Surfactant Gradient MEKC as a Base System of Multi-Mode CE

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Electrokinetic separation of benzoates as model organic anions was investigated using mixed micellar solutions of CTAC and Tween 20 possessing polyether chains, where electroosmotic flow was eliminated virtually. Addition of an adequate amount of Tween 20 to the pure CTAC system decreased the electrostatic interaction between CTAC and the anionic analytes significantly to give remarkably improved separation of the analytes, though the analysis time was increased markedly. Under the present conditions, the cationic micelles migrate fastest compared with all of the anions and thus, the mixed micelles of the surfactant composition in the inlet reservoir can pass through and interact with all of the analytes before they are detected. This means we can perform surfactant gradient elution by simply changing the inlet reservoir including running solutions of different compositions of the surfactants during a single run. The model anions were separated completely within a reasonable time using a gradient program for the concentration of Tween 20 in the presence of CTAC of a fixed concentration. The present surfactant gradient method can be extended to separation of organic cations such as biological amines simply using anionic surfactant systems like the mixed systems of SDS and Tween 20. Similar surfactant gradient methods would be potent ones in the separation of neutral analytes with a large range of hydrophobicty. Furthermore, the present method will enable us perform multi mode separation using some different ionic selectors in turn in a single run. Such situation would give us novel selectivities in separation.