

2015 Study of Pesticides in Community Public Water Supply Wells

Summary

The Minnesota Department of Health (MDH), in cooperation with the Minnesota Department of Agriculture (MDA), studied levels of 135 pesticides and pesticide degradates at 108 community public water system (CPWS) wells in February and March 2015. Wells considered to be at higher risk of pesticide contamination were targeted for sampling. Results are not representative of all CPWS wells. Pesticides were detected at low levels in 72 of 108 samples (67 percent). A total of 19 pesticides or pesticide degradates were detected; no neonicotinoid pesticides were detected. All detections were below state health guidance values or federal standards. The study results suggest that in sampled CPWS wells (considered to be at higher risk of pesticide contamination) there is currently no known public health risk from pesticides.

Study Purpose

Main purposes of this work include:

- determining the presence and relative levels of pesticides and associated degradates in groundwater collected from CPWS wells;
- determining if neonicotinoid pesticides were present in groundwater collected from CPWS wells;
- determining if monitoring should be expanded to assess pesticides in other CPWS wells that may be at risk of pesticide contamination.

Findings

Pesticide levels in the 108 CPWS wells were found to be below levels of health concern (based on MDH or US Environmental Protection Agency (EPA) health reference values or standards), but were present in 67 percent (72) of wells tested. To account for multiple chemicals potentially present in the same wells, MDH conducted a cumulative assessment of the potential health risk from combined exposure to the chemicals detected in the CPWS samples. That cumulative assessment found that the concentrations do not pose a health risk even when combining chemicals that have common health effects over a common duration of exposure.

The study found 19 pesticides and pesticide degradates out of 135 analyzed in the samples. Metolachlor ESA was the most frequently detected compound and was found in 63 percent of the wells sampled. Metolachlor ESA is a degradate of metolachlor, which is used to control grasses and broadleaf weeds in corn and soybeans. Metolachlor OXA, also a degradate of metolachlor, was detected in 33 percent of sampled wells. Other pesticides or pesticide degradates detected in more than 10 samples include alachlor ESA (45 percent of wells), alachlor OXA (11 percent of wells), and acetochlor ESA (19 percent of

wells). Alachlor ESA and alachlor OXA are degradates of alachlor, which is used to control grasses and broadleaf weeds in corn and soybeans. Acetochlor ESA, a degradate of acetochlor, is used in pre-planting soil application to control weeds in corn. Most wells (75 percent) had three or fewer pesticide or pesticide degradate detections.

No neonicotinoid pesticides were detected in any of the sampled wells. A neonicotinoid pesticide is a class of insecticides chemically related to nicotine. The name literally means “new nicotine-like insecticides.” They are much more toxic to invertebrates, like insects, than they are to mammals, birds and other higher organisms. However, there is concern over their potential impact to bees.

Future monitoring of CPWS wells for pesticides is recommended to evaluate the occurrence of pesticides and pesticide degradates over time. Future studies should expand to include a random selection of high risk and low risk wells across the state and selected surface water systems.

Background

Pesticides are chemicals that include herbicides to manage undesirable plants, insecticides to manage undesirable insects, and fungicides to manage molds and fungi. Pesticide degradates are chemicals that are formed when pesticides break down. Pesticide contamination of groundwater may happen when precipitation or surface water moves into aquifers from the land surface in areas where pesticides are used.

MDA has been monitoring Minnesota groundwater for pesticides since 1987 as part of a larger charge to manage pesticides statewide. Most of this work is done in shallow monitoring wells rather than the deeper drinking water aquifers and pumping wells sampled in this 2015 study. MDH routinely tests drinking water that enters CPWS distribution systems for 24 pesticide compounds as directed by the Safe Drinking Water Act.

The full report is available on the MDA website: [2015 Reconnaissance Study of Pesticide Compounds in Community Public Water Supply Wells \(PDF\)](https://www.mda.state.mn.us/sites/default/files/inline-files/2015PesticideReconReport_0.pdf)
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