METHOD DEVELOPMENT FOR THE ANALYSIS OF BETA-CAROTENE AND ASTAXANTHIN BY CAPILLARY ELECTROPHORESIS

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ABSTRACT

Oil-in-water (o/w) and water-in-oil (w/o) MEEKC were investigated for the separation of beta-cartoene and astaxanthin. Due to the instability of the carotenoids in acid pH (2.5), o/w MEEKC at acid pH was not suitable. O/W microemulsion with basic pH (9.2) gave poor separation and sensitivity for both carotenoids because of highly hydrophobic nature and solubility problems. The second approach, w/o MEEKC offered complete resolution of both carotenoids due to its unique separation mechanism. Development of w/o MEEKC optimum condition was investigated by varying injection time, oil and surfactant types, surfactant and water compositions, additional oils and capillary length. The w/o microemulsion buffer containing 9% (w/w) SDS, 80% (w/w) 1- butanol, 11% (w/w) 70 mM sodium acetate (pH 8), using temperature of 25°C, the separating voltage of -30 kV and the total capillary length of 32 cm (effective length 23.5 cm) was optimized. Detection was by a diode array detector at 475 nm with 40 nm bandwidth. Both carotenoids could be resolved within 9 min with a resolution of 4.9. Method linearity was good with r^2 of 0.997 for β-carotene and r^2 of 0.996 for astaxanthin over the concentration of 20-120 μg/ml. The method precision was excellent with % RSD of 3.1 % for migration time, 3.8 % for peak area of β -carotene and 1.1% for migration time, 3.4 % peak area for astaxanthin. Limits of detections were 3.5 and 4 μg/ml (%RSD= 5.3%) and limit of quantitations were 11.5 and 14 μg/ml (%RSD = 5.8 %) for beta-carotene and astaxanthin, respectively.

KEY WORDS: MICROEMULSION ELECTROKINETIC CHROMATOGRAPHY (MEEKC)/ BETA-CAROTENE/ ASTAXANTHIN

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