

Abstract

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Title of diploma thesis: Development of microemulsion electrokinetic chromatography method for the analysis of illegal fat-soluble foodstuff dyes

A microemulsion electrokinetic chromatography (MEEKC) method was developed and proposed for the determination of fat-soluble dyes (Sudan I, Sudan II, Sudan III, Sudan Red 7B, Sudan Orange G, and Methyl Red) illegally used in foodstuffs. The effect of surfactant, co-surfactant, organic modifier and oil as well as the capillary length were examined in order to optimize the separation. Final background electrolyte (solution of the microemulsion) for MEEKC was composed of 30mM phosphate buffer (pH 7.5), 1.2 % (w/v) sodium dodecyl sulfate, 1.2% (v/v) of n-hexane, 15% (v/v) of butan-1-ol, and 20% (v/v) of acetonitrile. A baseline separation of these six dyes was achieved within 11 min by using fused-silica capillary with 75 μm i.d. and effective length 36.5 cm. The applied voltage was 20 kV and temperature 25°C was maintained. The VIS detection wavelengths were 500 and 400 nm. The repeatability of the migration times and peak areas were characterized by RSD values ranging from 0.3 to 0,9 % and 1.7 – 2.7% (n = 5), respectively. The calibration curves were linear for all analytes ($R^2 \geq 0.9990$) and the limits of detection ranged from 0.19 $\mu\text{g/ml}$ (for Sudan III) to 1.27 $\mu\text{g/ml}$ (for Sudan Red 7B). The method devised is suitable for the analysis of suspected foodstuffs after appropriate sample pretreatment to eliminate matrix effects and to achieve sample pre-concentration.