



Phase Behavior of Dried – DDA Liposomal Formulation Dispersed in HPMC Matrix in the presence of Saccharides

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Abstract : The present study describes the effect of saccharides and hydroxypropyl methylcellulose (HPMC) matrix on phase behavior of dehydrated cationic dimethyldioctadecylammonium (DDA)-based liposomes. Saccharides such as sucrose, lactose and mannitol, have been reported to preserve the lipid membranes during drying, whilst HPMC matrix is widely used in solid dispersion to prevent aggregation and/or recrystallization. The study revealed that addition of sucrose and HPMC in the formulation demonstrated a miscible mixture that might construct a stable dried liposomal formulation. DTA data showed that sucrose (5% w/v) and HPMC added to DDA liposomal formulation were relatively more miscible with the mixtures; whereas lactose and mannitol at the same concentration of 5% showed phase separation from the mixtures in the dehydrated state. Furthermore, XRD and SEM analysis exhibited supporting evidences in which formulation using sucrose and lactose showed relatively less crystalline-forming properties compared to formulation using mannitol. Recrystallization that cause phase separation might trigger leakage and further affect the efficacy of the entrapped drug/antigen. From these data, it might be concluded that a dried-liposomal formulation can be prepared in the presence of sucrose (lyoprotectant) that is dispersed in HPMC matrix. The protective mechanism of sucrose (5% w/v) and HPMC matrix is proposed through inhibition of the recrystallization which causes phase separation; indicated by DTA, SEM and XRD data. The present study revealed prospective advantages of using sucrose and HPMC in development of dried – DDA liposomal formulations.

Keywords : Liposomes, DDA, Sucrose, Lactose, Mannitol, HPMC, Phase Separation.

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