

Structural aspects in saccharide-derived micelles studied by a spin probe technique.

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Streszczenie

Electron paramagnetic resonance spectroscopy (EPR) was used in this study to monitor micellization behavior of selected saccharide-derived surfactants in aqueous solutions by measuring the spin probe parameters of nitroxide labeled entities (5- and 16-doxylstearic acid methyl esters) as a function of temperature and surfactant concentration. A group of aldonamide-type surfactants of the following architecture was selected: a single-head single-tail structure (i.e., *N*-dodecyl-*N*-methylgluconamide—C₁₂MGA), a dicephalic representative (i.e., *N*-dodecyl-*N,N*-bis[3-*D*-gluconyl-amido)propyl]amine—C₁₂DGA and *N*-dodecyl-*N,N*-bis[3-*D*-lactobionylamido)propyl]amine—C₁₂DLA) and gemini one (i.e., *N,N'*-bisdodecyl-*N,N'*-bis[(3-*D*-gluconyl-amide)propyl]ethylenediamine—bis(C₁₂GA)). The anisotropy effect in the EPR spectra proved that molecules of the used spin probes penetrate effectively the studied micelles. Taking into account that the rotational correlation time magnitude correlated well with the probe mobility, the structure of formed aggregates and their microviscosity were achieved. It was found that the calculated values of rotational correlation times were relatively high and indicated large inhibition of rotations of the studied nitroxide probe molecules. The microviscosity of micelles increased slightly with the increase in surfactant concentration. Slope coefficients of the obtained temperature dependences under the studied concentration range were almost the same for both spin probes indicating the spherical shape of the aggregates. Our results show effectiveness of EPR technique for investigations of micelle formation and their molecular microenvironment.

Słowa kluczowe

Sugar surfactants, Micelles, Electron paramagnetic resonance, Spin probe, Correlation time

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