

TOXICOLOGICAL EVALUATION OF ENDOCRINE DISRUPTORS IN FORTALEZA LAGOON USING IN VITRO BIOASSAYS AND ANALYTICAL METHODS

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INTRODUCTION: Lakes are important aquatic systems for monitoring environmental pollution due to their low water exchange with the ocean and reduced current flow, which facilitates the accumulation of contaminants, including endocrine-disrupting compounds (EDCs). In southern Brazil, the state of Rio Grande do Sul contains the country's largest coastal plain, covering approximately 37,000 km², with 14,260 km² consisting of interconnected lagoon systems. This study focuses on Fortaleza Lagoon, a site used for recreational activities. **OBJECTIVE:** Water quality assessment of Fortaleza Lagoon using UPLC-MS/MS for detection of 17 α -ethinylestradiol (EE2), 17 β -estradiol (E2), and bisphenol A (BPA), along with E-screen assays based on gene expression analysis and cell proliferation using the MCF-7 cell line. **MATERIALS AND METHODS:** MCF-7 cells were exposed for 144 hours to water samples reconstituted in appropriate culture medium to assess cell proliferation using the sulforhodamine B (SRB) assay, and gene expression analysis was performed by RT-qPCR. Water samples were subjected to solid-phase extraction and chemical derivatization prior to the detection of endocrine-disrupting compounds by UPLC-MS/MS. **RESULTS AND CONCLUSIONS:** BPA and EE2 were identified at concentrations of 2.86 ng/L and 0.0012 ng/L, respectively. No increase in cell proliferation was observed; however, the downregulation of estrogen receptor 1 and 2 gene expression was identified. Even at low concentrations, the presence of these two EDCs suggests anthropogenic contamination in the lagoon. Although their presence did not lead to increased cell proliferation, samples from complex and heterogeneous matrices are often cytotoxic. Additionally, the literature indicates that BPA functions as a partial agonist, exhibiting weak receptor activation that may even result in reduced production of proteins associated with the estrogen signaling pathway. Despite only a small portion of the lagoon's margins being subject to anthropogenic occupation, most of the surrounding land is used for pasture, and no nearby contamination sources, such as effluent discharge, have been identified. These findings underscore the distinctive dynamics of lagoon systems and their tendency to accumulate pollutants.

Keywords: Environmental monitoring; MCF-7 cells; Sulforhodamine B.

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