CONTAMINANTS OF EMERGING CONCERN AFFECT BIOCHEMICAL BIOMARKERS IN NEOTROPICAL FISH FROM AN INTERNATIONAL RIVER IN SOUTHERN BRAZIL

Tamiris Rosso Storck[1]; Jaíne Ames[2]; Silvana Isabel Schneider[1]; Antônio Cleber da Silva Camargo[3]; Adriele Tassinari[4]; Keli Hofstatter[1]; Edivania Gelati de Batista[2]; Renato Zanella[5]; Osmar Damian Prestes[5]; Gustavo Brunetto[4]; Jaqueline Ineu Golombieski[6]; Vania Lucia Loro[2]; Tadeu Luis Tiecher[7]; Barbara Clasen[1,8]

[1]Programa de Pós-Graduação em Engenharia Ambiental, [2]Programa de Pós-Graduação em Ciências Biológicas: Bioquímica Toxicológica, [4]Programa de Pós-Graduação em Ciência do Solo, [5]Laboratório de Análises de Resíduos de Pesticidas, [6]Programa de Pós-Graduação em Ciência e Tecnologia Ambiental, Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul (RS), Brasil. [3]Universidade Federal do Pampa, Uruguaiana, RS, Brasil. [7]Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul, Campus Restinga, Porto Alegre, RS, Brasil. [8]Departamento de Ciências Ambientais, Universidade Estadual do Rio Grande do Sul, Porto Alegre, RS, Brasil

INTRODUCTION: Water resources contamination by contaminants of emerging concern (CEC) occurs as a result of the disorderly conversion of natural areas for agricultural and urbanization purposes, and poses an important threat to biodiversity. Thus, biomonitoring is an effective tool for assessing the effects of contamination on exposed organisms, through the analysis of chemical and biological variables. AIM: Evaluating the presence of CEC, such as pesticides, human and veterinary medicines and hormones, in the Uruguay River, southern Brazil, and the possible effects on biochemical biomarkers of *Astyanax* spp. fish. MATERIALS AND METHODS: Three sampling sites were determined: a site on the middle Uruguay River called SB, and the others upstream (DMC) and downstream (URU) of the central site (around 540 km). Surface water samples for pesticide and drug analysis were collected monthly for a year (2022 – 2023). While water samples for physicochemical and microbiological analysis, sediment for pesticide analysis and fish for biochemical biomarker analysis and pesticide bioaccumulation were collected seasonally. RESULTS: Seventeen pesticides, thirteen drugs and one hormone were detected in the surface water samples. Four pesticides were detected in the sediment and three in the fish muscle. The site with the highest number of pesticides in the water and sediment and drugs was the URU. The biochemical biomarkers showed significant differences between the collection sites; however, seasonality was the main factor contributing to the biomarker responses. The redundancy analyses showed that pH and water temperature were the variables with the greatest influence on the biomarkers, followed by the pesticides thiamethoxam, carbendazim and tebuconazole. The Venn diagram showed that the joint analysis of these variables (pH, temperature, thiamethoxam, carbendazim and tebuconazole) has a synergistic effect on the biomarkers in *Astyanax* spp. CONCLUSION: The Uruguay River is contaminated with different classes of CEC (pesticides, medicines and hormones) and that the association of contaminants with natural seasonal fluctuations can potentiate the adverse effects on organisms.

Keywords: Biomonitoring; *Astyanax* spp; Uruguay River.

Funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Fundação Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).