

Application of Scanning Electron Microscopy and X-Ray Evaluation of the Main Digestion Methods for Determination of Macroelements in Plant Tissue

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Abstract : Three commonly used digestion methods (dry ashing, acid digestion, and microwave digestion) in different variants were compared for digestion of tobacco leaves. Three main macroelements (K, Ca and Mg) were analysed using AAS Spectrometer Spectra AA 220, Varian, Australia. The accuracy and precision of the measurements were evaluated by using Polish reference material CTR-VTL-2 (Virginia tobacco leaves). To elucidate the problems with elemental recovery X-Ray and SEM–EDS analysis of all residues after digestion were performed. The X-ray investigation showed a formation of KClO_4 when HClO_4 was used as a part of the acids mixture. The use of HF at Ca and Mg determination led to the formation of CaF_2 and MgF_2 . The results were confirmed by energy dispersive X-ray microanalysis. SPSS program for Windows was used for statistical data processing.

Keywords : digestion methods, plant tissue, determination of macroelements, K, Ca, Mg

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