Some Chemicals Survive Treatment

U.S. Geological Survey researchers found that in selected community water facilities, low levels of certain man-made chemicals remain in public water supplies after the water has been treated. Water from nine rivers used in public water systems was tested, including the Elm Fork of the Trinity River in Texas, Nevada's Truckee River, and Cache La Poudre River in Colorado.

Samples were analyzed for about 260 commonly used chemicals, including pesticides, solvents, gasoline hydrocarbons, personal care and household-use products, disinfection byproducts, and manufacturing additives.

Low levels of about 130 of the manufactured chemicals were detected in streams and rivers before treatment at the public water facilities. Nearly two-thirds were also detected after treatment, most at levels less than 0.1 parts per billion (0.1 microgram per liter). Most of the chemicals assessed are unregulated, and USGS researchers stressed that the findings are not surprising and do not necessarily indicate a human health concern, but will be useful to water utility managers in evaluating future water treatment processes.

Chemicals included in this study serve as indicators of the possible presence of a larger number of commonly used chemicals in rivers, streams, and drinking water. The most commonly detected chemicals in the source water were herbicides, disinfection byproducts, and fragrances.

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SNWA Studies Pharmaceuticals, EDCs

Scientists at the Southern Nevada Water Authority studied source water, finished drinking water, and tap water from 19 U.S. water facilities serving more than 28 million people. Between 2006 and 2007 they analyzed the water for 51 pharmaceuticals, potential endocrine-disrupting compounds, and unregulated organic contaminants.

Of the compounds studied, 34 were found in at least one sample. Eleven compounds were detected in more than half of the source waters. Median concentrations of these compounds were generally less than 0.01 micrograms per liter (µg/L), with the highest being TCEP (a reducing agent) at 0.12 µg/L.

The occurrence of compounds in finished water is controlled by the type of oxidation used at each treatment plant. Of the 11 most commonly detected source-water compounds, only atrazine (herbicide), meprobamate (antianxiety), and phenytoin (anticonvulsant) were detected in more than half of finished or tap water samples (although atrazine, the only regulated compound, was detected at levels well below the U.S. EPA maximum contaminant level). These compounds are resistant to both chlorine and ozone oxidation. Naproxen, trimethoprim, and estrone were not detected in any finished waters, as these compounds can be efficiently oxidized by either chlorine or ozone. Carbamazepine was measured in finished waters from chlorine-employing plants but not those from ozone-employing plants.

The researchers suggested that atenolol, atrazine, DEET, estrone, meprobamate, and trimethoprim can serve as indicator compounds because they were detected frequently and showed removal trends that reflected the process performance. Atrazine was found in source waters far from any agricultural application, suggesting it may be a widespread environmental contaminant. The scientists also found the most prescribed pharmaceuticals were not the most frequently detected.

See Benotti, M.J., R.A. Trenholm, B.J. Vanderford, J.C. Holady, B.D. Stanford, and S.A. Snyder, 2009. Pharmaceuticals and endocrine disrupting compounds in U.S. drinking water, Environ. Sci. Tech., 43(3): 597-603.