

ECOLOGICAL RISK ASSESSMENT ASSOCIATED TO PESTICIDES IN JACAREPAGUÁ LAGOON, RJ/BRAZIL

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Abstract

The Jacarepaguá lowlands host one of the largest lagoon complexes in the State of Rio de Janeiro. The Jacarepaguá lagoon (JPAL), one of the four lagoons in this complex, gained international visibility after the Olympic Games in 2016 due to the construction of the Olympic park on its margins. The area has been the focus of intensive investments with urbanization and construction of residential condominiums with decentralized private sewage treatment systems, discharging effluents into the lagoon together with untreated sewage from slums. This study aimed to develop an Ecological Risk Assessment for the JPAL based on Water Quality, Chemical, Ecotoxicological and Ecological Lines of Evidence (LoE). Surface water samples were collected during four bimonthly campaigns at five sampling points in the JPAL. The Water Quality LoE based on physical-chemical parameters was used to estimate the Water Quality Risk (0.68 ± 0.06) classified as high risk (0.5-0.75). The Chemical LoE based on the presence of 116 pesticides was used to estimate the Chemical Risk (0.61 ± 0.21) also classified as high risk. The Ecotoxicological LoE based on chronic ecotoxicity assays (*Chlorella vulgaris* and *Ceriodaphnia dubia*) was used to estimate the Ecotoxicological Risk (0.78 ± 0.22) classified as very high risk (0.75-1.0). The Ecological LoE based on the analysis of richness and abundance of local algae species was used to estimate the Ecological Risk (0.72 ± 0.08) classified as high risk. Finally, the Environmental risk estimated by integrating the risks of these four LoE (0.77 ± 0.13) was considered a very high risk. It was concluded that JPAL reached an advanced stage of contamination and degradation of its ecosystem, demanding urgent risk mitigation actions, such as the end of clandestine sewage discharge into the lagoon. Further investigation is needed to elucidate the main sources and routes of pesticides found in JPAL with the purpose of preventing them from reaching the lagoon.

Keywords: Urbanized lagoon, Pesticides, Insecticide, Ecological Risk Assessment, Aquatic Toxicology, Biodiversity.