Abstract

The aim of this bachelor thesis was to determine the elements Se, Zn, Ca and Mg in plant samples using atomic absorption spectrometry with two different types of atomization. The both methods has been optimized for the determination of these elements. Optimization of a burner height which generally ranged between 6.0 and 7.0 cm and optimization of the flow rate of acetylene, air and nitrous oxide was needed for the method using flame atomization. It also has been set location of the hollow cathode lamp. Optimization of dilution of hydrochloric acid, the concentration of sodium borohydride and the flow rate of the sample was needed for the method of atomic absorption spectrometry with the chemical generation of volatile hydrides. Optimal conditions, which were found, were used for measurement method performance which are describe the method for the determination of individual elements. The limit of detection for selenium was 0,496 μg L^{-1}, for zinc was 6,01 μg L^{-1}, for calcium was 15,51 μg L^{-1} and for magnesium was 2,47 μg L^{-1}.

Optimal conditions were also used for determination of the elements in real samples which were prepared by decomposition of plant materials with nitric acid in a microwave oven. Samples were diluted to provide a measurable response and the auxiliary solution of potassium chloride was added to the some of them. Zinc, calcium and magnesium were determined by using atomic absorption spectrometry with flame atomization and selenium was determined by using atomic absorption spectrometry with the chemical generation of volatile hydrides. The results are introduced in units of mg L^{-1} a μg L^{-1} and they provide the information of the largest amount of individual elements found in the plant samples.