Analysis of Methylglyoxal in Water and Biological Matrices by Capillary Zone Electrophoresis with Diode Array Detection

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We describe a new method for the determination of methylglyoxal in water and biological matrices, using *o*-phenylenediamine as derivatising agent and solid-phase extraction followed by capillary zone electrophoresis with diode array detection. It has been established that 25 mM sodium phosphate running buffers at pH 2.2, 30 kV and 25ºC, allowed the best instrumental conditions for the optimum separation of methylglyoxal in a suitable analytical time (< 10 min), using a 75 µm inner diameter having an effective length of 45.1 cm uncoated fused-silica capillary with a extended light path, and the wavelength set to 200 nm. Under optimized instrumental conditions, good reproducibility of the migration time (< 1.1%), precision (< 5%), excellent linear dynamic range from 0.1 to 3.6 mg/L (r^2 = 0.9997) and low limits of detection (7.2 µg/L) were obtained for methylglyoxal measurements, using the internal standard methodology. Assays on laboratory-spiked tap and ground water samples allowed a remarkable accuracy, presenting yields of 95.0 ± 4.3 and 94.0 ± 1.1 % respectively, and good performance to determine methylglyoxal in beer and yeast cells suspensions matrices was also obtained at the trace level.

The present methodology is a cost-effective alternative for routine quality control analysis, showing to be reliable, sensitive and with a low sample volume requirement to monitor methylglyoxal in water and biological matrices.

References

Rosário, P., Cordeiro, C., Ponces, A., Nogueira, J.M.F.; *Electrophoresis* 2005, 26, 1760-1767.