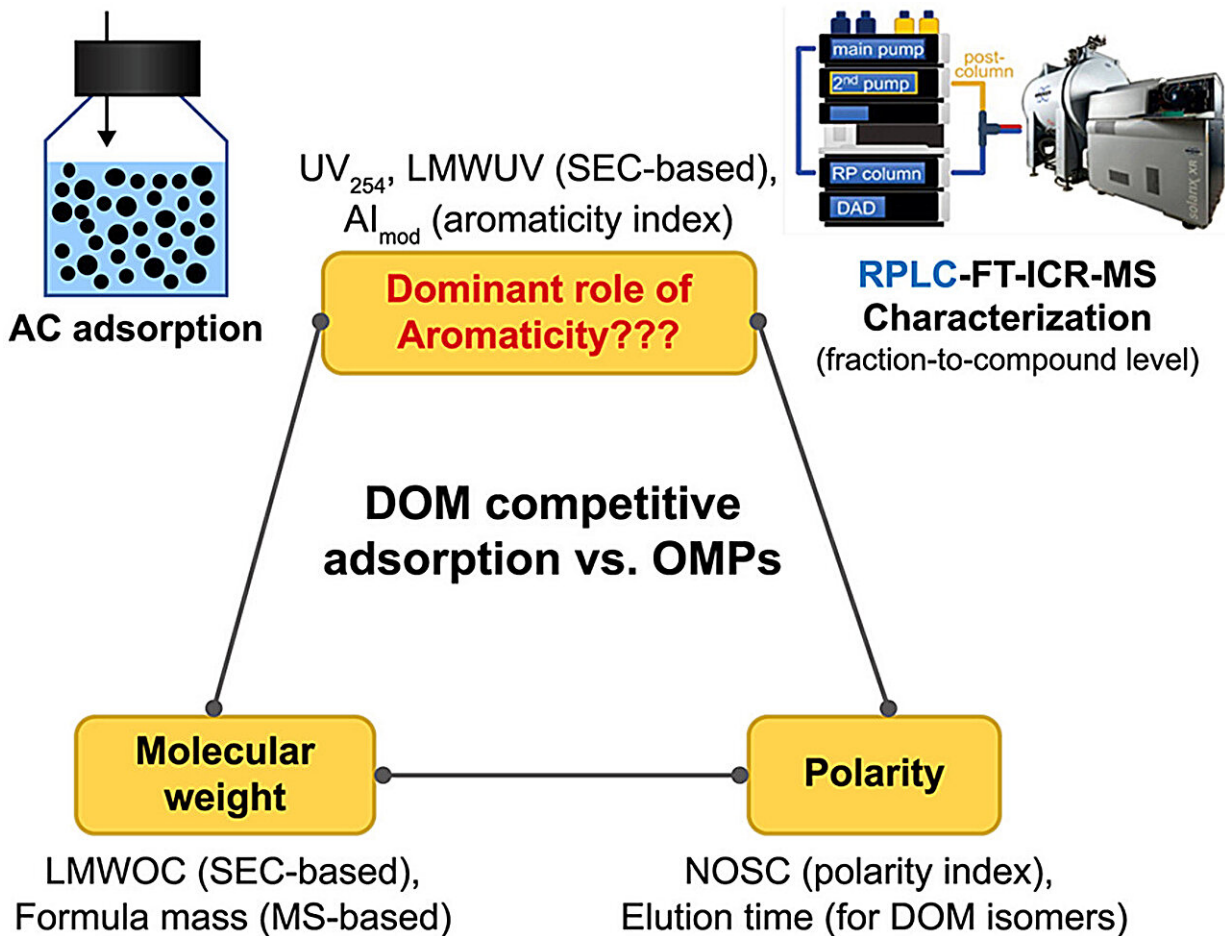


How aromatic dissolved organic matter affects organic micropollutant adsorption

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Credit: *Environmental Science and Ecotechnology* (2024). DOI: 10.1016/j.ese.2024.100392

Activated carbon is employed for the adsorption of organic micropollutants (OMPs) from water, typically present in concentrations ranging from ng L^{-1} to $\mu\text{g L}^{-1}$. However, the efficacy of OMP removal deteriorates considerably due to competitive adsorption from background dissolved organic matter (DOM), present at substantially higher concentrations in mg L^{-1} . Interpreting the characteristics of competitive DOM is crucial in predicting OMP adsorption efficiencies across diverse natural waters.

In a study [published](#) in *Environmental Science and Ecotechnology*, a multinational team describes the intricate influence of aromaticity and polarity in low MW DOM competition, from a fraction level to a compound level. They achieved this by employing direct sample injection liquid chromatography coupled with ultrahigh-resolution Fourier-transform ion cyclotron resonance mass spectrometry.

Anion exchange resin pre-treatment eliminated 93% of UV_{254} -active DOM, predominantly aromatic and polar DOM, and only minimally alleviated DOM competition. Molecular characterization revealed that nonpolar molecular formulas (constituting 26% PAC-adsorbable DOM) with medium aromaticity contributed more to the DOM competitiveness.

Isomer-level analysis indicated that the competitiveness of highly aromatic LMW DOM compounds was strongly counterbalanced by the increased polarity. These findings suggest that aromatic DOM (as measured by UV_{254}) was not essentially competitive against OMPs in [adsorption](#).

The study illustrates the counterbalancing effect of aromaticity and polarity in understanding the competitive adsorption of DOM and highlights the limitations of relying solely on aromaticity or UV_{254} -based methods as the sole interpretive metric.

More information: Qi Wang et al, How aromatic dissolved organic matter differs in competitiveness against organic micropollutant adsorption, *Environmental Science and Ecotechnology* (2024). [DOI: 10.1016/j.esec.2024.100392](https://doi.org/10.1016/j.esec.2024.100392)

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