

Impact of Coagulation on Pharmaceuticals and Endocrine Disrupting Compounds

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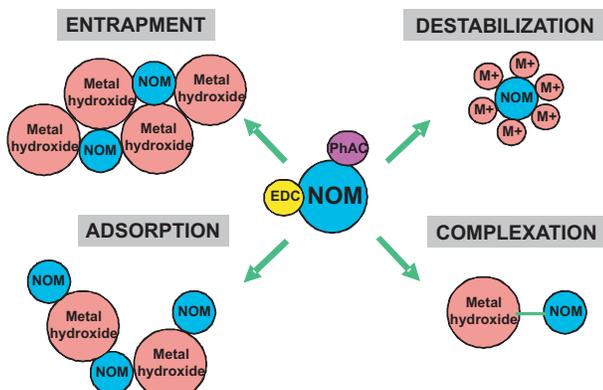


Figure 1: Mechanisms for NOM removal via coagulation (adapted from Jarvis et al. 2004)

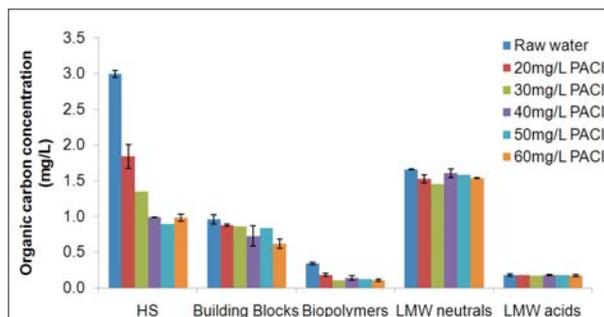


Figure 2: Impact of coagulation (using PACI) on NOM fractions

Environmental levels of many pharmaceutically active compounds (PhACs) and endocrine-disrupting compounds (EDCs) are currently unregulated, but their presence in source waters used by drinking water treatment plants has piqued public interest. Although, conventional water treatment has not been specifically designed to treat these micropollutants, optimization of some processes may provide “value added” in terms of EDC/PhAC removal. Previous research indicates that EDCs and PhACs are not well removed during chemical coagulation; however, removal efficiency increases in the presence of natural organic matter (NOM, often measured as TOC). Micropollutants may bind to NOM, which is then removed during coagulation in a number of ways (Figure 1). However, NOM is a complex mixture of organic chemicals and the composition varies widely with different source waters and seasons. Therefore, we are exploring the link between specific NOM characteristics and EDC and PhAC removal.

To gain more insight into the composition of NOM in different waters, the DWRG has adopted a new analytical technique: liquid chromatography-organic carbon detection (LC-OCD). This cutting-edge technology allows us to detect different components of NOM according to size and chemical attributes (Figure 2).

To investigate concurrent NOM and EDC/PhAC removal, jar test trials are being conducted for a range of source waters provided by treatment facilities in Canada. Through these studies the use and dosage of various coagulants (alum, PACI) is being assessed.



Figure 3: Jar test set-up



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