



NERL/NRMRL-Regional Municipal Effluent Survey



Objectives: Assess the concentration and magnitude of pharmaceuticals, other emerging contaminants and estrogenicity in municipal wastewater effluents.

Background: Pharmaceuticals for human use have been detected in wastewater, surface waters, fish tissues, and drinking water. This has raised concerns about human or environmental impacts among the public, media, utility operators, regulators, and legislators. Concerns have been difficult to address because there are more than 2,000 pharmaceuticals used in the US (more than can practically be measured) and conducting nationally representative surveys for any contaminant is a challenge.

Studies conducted to date suggest that municipal wastewater is likely the primary source of human pharmaceuticals entering the aquatic environment, and that the concentration of pharmaceuticals in municipal effluents typically exceeds that in surface water, ground water, or drinking water. Therefore characterizing pharmaceutical concentrations in municipal effluents would identify a worst case scenario for concentrations likely to be encountered in these other media.

ORD recently developed a prioritization of pharmaceuticals for future research based on ranking the pharmaceuticals by predicting the greatest risk to the health of humans or aquatic life (contact Mitch Kostich for details). An liquid chromatography-mass spectrometry-based analytical method was developed to quantify the 50 highest priority pharmaceuticals in wastewater (contact Angela Batt for details). This method is being employed for the OW's National Rivers and Streams Assessment (NRSA), the OW's National Coastal Condition Assessment (NCCA), and a joint EPA-USGS study on drinking water and source waters.

Approach: The 50 very large municipal wastewater plants in the US were identified from the 2004 Clean Watershed Needs Survey. These plants produce about 16% of all the municipal wastewater in the US. A one-time grab sample (total of 8 liters) of finished effluent from each plant will be collected by EPA Regional or Plant personnel, then shipped to ORD-Cincinnati. For each effluent sample, ORD-Cincinnati will determine the concentration of the 50 highest priority pharmaceuticals, steroid hormones, alkylphenolic compounds, Bisphenol A, fluorinated chemicals, and the estrogenic potential in a fathead minnow vitellogenin induction assay.

Outcome: Results for individual plants will be reported to the corresponding plant operator and Region. Results will also be published in a peer-reviewed scientific manuscript, which will describe the WWTPs and emerging contaminant results, but will not reveal which measurements come from which plant.

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