Accumulation and Distribution of Minerals and Heavy Metals in Cotton Plants Grown on Soil Amended with Urban Sewage Sludge

1F.M.Salama and 2N.A. El-Tayeh 1Botany Department, Faculty of Science, Assiut University and 2Botany Department, Faculty of Science (Qena), South Valley University, Egypt.

Abstract:

EWAGE sludge collected from El-Salhya sewage station at Qena ..... city in Egypt was applied in a pot experiment to investigate the uptake and distribution of certain mineral nutrients and some heavy metals in different organs of Gossypium barbadence plants. The sludge was mixed with sand at three levels: 10%, 20% and 30% and the sand was used (without sludge) as control. Results revealed that amendment the sandy soil with sewage sludge resulted in increasing the essential nutrients in the experimental plant parts especially N and P. The distribution of Na and K was in another way, and mostly Na accumulated in roots while more K transported into shoots of the plants. Results indicated also that Na/K ratio was higher in plant roots than in shoots. Mg and Ca distributed in shoots and roots with significant change from the roots toward the shoots, and also between both organs in plants grown on sludge and their analogous in control plants. Results of heavy metals analysis in this study indicated that heavy metal accumulation was more in roots than shoots under sewage sludge amendment. Data indicated that Fe and Pb accumulated in roots of plants more than shoots. In contrast to these metals, Ni was transported up to the shoots, while low amounts were detected in roots. The accumulation of heavy metals in cotton plants grown on sandy soil amended with sewage sludge was generally arranged in the following preference: Fe

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