Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
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ACCUMULATION AND AVAILABILITY OF TRACE ELEMENTS FROM SOIL INTO ORIENTAL TOBACCO GROWN IN MACEDONIA

Biljana Jordanoska[1*], Trajče Stafilov[2], Valentina Pelivanoska[1]

[1]Scientific Tobacco Institute, University "St.Kliment Ohridski"– Prilep, Laboratory of Quality Control of Soil, Water, Fertilizer and Plant material, Kičevska bb, 7500 Prilep, Republic of Macedonia
[2]Institute of Chemistry, Faculty of Science SS. Cyril and Methodius University, Arhimedova 5, 1000 Skopje, Republic of Macedonia

Abstract

Tobacco is one of the most important agricultural products in the Republic of Macedonia. Elemental composition of tobacco and soil from different agricultural areas was studied for monitoring purposes. The main purpose was to determine the intensity of accumulation of various elements in tobacco plants and to determine possible relationships between certain chemical and physical properties of soils (pH, clay, cation exchange capacity - CEC, organic matters - OM and total organic carbon - TOC). Total and DTPA (diethylenetriaminepentaacetic acid) extractable concentration of eighteen elements (Ag, Al, Ba, Ca, Cr, Cu, Li, Fe, K, Mg, Mn, Na, Ni, Pb, P, V, Sr, and Zn) was analyzed by atomic emission spectrometry with inductively coupled plasma (ICP-AES). Element content in tobacco leaves showed weak correlation with DTPA extractable elements, soil properties and total element content in soil. Strong correlations were observed only within soil properties and with Ni content of tobacco leaves and DTPA extractable Cd and P. Elemental distribution varied in different parts of tobacco plants. The results of multielement analyses generally showed the highest concentrations in leaves. Only Cu, Zn and P had higher concentration in tobacco seeds, Na in root and K in stem in comparison to other tobacco organs. Higher concentrations of metals were determined in tobacco leaves grown in soils with increased content of the corresponding metal. Despite intensive tobacco production, concentrations of most of the studied elements in soil and plants were at typical levels of low anthropogenic pressure areas.

Key words: soil properties, trace element, tobacco

Received: December, 2013; Revised final: August, 2014; Accepted: September, 2014

*Author to whom all correspondence should be addressed: e-mail: bi.jordanoska@gmail.com; Phone: +389 78263373; Fax:+389 48412761