

THE EFFECT OF pH ON THE INTERFACIAL TENSION OF BILAYER LIPID MEMBRANES FORMED FROM PHOSPHATIDYLCHOLINE OR PHOSPHATIDYLSERINE

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The aim of this work is to describe the adsorption of H⁺ and OH⁻ ions on the phosphatidylcholine (PC) or phosphatidylserine (PS) layer for a wide range of pH, defining the influence of the pH of electrolyte solutions on the interfacial tension of PC or PS membranes.

The interfacial tension (γ) of the lipid bilayer was determined by measuring the curvature radius (R) of the convex surface formed by applying a pressure difference (Δp) on membrane both sides. The apparatus and the measurement method were described in elsewhere [1, 2].

Egg PC (99%) from Fluka and 3-sn-phosphatidyl-L-serine from bovine brain (99%) from Fluka was used in the experiment. Buffers of 2-12 pH ranges were prepared according to Britton and Robinson.

The effect of the pH of electrolyte solutions on the interfacial tension of lipid membranes formed of PC or PS was studied. Models were presented to describe the adsorption of H⁺ and OH⁻ on the lipid membranes quantitatively for the entire range of pH, i.e. from 2 to 12. The interpretations were performed in terms of the assumed model in which the PC or PS membrane surface is a continuum with uniformly distributed functional groups constituting the centres of adsorption for the H⁺ and OH⁻ groups. The contributions of individual forms of the PC or PS molecule to the interfacial tension were assumed to be additive. The models which describe the dependence of the interfacial tension of the bilayer on pH terms of PC or PS molecule form influence on tension fit the behaviour of the membranes for better than the description based on the Gibbs's isotherm [2].

REFERENCES

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2. Petelska, A.D. and Figaszewski, Z.A. Effect of pH on the interfacial tension of bilayer lipid membrane. **Biophys. J.** 78 (2000) 812-817.