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Study on the effects of polyethylene glycol chain length on chlorpheniramine maleate niosomes

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Background and Aims: Different factors such as pH, ionic strength, polarity and dielectric constant of hydration media could affect on vesicular size. Consequently, several formulation characteristics like release of entrapped material and stability would be changed following size alteration. The present study was designed to evaluate the effect of polyethylene glycol (PEG) incorporation on chlorpheniramine maleate (CPM) niosomal characteristics.
Methods: Sorbitan esters (Span 20, 40, 60 and 80), their polyxylated derivatives (Tween 20, 40, 60 and 80) and cholesterol were used for preparation of niosomes by film hydration method. Different molecular weight PEGs from 1500 to 35000D were incorporated in hydration medium to evaluate the volume diameter, drug release profile, CPM encapsulation efficiency and vesicular stability.
Results: Round and tubular multilamellar vesicles (MLVs) were formed. Span/Tween 80 could not form vesicles in the presence of PEGs due to unsaturated oleyl alkyl chain in the utilized surfactants. Generally, the PEG chain length increment resulted in CPM encapsulation efficiency and niosomal volume diameter. Vesicular aggregation, cholesterol crystal separation and size change during storage were reduced by incorporation of medium PEG chain length.
Conclusions: Formulation of stable vesicular niosomes for entrapment of water soluble molecules such as CPM can be achieved by incorporation of water soluble polymers such as PEGs. Therefore, many factors would be kept in mind for vesicular modification attempts.

Keywords: Polyethylene glycol; Chlorpheniramine; Niosomes