

The Pitfalls of Fluoride Analysis in Plasma and Serum

An ion chromatographic method was developed for the determination of fluoride in plasma and serum. In the past fluoride concentration was determined using a fluoride specific electrode. This method has a long analysis time and requires a large amount of sample, with limited sensitivity. Ion chromatography has the potential to provide a faster and more sensitive analysis of fluoride in biological matrices. The ISU VDL received plasma and serum samples from a Bull and Cow known to be pasturing on reclaimed phosphate mining ground, potentially contaminated with fluoride. Samples and control samples were first analyzed using our routine ion chromatographic method for anions in water, and ocular fluid. This method produced a high value for fluoride in known normal plasma and serum samples. Protein precipitation prior to analysis by ion chromatography using this routine anion screen also resulted in high fluoride values. By switching ion chromatographic columns and mobile phases we were able to achieve appropriate and meaningful results and obtain normal fluoride values for normal serum/plasma samples. In our lab this method for fluoride in serum/plasma resulted in an LOD of 0.01 ppm and a LOQ of 0.1 ppm. With a few adjustments this procedure may also work well with other biological matrices, like liver, kidney, and bone.

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