

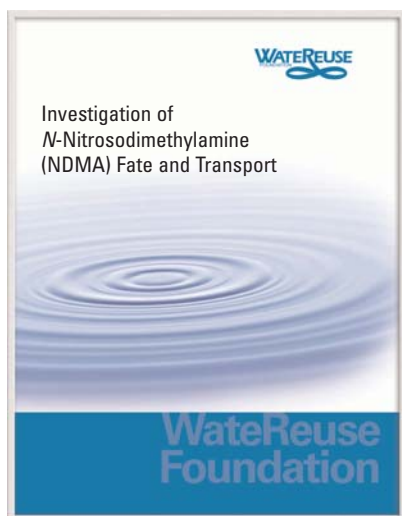
Project PROFILE



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Advancing the Science of Water Reuse and Desalination through Research

Investigation of *N*-Nitrosodimethylamine (NDMA) Fate and Transport



Product Number: 02-002-01

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Project Number

WRF-02-002

Principal Investigator

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N-Nitrosodimethylamine (NDMA) is a polar, uncharged organic compound that is frequently present in wastewater effluent. In response to human health concerns associated with NDMA, water utilities and regulatory agencies have dedicated substantial effort to monitoring NDMA and attempting to reduce NDMA concentrations in wastewater effluent.

While source control and modifications of treatment processes may

lead to decreases in NDMA concentrations in wastewater, it is extremely difficult to achieve the stringent levels derived for protection of public health without installing expensive, advanced treatment systems. Therefore, NDMA in wastewater effluent could enter potable water supplies when wastewater effluent is used for landscape irrigation or groundwater recharge.

To assess the potential for NDMA in wastewater effluent to enter potable water supplies through these mechanisms, a research project was conducted between 2002 and 2005 by a team of researchers from the University of California (UC) Berkeley, UC Riverside, Arizona State University, and Todd Engineers.

Objectives

The overall objective of the project was to assess the fate and transport of NDMA and NDMA precursors in soil, groundwater, and surface waters. The project included a review of available data from NDMA contaminated sites to identify environmental variables that influence NDMA transport and transformation.

The project also included experimental studies to assess the potential for biotransformation and field studies to assess volatilization and transport of NDMA in irrigated soil plots and soil columns.

Benefits

Prior to this project, little was known about the potential for loss of NDMA and NDMA precursors under conditions experienced in water reuse programs. Results from this study indicate that NDMA and NDMA precursors in wastewater effluent may be removed during landscape irrigation or groundwater recharge under certain conditions.

Highlights

- In landscape irrigation systems, NDMA readily volatilizes from soil after application with nearly complete removal within several hours under conditions typically used for turfgrass.
- NDMA is readily transported in groundwater systems. Data from hazardous waste sites where NDMA was released show little evidence for sorption or biodegradation in groundwater.
- NDMA precursors are highly resistant to biotransformation. The NDMA precursors are partially removed in saturated soil columns, indicating that they exhibit some affinity for soil surfaces.
- Landscape irrigation with NDMA-contaminated water appears to pose little potential for contaminating aquifers, whereas direct injection or soil aquifer treatment have the potential to introduce NDMA into groundwater.

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About the Foundation

The mission of the WaterReuse Foundation is to conduct and promote applied research on the reclamation, recycling, reuse, and desalination of water.