Geophysical Research Abstracts
Vol. 16, EGU2014-10078, 2014
EGU General Assembly 2014

Release dynamics of dissolved organic matter in soil amended with biosolids

Pavel Trifonov, Talli Ilani, and Gilboa Arye

The Jacob Blaustein Institutes for Desert Research, Ben Gurion University of the Negev, Midreshet Ben Gurion, Israel (tripjappan@gmail.com)

Among the soil organic matter (SOM) components, dissolved organic matter (DOM) is the link between the solid phase and the soil solution. Previous studies emphasize the turnover of dissolved organic carbon (DOC) and nitrogen (DON) in soils as major pathways of element cycling. In addition to DOM contribution to carbon, nitrogen and other nutrient budgets, it also influence soil biological activity, reduces metal-ion toxicity, increase the transport of some compounds and contribute to the mineral weathering. Amending soils with biosolids originated from sludge have become very popular in the recent years. Those additions significantly affect the quantity and the composition of the DOM in agricultural soils. It should be noted that under most irrigation habitants, the soil is subjected to drying and re-wetting cycles, inducing a complex changes of soil structure, aggregation, SOM quality and microflora. However, most studies that addressed the above issues (directly or indirectly) are engaged with soils under cover of naturally occurring forests of relatively humid areas rather than agricultural soils in arid areas.
In the current study we examined the DOC and DON release dynamic of sand and loess soils sampled from the Negev Desert of Israel. Each one of the soils were mixing with 5% (w/w) of one of the biosolids and packed into a Plexiglass column (I.d. 5.2 cm, L=20 cm). The flow-through experiments were conducted under low (1 ml/min) or high (10 ml/min) flow rates in a continuous or interrupted manner. The leachates were collected in time intervals equivalent to about 0.12 pore volume of a given soil-biosolids mixture. The established leaching curves of DOC, DON, NO_3-, NH4+ and Cl- are analyzed by water flow and solute transport model for saturate (continuous runs) or variably saturate water flow conditions (interrupted runs). The chemical equilibrium or non-equilibrium (i.e. equilibrium and/or kinetics adsorption/desorption) versions of the convection dispersion equation are being used to describe the solute transport. In addition the sensitivity of the model for assigning a first order production term will be demonstrated.