

New environmental monitoring framework for contaminants of emerging concern (CECs)

Keith A. Maruya¹, Nathan G. Dodder¹, Alvine C. Mehinto¹

¹SCCWRP, Costa Mesa, CA, United States.

Abstract

The current risk-based paradigm that informs monitoring and assessment of environmental contaminants is ineffective in managing the thousands of chemicals that can occur in our water resources. We propose a tiered monitoring framework for contaminants of emerging concern (CECs) that features bioanalytical tools to screen for chemicals by mode of action. This initial monitoring step would employ a comprehensive battery of in vitro bioassays to screen for exposure to the most relevant CECs, while also "directing" which chemical-specific analyses are warranted should screening responses deem that additional information is needed. Non-targeted analysis represents a second novel analytical approach that broadens the scope of toxicity identification commonly relegated to "targeted" (i.e. chemical specific) analysis. Non-targeted methods based on GCxGC-TOF/MS and LC-QTOF/MS are under development for semi-volatile and water soluble CECs, respectively. These non-targeted methods can also be applied to proactively scan for unexpected/unknown contaminants in environmental samples. Successful development and incorporation of these novel methods will give managers a more comprehensive and responsive monitoring and assessment framework that is better equipped to deal with our ever-changing chemical landscape.