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Complexes of oligoethylenimines and dicationic surfactants with polyacrylic acid

Homologous series of polyacrylic acid (PA) and sodium polyacrylate (PA-Na) were studied in aqueous solution, as well as in a phosphate-buffered saline (PBS) at a temperature of 37° C, which simulates physiological conditions. The studies were carried out at neutral and acidic pH. The conformation characteristics of PA macromolecules in PBS at 37° C was investigated for the first time, the role of excluded volume effects in their structure in solution was analyzed.

The complexation processes of polyacrylates with oligoethylenimines of various lengths, with a variation in the ratio of components and pH of the medium, have been studied in detail. It was established that at acidic pH, the amino groups of oligoethylenimines are protonated, which leads to the formation of their complexes with PA.

The studies of complexation of PA-Na samples of various molar masses with diethylenetriamine have shown that both individual macromolecules and their complexes are always present in solutions. At the same time, the transition of the pH of the media from neutral to acidic leads to increase of the complex concentration. The complexation processes with dicationic surfactant molecules in a PBS were studied. It was found that the main factors in the complexation process are the ionic strength of the solution and the chemical structure of the ionic group of the surfactant.

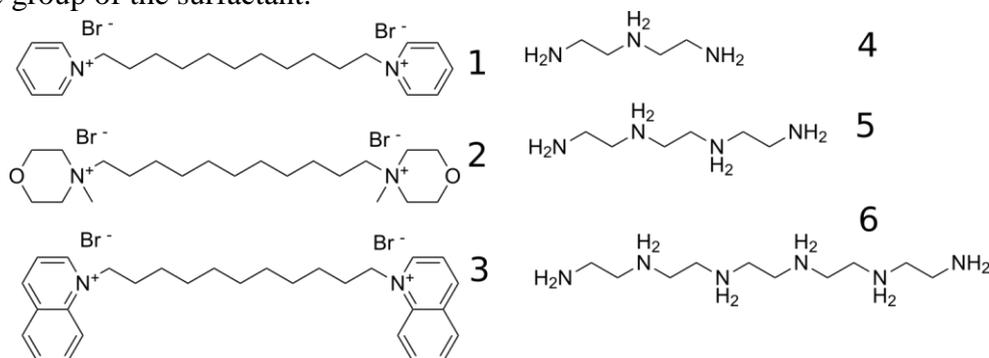


Figure 1. Chemical structure of dicationic surfactants (1, 2, 3) and oligoethylenimines (4, 5, 6) used for complexes formation

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