ABSTRACT

Charles University in Prague, Faculty of Pharmacy in Hradec Králové

Department of Pharmaceutical Technology

Mentor: PharmDr. Ondřej Holas, Ph.D.

Student: Martina Nekolová

Title of thesis: Polymeric nanoparticles for poorly water-soluble drugs delivery

Polymeric nanoparticles represent a modern drug form. One of the main advantages is influencing the pharmacokinetic properties of the administered substance - e.g. increasing solubility in water. They enable the targeted delivery of the drug to the affected tissue and this way minimize adverse effects. This could be of great benefit to the therapy of cancer or inflammatory diseases. Both the target tissue and the nanoparticles must have some specific properties. For particles, it is, for example, size and surface charge.

The aim of this work was to prepare nanoparticles with a substance poorly soluble in water, represented by curcumin. The particles were prepared by the nanoprecipitation method with different types of poly(lactic-co-glycolic acid) (PLGA) copolymer. A 50:50 linear PLGA polymer and a branched PLGA A2 polymer were used. The prepared nanoparticles were compared on several parameters – particle size and polydispersity, encapsulation efficiency (EE), drug-loading capacity (DLC) and dissolution profile. PLGA 50:50 was found to provide nanoparticles with a larger size but at the same time with greater polydispersity. EE and DLC were evaluated by spectrophotometer. PLGA A2 samples generally showed higher EE and DLC values. Increasing the weight of the used polymer increased the size of the particles, but the EE and DLC values remained low for both polymers – so the ability of the particles to encapsulate the substance did not increase. During the dissolution test, it was found that a larger amount of curcumin was released from the PLGA A2 particles.

Key words: Nanoparticles, polymers, curcumin, biodegradability, targeting