres

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Description
A biodegradable triblock poly(ε-caprolactone)–poly(ethylene glycol)–poly(ε-caprolactone) copolymer was successfully synthesized by ring-opening polymerization of ε-caprolactone, and was characterized by intrinsic viscosimetry, ^{1}H nuclear magnetic resonance, infrared spectroscopy and X-ray diffraction. Copolymer microparticles loaded with ibuprofen were prepared by an oil-in-water (o/w) emulsion solvent evaporation process. They were carefully weighted and characterized through their zeta potential. In this work, 4 selected process parameters (shaking speed X_1, time of contact X_2, poly(vinyl alcohol) concentration X_3, and ibuprofen concentration X_4) were adjusted at 2 different values. For each of the 16 experimental conditions, repeated twice, the drug encapsulation efficiency of the microspheres was determined, according to the following definition: EE (X_1, X_2, X_3, X_4) = mass of encapsulated ibuprofen …