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On-line pre-concentration for determination of glycosaminoglycans in cosmetic samples

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Capillary Zone Electrophoresis (CZE) was developed for separation and determination of Chondroitin Sulfate (CS), Dermatan Sulfate (DS) and Hyaluronic Acid (HA). Large-volume sample stacking using an EOF pump (LVSEP) was coupled with CZE for sensitivity improvement. A Background Electrolyte (BGE) for the separation consisted of 200 mM NaH_2PO_4, pH 4.0 and 200 mM butylamine. In addition, 0.5% w/v Polyethylene Glycol (PEG) was also added to the BGE to reduce sample adsorption on the capillary, thus improving precision of the system. The separation was performed using an applied voltage of -16 kV. For quantitative analysis of CS, DS and HA, the standard addition method was used to construct calibration curves, which were in the ranges of 100-300, 100-500 and 50-250 mg L^{-1}, respectively. Limits of detection and quantitation of the proposed method for determination of CS, DS and HA were 3.0, 5.0, 1.0 mg L^{-1} and 10.0, 15.0 and 3.0 mg L^{-1}, respectively. In addition, intra-day (n=5) and inter-day (n=3) precisions were investigated and found that the percentages of relative standard deviation of the migration time and corrected peak area were about 0.4% and 5.9% (for intra-day) and 0.5% and 5.4% (for inter-day), respectively. The developed method was first applied for determination of HA in cosmetic samples and found that the recovery percentages of HA were in the range of 95.3-104.4%, indicating high accuracy of the method. Therefore, the developed method was reliable and simple without complicated sample preparation. Moreover, this method will be further applied for determination of the HA in human cerebrospinal fluid for checking and monitoring the HA levels in patients with brain injury diseases.

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