SAXS STUDIES OF DMPC AND DPPC-DIMERIC SURFACTANT LIPOPLEXES

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Dimeric surfactants are a new class of surfactants. They show significantly improved properties in comparison to conventional (monomeric) surfactants. The dimeric surfactants are characterised by critical micellization concentration (CMC) much lower than that of a classic (monomeric) surfactants with equivalent hydrophobic chain length. Dimeric surfactants are also a good surface tension reducers, much more efficient than the corresponding monomeric surfactants [1-3].

The aim of this study was to analyse the effect of different concentrations of dimeric surfactant on the disturbance or stabilisation of particular phases of phospholipids in its mixtures. The study was performed on 1,2-dimyristoyl-sn-glycero-3-phosphocholine (DMPC) and 1,2-dipalmitoyl-sn-glycero-3-phosphocholine (DPPC) and derivative of 1,1'-(alkyl)bis 3-alkyloxymethylimidazolium chloride.

A series of the SAXS data sets were collected in MaxLab, at Beam Line 7-11 (Lund, Sweden) [4]. The data were collected at temperatures from 6 to 30°C for DMPC and from 10 to 45°C for DPPC using the synchrotron radiation (λ = 0.107 nm) and the Mar 165 CCD detector. The scattering vector range was $0.05 < s < 3.42$ nm^{-1}.

All data sets were processed (normalized to the incident beam intensity, corrected for detector response and the scattering of the buffer was subtracted) using the computer programs BLI7-11 [4] and PRIMUS [5].

The SAXS results implied a gradual disappearance of the lamellar phase typical of DMPC and DPPC and a probable formation of the mixed liposomes. Also the temperature range of the main phase transition in DMPC was shifted towards lower temperatures.

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