Executive Summary

WERF

Characterizing the safety or risk of trace organic compounds in biosolids

Gathering Unpublished Data for Compounds Detected in Biosolids (TOBI1T11)

The Central Issue

When done using best practices and adherence to existing regulations, land application of biosolids minimizes environmental and human health risks from exposure to microbes, metals, dioxin, and etc. However, concerns have been raised in response to published reports of trace organic compounds in biosolids. These include, for example, pharmaceuticals and personal care products. Although, there are well-established standard methods to evaluate these potential risks (those used under the Part 503 Rules), what is often missing are the data needed to characterize the exposure to and toxicity of the compounds.

Context and Background

WERF published a state of the science review on trace organic chemicals in biosolids-amended soils (SRSKT09) and has been coordinating with a number of wastewater utilities (many working in partnership with university researchers) who are developing data for compounds in their biosolids.

The U.S. EPA is conducting an evaluation of the roughly 140 chemicals monitored in the 2009 EPA Targeted National Sewage Sludge Survey (TNSSS). EPA is collecting and evaluating published data and developing a database and a prioritization tool for trace organics in land-applied biosolids.

In 2011, WERF commissioned a study to look for and assemble high-quality, unpublished environmental fate and toxicity data on trace organic compounds for which there were inadequate published data found to characterize risk. This effort focused on about 60 of the 140 chemicals being evaluated by EPA. The chemical classes of trace organics considered in this study included antibiotics, hormone steroids, organotins, surfactants, organosiloxanes, fragrance raw materials, antimicrobials, and alcohol ethoxylates. WERF subscribers that are pharmaceutical, chemical, and consumer product companies provided their unpublished data, as did other companies in these sectors.

Data from this study can be leveraged with those compiled previously by WERF and the U.S. EPA to prioritize further data collection needs and approaches for all chemicals evaluated to date.

Findings and Conclusions

The research findings provide empirical data and technical understanding to assess environmental and health risks of trace organic compounds in biosolids transported to soils following land application. A substantial volume of unpublished (or recently published) experimental data was collected.

Of the 60 trace organic compounds that were searched, mammalian toxicology and pharmacological data that can be used to derive human health benchmarks were identified for half of them. These benchmarks are a key element for risk assessment. The WERF technical advisory team for this research is preparing the scope of work for a final phase of research that will attempt to fill the remaining critical data gaps. WERF continues to coordinate its efforts with EPA and is providing the new data for their database and prioritization tool.

Management and Policy Implications

The data from the WERF study are available for EPA use to further characterize risk for these chemicals. Trace organic chemicals are not currently regulated in biosolids. WERF will continue to coordinate with its wastewater utility, land applier, chemical manufacturer, and regulatory agency partners to bring a science-based resolution to this important issue. WERF's extensive research into removal and fate of trace organics in wastewater treatment is providing direct support for facility management decisions.

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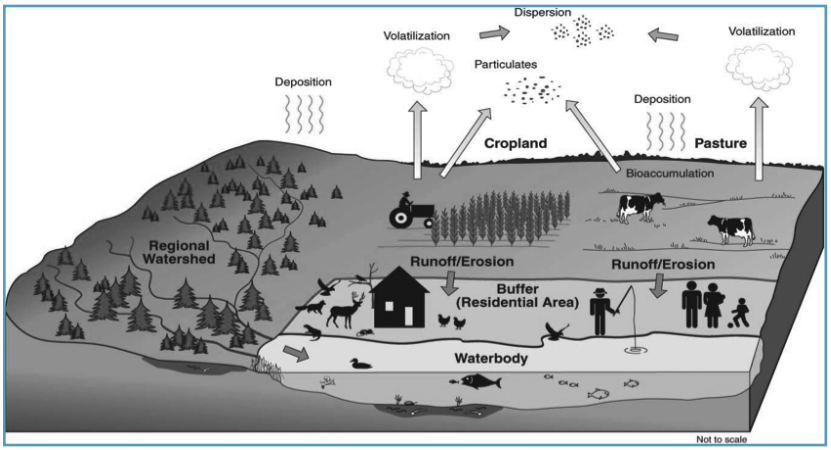

Ultimately, this study contributes to the goal of the WERF biosolids research program: To support sound risk characterizations for trace organic chemicals in biosolids and amended soils.

Related WERF Research

Project Title	Research Focus
Trace Organic Compound Removal During Wastewater Treatment (CEC4R08)	This multi-faceted effort intended to answer: ■ What compounds should be best monitored to assess performance? ■ How does process operation affect trace organic chemical removal? ■ Can we model predict pharmaceuticals and personal care products removal at a wastewater treatment plant? ■ How well does solids processing (e.g., anaerobic digestion) remove trace organic compounds?
Trace Organic Chemicals in Biosolids-Amended Soils: State-of-the-Science Review (SRSK5T09)	Examines which TOrC are of greatest concern in soils, then categorizes them in terms of priority. Comprehensive literature review identifies relevant data on fate, transport, biotransfer from soil to plants and animals, and toxicity in the terrestrial environment. Based on the review, data gaps were identified for the parameters most important for conducting terrestrial risk assessments.

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