Determination Of Aluminum By Capillary Electrophoresis-Direct UV-Detection

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Aluminum (Al) causes and catalyzes many diseases if it reaches a certain concentration in the human and animal bodies. So, the determination of Al has drawn attention in recent years [1-4].

In capillary electrophoresis (CE), cations like aluminum are determined either by indirect detection or by exploiting the complexation of the involved metal ions, also depending on the complexing properties of the specific metal ion. It provides an economic and sensitive method for the determination of cations due to its high separation efficiency, good repeatability, fast analysis, and low consumption of electrolytes and samples. Moreover, the capital and operating costs are significantly lower neither equipment nor costly column is needed in addition to low consumption of chemical reagents.

In this study, the determination of aluminium in pharmaceutical suspension and deo rolls by capillary zone electrophoresis (CZE) is described by the complexation with 2,2',3,4-tetrahydroxy-3-sulpho-5-nitroazobenzene (tetrahydroxyazon SN) at pH 4. The method was optimized by studying several experimental and instrumental parameters. Influences of buffer concentration and pH as well as the organic modifier content of the mobile phase, applied voltage and injection time on selectivity and efficiency were evaluated in detail.

To achieve the method a 75 µm i.d. fused silica capillary column (total length 75 cm, effective length 50 cm) and a mobile phase composed by 10 mM acetate buffer at pH 4 were used. Nicotinamide was suitable as an internal standard. The signals were detected at 210 nm. After elucidating the optimum conditions validation studies were carried out such as repeatability and linearity applying intra and inter-day injections. LOD and LOQ values were also calculated.

The CZE method was applied to the determination of Al in pharmaceutical suspensions and deo rolls samples after a simple pre procedure. Satisfied results were obtained using the complexation procedure.

In conclusion, the method could be used for the determination of Al and it is proposed to the laboratories that makes Al analysis.

References