1. ABSTRACT

Diploma thesis concerns with the evaluation of the basic properties of the nanofibre membranes that are made of polyvinylalcohol, chitosan and (D,L) polylactic acid in connection with their possible use as carriers of drugs. Thesis characterizes electrospinning as a method of production of nonwoven textiles and nanofibre materials, polymers that were used in preparation of the nanofibre membranes under experiments, and testing methods that were used. Transdermal pharmaceuticals declared in the AISLP database were summarized in the connection with their possible use in drug administration.

The selected physical characteristics of three chemical types of the nonwoven nanofibre membranes made in laboratories ELMARCO Liberec were investigated. The tensile stress properties, hydrophile-lipophile character of surface and absorption-release properties of the membranes were studied at a permeation in vitro study using caffein as a model drug in the experimental part of my work.

Tensile properties of membranes are affected by previous radiation sterilization and direction of testing. General characterization of all membranes was not found. Chitosan membrane becomes firmer material after sterilization and it is also tougher in transverse tensile force. PLA membrane is weak after sterilization and also transverse tensile force of it is weak. In wetting measurements, all membranes were water-unwettable, thus water resistant. Within the unsterilized samples PVA membrane is the most lipophilic and Chitosan membrane is the most hydrophilic. In sterilized group of samples PVA is the most lipophilic and PLA is the least. All three membranes become more hydrophilic after sterilization.

At absorptivity testing all membranes were able to keep some quantity of hydrophilic liquid - PVA membrane the most, Chitosan membrane the least. At the release-permeation tests all membranes behaved in the same way and they afforded lower concentration of caffeine in acceptor liquid and release a less amount of the drug than controls, so they retard permeation. PLA membrane limits caffeine permeation the most, PVA retards it the least.

Obtained outcomes are part of the wider study at UK-FaF in Hradec Králové.