

Comparing micro-element profiles of various legumes conventionally grown in Serbia using an ICP-OES approach

DOBRIJEVIĆ D. (4), PASTOR K. (1), ILIĆ M. (1), AŽANSKI M. (1), SKENĐI A. (2), STEFANOVIĆ S. (2), PAPAGEORGIOU M. (2), VELICKOVA E. (3)

1 Faculty of Technology Novi Sad; University of Novi Sad, Novi Sad, Serbia

2 Department of Food Science and Technology; International Hellenic University, Thessaloniki, Greece

3 University SS Cyril and Methodius, Skopje, Macedonia

4 Faculty of Medicine; University of Novi Sad, Novi Sad, Serbia

Legume samples belonging to the following major botanical species: common beans (*Phaseolus* spp; n=17), faba beans (*Vicia* spp; n=8), field peas (*Pisum* spp; n=7) and grass peas (*Lathyrus* spp; n=6), were analyzed in this study. Samples were cultivated conventionally at the Institute of Field and Vegetable Crops in Serbia, in 2019. They were milled into flour and digested in a microwave oven, following a slightly modified and shortened method compared to the standard method for cereal grains, as provided by the manufacturer. About 0.5 g ($\pm 2\%$) of each flour sample was put in a teflon vessel, where 5 ml of 65% nitric acid and 2 ml of 30% hydrogen peroxide were added. The microwave power used was 800 W, with a total digestion time of 40 minutes, with additional 20 minutes for cooling down the sample vessels to room temperature. The clear liquid, obtained after sample digestion, was diluted with 2% nitric acid and put in a glassy vial till analysis on an ICP-OES, for micro-elements iron, copper, zinc and manganese. All samples were analyzed in triplicate. Summary statistics, MANOVA and PCA were performed using the SPSS 26.0. The mean contents for Fe, Cu, Zn and Mn, respectively, were as follows: 35.9, 4.3, 43.0 and 10.1 in mg/kg of common bean; 26.0, 3.0, 25.2 and 7.9 in mg/kg of faba bean; 41.4, 3.2, 18.4 and 7.2 in mg/kg of field peas; and 26.5, 3.0, 79.0 and 10.1 in mg/kg of grass peas flour. MANOVA revealed significant differences between faba beans, field peas and grass pea in Fe content, and between faba bean and field peas in Zn content. The Fe content was the highest in the field peas and Zn in grass pea. PCA analysis showed distribution patterns of micro-elements among investigated legumes. According to the WHO, iron deficiency is the most common nutritional problem in the world, and together with zinc supplementation is recommended for severe malnutrition and related disorders. Therefore, monitoring these micro-elements in selected legume cultivars is crucial since they could represent one of the important sources in the everyday diet.