

OCCURRENCE AND ECOLOGICAL RISK ASSESSMENT OF ENDOCRINE DISRUPTING COMPOUNDS IN AN URBANIZED SUB-BASIN OF RIO DE JANEIRO STATE

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ABSTRACT

The João Mendes river is one of the most important contributors to the Piratininga/Itaipu lagoon system in Niterói oceanic region, Rio de Janeiro State, Brazil. It is known that this basin is suffering with the discharge of untreated domestic sewage. The objective of the present study was to contribute to the environmental diagnosis of this sub-basin by assessing the ecological risks related to the presence of endocrine disrupting compounds in the surface water of João Mendes river. Four monitoring campaigns were carried out during a seven-month period with four sampling points. One of these points was taken as reference (P0) assuming absence of relevant contamination due to sewage discharge plus three points (P1, P2, P3) suspected of being seriously affected by sewage discharge. The Ecological Risk Assessment (ERA) model applied was based on the Dutch Triad, which integrates Chemical and Ecotoxicological Lines of Evidence (LoE) to estimate the environmental risk of the studied area. The presence of Bisphenol-A and 17 α -ethynylestradiol were investigated as Chemical Substances of Interest (CSI) to integrate the Chemical LoE using ultraperformance liquid chromatography (UPLC-MS/MS). The ecotoxicological assays selected to integrate the Ecotoxicological LoE were: micronucleus frequency in fish *Oreochromis niloticus*; growth inhibition of the microalgae *Raphidocelis subcapitata*; reproduction of micro-crustaceous *Ceriodaphnia dubia* and; Yeast Estrogen Screen (YES) with genetically modified *Saccharomyces cerevisiae*. In P0 very low concentrations of CSI were found and no significant differences were observed when compared to the controls of the ecotoxicity assays. The sampling points P1, P2, P3 presented Extreme Risk (>0.75) in all campaigns for both Chemical and Ecotoxicological LoE. The Integrated Ecological Risk in all points was estimated as extreme (P1>0.99; P2>0.99; P3>0.99). The extreme risks were associated to the highest concentrations of 17 α -ethynylestradiol being this compound considered the main responsible for the risk attributed to the monitored points.

KEYWORDS: Urbanized Basin, Emerging Micropollutants, Ecological Risk Assessment, Aquatic Toxicology.