QUICK AND INEXPENSIVE DETERMINATION OF OXALATE IN VEGETABLE SAMPLES WITH CPE/UV-VIS

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The analysis of oxalate is of great importance in food because of its effect on the human body. High oxalate concentration in the blood or urine accompanies a number of maladies including renal failure, vitamin deficiencies. It has also been implicated in the formation of kidney stones, in this case the precipitation of calcium oxalate within kidney occurs and this can cause renal tissue damage. Vegetables generally contain wide variations in oxalic acid, so that selective and precise methods for the determination of oxalic acid are very important\textsuperscript{[1]}.

A novel micellar mediated cloud point extraction (CPE) method has been developed for sensitive determination of trace amounts of oxalate by means of spectrophotometry. The method is based on ion-pairing formation of anionic complex produced by the reaction of oxalate with Mo(VI) with Toluidine blue (TB\textsuperscript{+}) being a cationic thiazine group dye at pH 6.0 and cloud point extraction of ion-pairing complex formed from aqueous solution using Triton X-114. The extracted surfactant rich phase is diluted with 1.0 mL of acidic ethanol and its absorbance is measured at 634 nm. The effects of analytical variables such as concentration of nonionic surfactant, reagents concentration (Mo(VI) and TB\textsuperscript{+}), incubation temperature and time, centrifugation rate and time, pH and buffer concentration on the CPE were studied in details and a set of optimum conditions was obtained. The calibration graph was highly linear in the range of 1.2–240 µg L\textsuperscript{-1}. The limit of detection (LOD) based on ratio of three times the standard deviation of the ten replicate blank measurements to slope of calibration curve (3σ\textsubscript{blank}/m) was 0.36 µg L\textsuperscript{-1} (n: 10) and the precision (as RSD) for determination of 10, 50 and 100 µg L\textsuperscript{-1} of oxalate was in range of 2.50-5.30% (n:5). The method was successfully applied to the speciative determination of soluble, insoluble and total oxalate in different vegetable samples after dilution of pretreated and digested samples with and without 30 mL of 0.2 mol L\textsuperscript{-1} H\textsubscript{2}SO\textsubscript{4} at 80 °C for 15 min.

REFERENCES