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Preparation and characterization of selenium nanoparticles incorporated within poly(ε-caprolactone)

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Drug delivery systems of nano- and micro-size represent a new generation of therapeutics that hold promise to become excellent tool in treatment of various diseases and disorders, which are resistant to currently available drugs. This study was performed in order to develop the selenium nanoparticles coated with poly(ε-caprolactone) (PCL), as a potential anticancer agent. Selenium nanoparticles (SeNp) were first synthesized by chemical reduction of sodium selenite, using ascorbic acid as reductant and bovine serum albumin as stabilizer. Obtained SeNPs, with average diameter of ~80 nm, were then incorporated within PCL applying emulsification and freeze drying methods. The final microparticles of PCL/SeNp were characterized by Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). Efficiency of encapsulation of SeNp within PCL particles was determined with inductively coupled plasma atomic emission spectroscopy (ICP-AES) analyses.