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Is our North Sea contaminated with endocrine disrupting compounds?

To date, little is known about the presence of endocrine disrupting compounds (EDCs) in the marine environment resulting in few toxicological marine assessments on EDCs. Furthermore, the protection of our coasts and marine waters are a long-standing part of the European Community environmental policy, which is also internationally regulated (a.o. OSPAR, USEPA, etc.). To better evaluate the possible effects of EDCs and to meet international legislative obligations in the marine environment there is a need for monitoring. Therefore, the aim of this study was to develop analytical methods that allow simultaneous monitoring of multiple EDCs in the marine environment. A first method was designed to monitor steroidal EDCs (estrogens, androgens, progestins and corticosteroids). A second method was designed for the detection of xeno-estrogens, in particular phthalates and phenols. Both methods were optimised on an ultra high performance liquid chromatograph (UHPLC) coupled to a hybrid high-resolution mass spectrometer (HRMS). The steroidal EDCs and xeno-estrogens were separated with a water/methanol on a Hypersil Gold column. For both the steroidal EDCs and xeno-estrogens novel extraction procedures were developed using SpeedisksTM for sea water grab samples. The results of grab samples from the North Sea (in three Belgian coastal harbours Ostend, Nieuwpoort and Zeebrugge) in terms of EDC profile will be presented during the conference. A major advantage of our newly developed methods lies in their ability to identify also unknown EDCs in the North Sea, beside the targeted list (55 steroids and 20 xenoestrogens). This work will be an important first step towards environmental assessments, future European legislations and a contribution to the Marine Water Framework Directive.

Keywords: Endocrine disrupting compounds, Speedisks, grab samples, unknown analysis, seawater