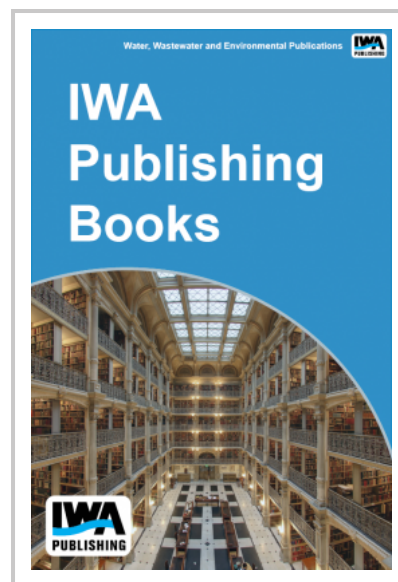


Diagnostic Tools to Evaluate Impacts of Trace Organic Compounds (Prioritization Framework for TOrCs)

With the advent of improved analytical detection capabilities, a variety of organic chemicals have been found in trace amounts (Trace Organic Chemicals, TOrCs) in surface waters, sediment, and fish tissue. These TOrCs include pharmaceuticals, personal care products, surfactants, and other currently unregulated chemicals. This WERF sponsored research presents a preliminary screening process and ecological diagnostic approaches that could be used to help prioritize and evaluate treated wastewater-influenced sites that may be most at risk from trace organic chemical (TOrC) exposure. Identifying or predicting ecological effects of TOrCs in typical aquatic systems is challenging, requiring a variety of tools that can diagnose effects at multiple scales of ecological organization. Development of a prioritization process is the goal of Task 1 of this research and the focus of this report.

This research developed three approaches to prioritize TOrCs:

1) risk-based, 2) chemical persistence, bioaccumulation potential, and toxicity (PBT), and 3) a hybrid based on risk, persistence, and bioaccumulation potential. Using an occurrence database compiled from over 100 monitoring studies, the three prioritization approaches were applied to over 500 TOrCs that have been detected in water or effluent samples in the U.S. over the past 10 years. Types of TOrCs identified as high priority differed among approaches: steroids/hormones, pharmaceuticals, and surfactants comprised most of the high priority TOrCs based on risk while pesticides, industrial chemicals, and PAHs comprised most of the high priority TOrCs based on a PBT approach. Except for the synthetic hormones and steroids, results of all three prioritization approaches yielded only a few pharmaceuticals of high priority. Using a risk-based prioritization approach, predicted chronic toxicity endpoints were more sensitive than endpoints based on estrogenic activity for most TOrCs. The prioritization list(s) resulting from this work is not necessarily intended to be viewed as a list of compounds to be monitored or for which water quality criteria should be developed. The process of developing the list(s) is as important as the list(s) itself and the appropriate use of any resulting list(s) will depend largely on the goals of the user.



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