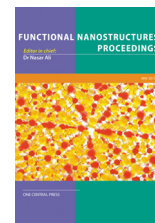


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# Hydrocortisone Acetate and Sodium Succinate Liposomal Preparations for Ophthalmic Application using Microfluidics

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## ABSTRACT

Liposomes are used in ophthalmic preparations to increase the corneal contact time and uptake of hydrophilic and hydrophobic APIs of ocular preparations [1] [2]. Microfluidic chips could be used as a continuous manufacturing process to produce nanoparticles [3]. The aim of this experiment was to investigate the critical process and formulation factors in the liposomal preparation of hydrocortisone through microfluidic device. Three factors were investigated in this study: flow rate ratio (FRR), drug concentration (DC) and total lipid concentration (TLC). Liposomes particles size (PS), polydispersity (PDI) and drug entrapment efficiency (EE %) were selected as responses. Minitab software was used to construct a central composite design (CCD) to analyse the importance of these parameters. A microfluidic device (Y- type, 2 inlets) was used to produce a liposomal formulation for ophthalmic application. Hydrocortisone Acetate (HCA) and sodium succinate (HSS) were used as a model drug to investigate the effect of drug hydrophilicity on liposomes size and encapsulation efficiency. Lecithin and cholesterol were used as lipid. The obtained results show the FRR of water/ alcohol was the significant factor for both drugs in term of PS, PDI and (EE %). TLC and DC have an effect in case of HCA but not in case of HSS. The Highest drug EE% is 65 % for HSS and 29% for HCA. The design space for the physical characteristics (CQA) of liposomes was determined successfully with respect to the intended use.

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