ABSTRACT

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Title of thesis:	Preparation and evaluation of lipid based nanoparticles as drug carriers

Solid lipid nanoparticles (SLN) and nanostructured lipid carriers (NLC) are promising drug delivery systems. Their capability to encapsulate both hydrophilic and lipophilic molecules, biocompatibility and biodegradability of lipids make them a suitable alternative for well-established drug carries.

The aim of this thesis was to determine suitable ratios of composition of nanoparticles with acceptable properties (especially reduced size and polydispersity, high zeta potential absolute values), to investigate status and thermodynamic behaviour of the nanoparticles and lipids used and to examine drug encapsulation efficiency. Nanoprecipitation method was used to prepare nanoparticles from stearic acid as a solid lipid and in the case of NLC preparation isopropyl myristate as a liquid lipid was used. Kolliphor® P 188 as a surfactant and Span® 20 as a co-surfactant were the best choice to meet intended characteristics. It was shown that usually lower the concentration of surfactant and co-surfactant was the smaller nanoparticles were produced. In the selected final formulation, differential scanning calorimetry analysis was performed to investigate status and structural properties of lipids and nanoparticles. Obtained results suggest incorporation of nonsteroidal anti-inflammatory drug indomethacin in the structure of nanoparticles. High-performance liquid chromatography analysis was carried out to determine encapsulation efficiency of the final formulation.

Keywords: lipid nanoparticles, solid lipid nanoparticles, nanostrucutred lipid carriers, drug-delivery systems, precipitation method