**Monitoring emerging contaminants in wastewaters and the environment: The catchment approach**

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The presence of emerging contaminants (ECs; pharmaceuticals, personal care products and illicit drugs) in the environment has been given much attention over recent years. Our current study is investigating the presence and fate of ECs in wastewaters and the environment within a river catchment in South-West England. An integrated analytical approach of targeted (>200 compounds including metabolites) and non-targeted screening, chiral analysis and solids analysis will provie a holistic overview of EC distribution and behaviour throughout the catchment. Wastewater treatment works for monitoring have been selected to cover >70 % of the population. A minimum of five sampling points per site will be investigated (influent wastewater, effluent wastewater, biomass/sludge, and river water upstream and down stream of the effluent discharge point. Monitoring involves eight (consecutive) day sampling campaigns utilising composite samplers. This approach will provide one of the most comprehensive investigations of ECs in the environment to date.

Initial findings have shown the ubiquity of ECs in wastewaters. Weekly profiles of non-steroidal anti-inflammatory drugs and suspected endocrine disrupting chemicals (EDCs) in influent wastewater show little inter-day variation (Figure 1A). This is to be expected through their continual use. A similar trend was observed for the stimulants amphetamine and methamphetamine (Figure 1B). In contrast, cocaine and benzoylecgonine and MDMA demonstrated significantly higher concentrations during weekends due to their recreational use. Interestingly, a similar trend was observed for MDMA in effluent. In effluent, MDA was also observed showing a similar trend to the parent compound MDMA. This demonstrates the necessity of analysing metabolites for fate evaluation and the development of more accurate risk assesment.



Figure 1. Daily loads of NSAIDs and EDCs (A) and Stimulants (B) in influent and effluent wastewaters during an eight day period. Compound identification : 1acetaminophen; 2ibuprofen; 3naproxen; 4bisphenol-A; 5diclofenac; 6estrone; 7ketoprofen; 8benzoylecgonine; 9cocaine; 10amphetamine ; 11MDMA; 12cocaethylene; 13mephedrone; 14methamphetamine; 15MDA

The catchment approach described here provides the opportunity to produce a comprehensive data-set of ECs in wastewater and the environment. This data will be used to, but not limited to, provide a better understanding of EC fate and behaviour during wastewater treatment and in the environment (in both aqueous and terrestrial compartments), detailed wastewater based epidemiology of pharmaceuticals and illicit drugs, and the development of more accurate environmental risk assessment.