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Chemical and biological assessment of endocrine disrupting chemicals in wastewater and coastal waters in Kuwait

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The pollution of coastal regions worldwide has been of a great concern due to the presence of endocrine disrupting chemicals (EDCs). These chemicals find their way to the marine environment via the sewage treatment plants (STPs). Hence, this study investigated the status and sources of EDCs and effect on fish in Kuwait's coastal areas. The assessment of three STPs indicated the presence of significant levels of phthalates (19 and 31 µg/l), alkylphenols (85 and 159 ng/l), and estrogens (30 and 368 ng/l) in both inflow and outflow samples. The analysis of samples from field exposure sites revealed significant levels of EDCs in seawater (phthalates: 2.1 to 4.6 µg/l; alkylphenols: 1.2 to 16.4 ng/l; estrogens: 0 to 36.2 ng/l) and sediment (phthalates: 2.1 to 15.7 mg/kg dry wt; alkyphenols: 2.5 to 15.1 µg/kg dry wt.; estrogens: 4.1 to 214.2 µg/kg dry wt.) samples. The biological perspective investigated through fish exposure to sewage outlets at five sites. The hepatosomatic index (HSI) revealed a higher level in winter samples (0.48% to 0.79%) in comparison to summer samples (1% to 1.5%). Histological observation of hepatic tissue of fish exposed during winter months in all sites, showed much less necrotic changes and hepatic vacuolation in the hepatic tissue of summer exposed fish. Immunohistochemistry evidences revealed a significant level of positive signals and Vtg localization in the hepatic tissue as the results support the histopathological alterations observed. Overall, the study suggests that there is possible local source or a chronic input of untreated and/or partially treated water due to the significant levels of phthalates, alkyphenols and estrogens detected in the Kuwait Bay. These levels were enough to initiate alteration in the hepatic tissue of fish exposed to the sewage outlets in Kuwait for two weeks.

Biography

N Al-Jandal has her expertise in Ecotoxicology and Fish Physiology. She has completed her PhD at the University of Exeter-United Kingdom. She is an Associate Research Scientist in Kuwait Institute for Scientific Research.

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