

**MIKROCALORIMETRIC STUDIES ON THE INTERACTION
OF N-DODECYL-N,N-DIMETHYL-N-BENZYLAMMONIUM HALIDES
WITH PHOSPHATIDYLCHOLINE BILAYERS: A COUNTERION
EFFECT**

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N-dodecyl-N,N-dimethyl-N-benzylammonium halides (DBeAX), like many other amphiphilic quaternary ammonium salts, show biological activity. One of these halides is a major component of "benzalkonium chloride", which is widely used as an antiseptic in pharmaceutical preparations.

The mechanism responsible for the antimicrobial action of surfactants is not clearly understood, particularly the role played by counterions in the biological activity of surfactants. In order to elaborate on how counterions affect the properties of biological membranes, we studied the effect of amphiphilic quaternary ammonium salts on the thermotropic properties of the phosphatidylcholine bilayer by means of differential scanning calorimetry. In the case of two series of the halides (N-dodecyl-N,N,N-methylammonium and N-dodecyl-N,N-dimethyl-N-benzylammonium), we found that added surfactants decreased the main phase transition temperature, and that this decrease depends on the type of counterion. Besides this, we showed that surfactants were able to form surfactant-poor and surfactant-rich domains, and that the kind of counterion influenced domain formation.

In this study, the micellization and then interaction of DBeAX (X= Cl⁻ Br⁻ and I⁻) with liposomes formed from DPPC and DPPC containing 5 and 20 mol% of cholesterol were studied by means of high sensitivity isothermal titration calorimetry (ITC). We present and analyse the effect of counterions on the titration curves. The obtained results contribute to a better understanding of the counterion effect in the biological activity of surfactants.

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