

ABSTRACT

CHARLES UNIVERSITY

FACULTY OF PHARMACY IN HRADEC KRÁLOVÉ

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

Author: Vlastimil Barák
Title of Diploma thesis The influence of formulation factors on the characteristics of terbinafine loaded nanoparticles
Supervisor: PharmDr. Eva Šnejdrová, Ph.D.
Consultant: Mgr. Juraj Martiška

The diploma thesis is focused on biodegradable polymer nanoparticles loaded by terbinafine based on the copolymer of glycolic and lactic acid branched on polyacrylic acid. The nanoprecipitation method was employed, and the influence of formulation factors on nanoparticle characteristics was studied. The following formulation factors were the concentration of the polymer, the amount of terbinafine, and the concentration of surfactant. Nanoparticles of 120 nm to 300 nm were obtained depending on the preparation conditions. The nanoparticle polydispersity was in all cases from 0.080 to 0.230. The prepared nanoparticles were stable, as evidenced by zeta potential values above 38 mV. A positive zeta potential is desirable for dermal and mucosal adhesion in the topical and ocular application of nanoparticles with terbinafine. The amount of polymer used to form nanoparticles has the greatest effect on particle size. With increasing polyester concentration in the internal phase, the size of the nanoparticles increased. The impact of terbinafine and surfactant concentration on nanoparticle size was significantly lower. Cetrimide created generally smaller nanoparticle than didodecyldimethylammonium bromide. The particle size is also influenced by the amount of internal phase. The size of the nanoparticles increased with increasing ration of the inner phase.

Keywords: polymeric nanoparticles, branched polyesters, PLGA, particle size, terbinafine, zeta potential, polydispersity.