

## A Soft Computing Approach Monitoring of Heavy Metals in Soil and Vegetables in the Republic of Macedonia

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**Abstract :** The average total concentrations of heavy metals; cadmium [Cd], copper [Cu], nickel [Ni], lead [Pb], and zinc [Zn] were analyzed in soil and vegetables samples collected from the different region of Macedonia during the years 2010-2012. Basic soil properties such as pH, organic matter and clay content were also included in the study. The average concentrations of Cd, Cu, Ni, Pb, Zn in the A horizon (0-30 cm) of agricultural soils were as follows, respectively: 0.25, 5.3, 6.9, 15.2, 26.3 mg kg<sup>-1</sup> of soil. We have found that neural networking model can be considered as a tool for prediction and spatial analysis of the processes controlling the metal transfer within the soil-and vegetables. The predictive ability of such models is well over 80% as compared to 20% for typical regression models. A radial basic function network reflects good predicting accuracy and correlation coefficients between soil properties and metal content in vegetables much better than the back-propagation method. Neural Networking / soft computing can support the decision-making processes at different levels, including agro ecology, to improve crop management based on monitoring data and risk assessment of metal transfer from soils to vegetables.

**Keywords :** soft computing approach, total concentrations, heavy metals, agricultural soils

**Conference Title :** ICCIS 2016 : International Conference on Chemical Industry and Science

**Conference Location :** Jeddah, Saudi Arabia

**Conference Dates :** January 26-27, 2016