Calorimetric Studies on Saturated Mixed-Chain Lecithin-Water Systems. The Nonequivalence of Acyl Chains in the Thermotropic Phase Transition.

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Abstract

Calorimetric measurements were performed on various lecithin-water systems in which the lecithins, analogously to the naturally occuring ones, have different fatty acid residues in the 1 and 2 position of the glycerol backbone. The data show that variation of the acyl chains either have no influence upon, or contribute 0.5 Kcal/mol per CH_2-segment to the phase transition enthalpy.
Futhermore one can conclude that the effectively shorter chain in the mixed-chain lecithins determines, regardless of its position, the magnitude of the transition enthalpy ΔH_m.
The pre-transition behaviour is determined by the effective chain lengths and their position on the glycerol backbone. In one case (1M-2S-PC) it could be shown that there is no calorimetrically detectable pre-transition. Thus , in order to understand the phase transition behaviour of phospholipid-water systems it is not enough to know only the number of CH_2-segments but also equally important are the effective chain lengths and the positions on the glycerol backbone.