ABSTRACT

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Title od thesis: Dissolution study of PLGA nanoparticles

PLGA nanoparticles are used as nanoparticle carrier systems for targeted distribution and controlled release of drugs.

The aim of this diploma thesis was to prepare PLGA nanoparticles with encapsulated fluorescein and dexamethasone acetate and subsequently dissolve them in various media. Fluorescein as a model substance was chosen because of its low solubility in water, which is close to that of dexamethasone acetate.

Nanoparticles were prepared by the nanoprecipitation method. The following dissolution media were chosen for fluorescein dissolution: 0.01M PBS, saline, acetate buffer, and artificial lysosomal fluid (ALF). Dissolution of PLGA nanoparticles with dexamethasone acetate was performed in 0.01 M PBS. The nanoparticles were also evaluated for size, PDI, zeta potential and encapsulation efficiency.

The willingness of fluorescein to release from PLGA nanoparticles decreased in the order: acetate buffer saline, 0.01M PBS and ALF. Lowering the pH of the dissolution medium from 7.4 (PBS, saline) to 5.5 (acetate buffer) resulted in the release of approximately twice as much fluorescein in the same time. Lowering the pH to 4.5 (ALF) did not further accelerate or enhance release.

When dexamethasone acetate was dissolved to 0.01M PBS, 80% was released in 48 hours. The maximal amount of fluorescein released into the same medium was 68% during 4 hours.

Keywords: PLGA, nanoparticles, fluorescein, dexamethason-acetate, dissolution