

Project Title: Investigation of the Occurrence of Pharmaceutical and Personal Care products (PPCP) in Sludge & Wastewater samples using Chromatographic Separation Techniques with Mass Spectrometry Detection

Project summary: The growing use of pharmaceutical and personal care products (human and veterinary) in developed countries is becoming a significant environmental concern. Over the past 10 years there have been numerous studies on the prevalence of PPCP in wastewater, surface water and groundwater.

This emerging environmental concern is due to the increase use of medication, aging populations in developed countries (volume of medication increases with age), increase in populations and also the increase in use of recreational or illicit drugs.

It is estimated that the drinking water of 41 million Americans could be contaminated with prescription and / or over the counter (OTC) medication. The first instance of detectable PPCPs in the environment was identified in 1999.

The various classes of pharmaceuticals detected in studies to date include, antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), benzodiazepines, endocrine disruptors and amphetamines. A wide range of drugs of abuse have also been detected in wastewater and surface waters over the past 10 years.

This project aims to examine the occurrence of PPCP in sludge and wastewater samples from wastewater treatment plants in the Northwest of Ireland.

Objectives:

- Optimise Chromatographic and Mass Spectrometry conditions for the examination of a range of PPCP. The PPCP products chosen will reflect the most widely used PPCP and those that are most resistant to degradation in wastewater treatment plants. The methods used will be based on EPA Method 1694: Pharmaceuticals and Personal Care Products in Water, Soil, Sediment, and Biosolids by HPLC/MS/MS, December 2007.
- Validation of optimised methods using standard reference materials
- Design a sampling regime for wastewater and sludge samples
- Optimise sample preparation and enrichment techniques for a range of PPCP using liquid/ liquid extraction & off-line solid phase extraction (SPE).
- Evaluation of samples using optimised protocols
- Analysis of results

Applicant Requirements: Candidates for this position must hold, or expect to hold a B.Sc. (Hons) (minimum grade 2.2) (or equivalent) in (analytical) chemistry, environmental Science, forensic sciences, pharmacy, or toxicology. Applicants should have a strong background in analytical chemistry, data analysis, and an interest in environmental science. Good analytical skills are a prerequisite and the ability to carry out trace analysis of organic compounds using chromatographic instrumentation is essential. Hands-on experience with HPLC, GC, LCMS or GCMS is desirable. The applicant should be highly motivated, hard-working, capable of independent learning and have an interest in high-end instrumentation.