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Chlorotoluron behavior in compost amended soil

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The aim of this study was evaluating compost impact on herbicide (chlorotoluron) behavior in soil. Soil from the A horizon of the Luvisol was mixed with compost material and placed into plastic cylinders (diameter of 7.5 cm and height of 18 cm). Eight mixtures (A, B, C, D, E, F, G and H) of various compost fractions (from 1 to 8 % of mixture weight) and two samples for each mixture were prepared. Tensior 5 sensors for pressure head measurements were installed 5, 9.5 and 14 cm below the soil surface to monitor soil-water regime within each soil sample. 20 cm3 of chlorotoluron solution was applied on the top of the soil samples. The rainfall simulator was then used to apply distilled water on the soil tops with controlled infiltration rates. Water outflow and solute concentration from the bottom of the soil samples were monitored in time. The soil samples were divided into 9 layers (thickness of 2 cm) a day after the experiment and the total amount of chlorotoluron remaining in each soil layer was ascertained. Finally water flow and chlorotoluron transport was mathematically simulated using the HYDRUS-1D code.
Results only partly proved hypothesis that chlorotoluron mobility decreases with increasing organic matter content (e.g. compost fraction), which would be expected based on the batch sorption tests for various soil types with varying organic carbon content (Kodesova et al. 2010). While chlorotoluron mobility decreased up to compost fraction of 6%, herbicide mobility noticeably increased in G (7%) samples and slightly increased in H (8%) samples. In these two cases, the higher herbicide mobility was apparently caused by preferential flow, which occurred due to increasing structural differences of soil mixtures. Impact of soil structure on chlorotoluron behavior in soil was previously documented by Kodesova et al. (2008, 2009).

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