Fate and Transport of Biosolids-Borne Triclocarban (TCC).

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Environmental contamination by antimicrobial compounds raises important questions regarding potential impacts on water quality, human health, ecosystem health, and antibacterial resistance development. One antimicrobial of concern is Triclocarban (TCC), a High Production Volume (HPV) chemical and a common constituent of domestic wastewater. TCC is readily removed from the waste stream following activated sludge treatment, and concentrated in anaerobically digested residuals (biosolids) at concentrations up to 50 ppm (Heidler et al., 2006, ES&T 40:3634-3639). Research to date has primarily focused on analysis and surveys of TCC concentrations in various environmental compartments. Given the concentrations of TCC expected in biosolids, research should now be directed toward characterizing environmental transfer and ecological effects of biosolids-borne TCC. In a collaborative project funded by USEPA, the Soil and Water Science Department at the University of Florida and the Procter & Gamble Company are working to characterize the fate and transport of biosolids-borne TCC. Study data will ultimately contribute to a biosolids-borne TCC environmental and human health risk assessment. In Summer 2006, ^{14}C-TCC was used to perform a short-term biosolids-amended soil biodegradation study and to validate previously published biosolids-borne TCC extraction methods. Over the five-week degradation study, only ~7% of spiked ^{14}C-TCC mineralized and ^{14}C increased in the NaOH and combusted fractions, indicating incorporation into the humic (bound residue) fraction. In addition, TCC concentrations (5-43 ppm) in 22 biosolids representing various treatment processes were determined, and the logK_{ow} was measured (3.5 + .06) using HPLC/MS. A longer-term degradation study was initiated March 2007 to evaluate the effects of soil type on TCC mineralization and characterize degradation products. In Summer 2007, TCC solubility was measured, and TCC leachability in biosolids-amended soil was assessed. In the upcoming months, TCC sorption and desorption in biosolids-amended soil, plant uptake of biosolids-borne TCC, and biosolids-borne TCC impacts on soil microbial communities will be characterized.