Geophysical Research Abstracts
Vol. 12, EGU2010-2610-1, 2010
EGU General Assembly 2010

Metal Load of the Crops Depending on Land Use, Land Management and Soil Characteristics

Sezin Oeztan and Rolf-Alexander Duering

Institute of Soil Science and Soil Conservation, Justus Liebig University, Giessen, Germany
(sezin.oeztan@umwelt.uni-giessen.de/+49(0)641-9937109)

The increase of pollutant concentrations in soil and in the food chain became very important in the past few decades. Metals of different toxicities (Cd, Zn, As, Cr, Cu, Pb, Ni, Co, V, Tl) occur in soils as a result of weathering, industrial processes, fertilization and atmospheric deposition. Some of them can be absorbed by the plants due to their mobility. The transfer of metals from soil into the plants can be explained by the physicochemical characteristics of the soil such as pH-value, organic matter and clay content. Badly adapted cultivation of the agricultural soils (declining pH-value, application of unsuitable fertilizers) can enhance the mobility of the metals and by the way increase their concentrations in agricultural products.

With this study, a field experiment was established and the aim is to test the relations between available metal concentrations in the soil and metal load of the plants depending on the fertilization techniques. The plants and soil samples of the reference sites were taken, heavy metal contents of the soil samples identified by Microwave Assisted Extraction (MAE) and compared to the Aqua Regia Digestion Method for confirming the methodology. For the determination of the metal content in plants, MAE was executed to the selected plant samples and for that procedure, the samples were digested with HNO_3 and H_2O_2 in the microwave oven. Quantation of the metals in soil and in plants was done by ICP-OES Methodology.

The evaluation of the first results confirmed that the metal content of the soil is strongly dependent on the properties of different fertilization variants (N,P,K) used and physicochemical characteristics of the soils. According to the fertilization variants, total metal contents of the soil are increased in the soil samples which have high amounts of N, P, K fertilization. Soils which were enforced with high P fertilization degrees had significantly higher total Cd content. Results on the Cd content of the plant samples also revealed that transition of metals from soil to plants depend heavily on the fertilizer since plant samples and soil samples treated with the same fertilizer showed similar results.