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Environmental Monitoring, Occurrence and Potential Risks of Emerging Contaminants in Waters

Zulin Zhang, Mark Osprey, Christine Kerr, Melanie Lebleu, and Pat Cooper
The James Hutton Institute, Aberdeen, United Kingdom (zulin.zhang@hutton.ac.uk)

Emerging contaminants (ECs) such as current use pesticides (CUP), endocrine disrupting chemicals (EDCs), pharmaceuticals and personal care products (PPCPs) attracted global concern during the last decades due to their potential adverse effects on humans and ecosystems. This study will investigate the emerging contaminants including 9 pesticides, 5 EDCs and 6 PPCPs in waters from a Scottish Northeast catchment. The main objectives are (1) to compare and monitor these ECs in water by different sampling strategies (e.g. passive and spot sampling); (2) to investigate the occurrence and estimate the annual fluxes of ECs to the river and its adjacent estuary and North Sea; (3) to assess the potential risks of ECs to the aquatic environment. The total concentration for these different classes of chemicals were presented and the total annual fluxes were estimated, by spot and passive sampling, respectively. And the risk assessment results showed that the emerging contaminants such as Triclosan, chlorotoluron and E2 etc. posed potential ecological risks to the aquatic and suggested that mitigation measures might need to be taken to reduce the input of ECs into the river and its adjacent estuary and sea. The overall comparison of the two sampling strategies supported the hypothesis that passive sampling tends to integrate the contaminants over a period of exposure and allows quantification of contamination at low concentration. The results suggested that within a regulatory monitoring context passive sampling was more suitable for flux estimation and risk assessment of trace contaminants which cannot be diagnosed by spot sampling and for determining if long-term average concentrations comply with specified standards.