

2<sup>nd</sup> Annual Congress on

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## The effect of adding sewage sludge on the productivity of cotton, wheat and corn and the accumulation of some heavy metals in soil and crops

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This study was conducted in Al-Kamary station in Aleppo province in collaboration between the Arab center-ACSAD and the General Commission for Scientific Agricultural Research in Syria, to study the effect of adding sewage sludge on soil properties and on the productivity of cotton, wheat, and corn. The accumulation of heavy metals namely Cd, Cr, Ni, and Pb were monitored into the soil and plant tissue of the studied crops during three subsequent seasons. Sewage sludge was added to the soil at rates ranging between 6 and 15 ton/ha according to crop N requirement and when its content of heavy metals are less than the thresholds. Yields from the sewage applied treatments were compared with the treatment received chemical fertilizers, and the both of them were compared with the control which did not receive fertilizers or sewage sludge. The results indicated a significant increase in the productivity of some crops grown in the soil received sewage sludge, and this increase reached 15% in cotton, 36% in wheat grain, 16% in wheat straw and 47% in corn seeds compared with control. The increase in productivity also reached 2% in cotton, 16% in wheat grain, 10% in wheat straw and 36% in corn compared with chemical fertilizer application. Increases in the concentrations of heavy metals Pb, Ni, Cr, and Cd were 8.44, 122, 92, and 0.13 mg/kg, respectively in the soil received up to 15 ton/ha sewage sludge compared with control (5.42, 116, 95 and 0.07) mg/kg. However, these concentration remain within the natural limits (0.1-2) mg/kg of Cd, (10-150) mg/kg Cr, (5-500) mg/kg Ni, and (2-200) mg/kg Pb. No significant increase in the concentrations of the heavy metals in the plant tissues of the crops cultivated in soil received sewage sludge at a rate of 15 ton/ha. The concentration of the heavy metals in the plant tissues remained in the natural range of concentration (0.05-1.20) mg/kg Cd, (1-5) mg/kg Cr, (0-4) mg/kg Ni, and (0.1-30) mg/kg Pb, and far from the toxic and the harmful effects on human health according to the international standards.



Wheat and corn fertilization with sludge

### Recent Publications

1. Weggler K, M J McLaughlin and R D Graham (2004) Effect of chloride in soil solution on the plant availability of biosolid-borne cadmium. *Journal of Environmental Quality*. 33:496-504.
2. Tsadilas C D, I K Mitsios and E Golia (2005) Influence of biosolids application on some soil physical properties. *Communications in Soil Science and Plant Analysis*. 36(4-6):709-716.
3. Weber J et al. (2007) Agricultural and ecological aspects of a sandy soil as affected by the application of municipal solids waste composts. *Soil Biology and Biochemistry*. 39:1294-1302.
4. Moreno R, Lloret F and Alcaniz J M (2004) Effects of sewage sludge on plant community composition in restored limestone quarries. *Restoration Ecology*. 12(2):290-296.

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5. Mohammad Munie and Athameh Bayan (2004) Changes in soil fertility and plant uptake of nutrients and heavy metals in response to sewage sludge application to calcareous soils. *Journal of Agronomy*. 3(3):229-236.

## **Biography**

Omar Jouzdan is a Researcher and Expert on sustainable land management and non-conventional water uses such as treated water, brackish water and gray water. He has research and studies in the field of environmental pollution of natural resources (soil, water and plants), and find appropriate treatment and protection methods. Increase soil productivity to increase farmers' incomes and improve their livelihoods, and thus contribute to agricultural development. He has many scientific researches on the management of the uses of salt water, treated wastewater and sludge in agricultural irrigation, as well as improving the properties of physical, chemical and fertility soil, and increasing yield and production and research on environmental pollution.

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