METAL CONTAMINATION AND ASSOCIATED OXIDATIVE STRESS BIOMARKERS IN WHITE MANGROVE (*Laguncularia racemosa*) FROM AN IMPORTANT TROPICAL URBAN MANGROVE IN SOUTHEASTERN BRAZIL

Kamila Eduarda Souza Amaral[1,3*]; Erick Dias Campanelli[1]; Pedro Magno Avelar Araújo[1]; Camila Nunes Santos Lima[1]; Tatiana Dillenburg Saint'Pierre[2]; Rachel Ann Hauser-Davis[1]; Fabio Veríssimo Correia[1,3]

[1] Laboratório de Avaliação e Promoção da Saúde Ambiental, Fundação Oswaldo Cruz (Fiocruz), 21040-360 Rio de Janeiro, RJ, Brasil.
[2] Departamento de Química, Pontifícia Universidade Católica do Rio de Janeiro (PUC-Rio), 22453-900 Rio de Janeiro, RJ, Brasil.
[3] UNIRIO, Departamento de Ciências Naturais, Av. Pasteur, 458, Urca, 22290-240, Rio de Janeiro, RJ, Brasil

INTRODUCTION: White mangrove (*Laguncularia racemosa*) shows potential as a metal and metalloid contamination bioindicator, particularly in urban mangroves. Associations with oxidative stress biomarkers, however, remain understudied. OBJECTIVE: Assess metal and metalloids and oxidative stress biomarker associations in white mangrove tissues from an urban mangrove in Rio de Janeiro, Brazil. MATERIAL AND METHODS: White mangrove leaves, stems, pneumatophores, and propagules were collected from Rodrigo de Freitas Lagoon and freeze-dried. Aliquots (100 mg) were digested in nitric acid overnight and analyzed by ICP-MS to determine As, Cd, Hg, and Pb. Metallothionein was determined by Ellman's reaction at 412 nm, lipid peroxidation (LP) according to Esterbauer and Cheeseman (1990) at 532 nm and hydrogen peroxide (H_2O_2) according to Alexieva et al. at 390 nm. Data were analyzed using the Shapiro-Wilk test (normality), Kruskal-Wallis (group differences), and Spearman's correlation (metal-biomarker relationships). RESULTS AND CONCLUSION: Mean metal and biomarker concentrations differed significantly among tissues ($p < 0.05$). All elements were detected in all tissues, except Hg in propagules. Pneumatophores presented the highest As, Cd and Pb concentrations (0.70 ± 0.21, 0.28 ± 0.12 and 4.72 ± 1.05 mg kg^{-1} dw). Leaves presented the highest Hg concentrations (0.01 ± 0.001 mg kg^{-1} dry weight), as well as MT and H_2O_2 levels (1.31 ± 0.08 and 13.93 ± 0.91 μmol g^{-1} dw), while the lowest levels of these biomarkers were detected in pneumatophores (0.38 ± 0.08 and 7.40 ± 1.97 μmol g^{-1} dw). LP was the highest in pneumatophores (0.01 ± 0.004 μmol mg^{-1} ptn dw) and the lowest in leaves (0.003 ± 0.001 μmol mg ptn dw). As and Cd were significantly correlated in stems and leaves ($r = 0.786$, $p = 0.021$; $r = 0.905$, $p < 0.01$), as well as As in leaves and Hg in stems ($r = -0.905$, $p < 0.01$), suggesting synergistic effects via a shared metabolic pathway. H_2O_2 was significantly associated in pneumatophores and propagules ($r = 0.857$, $p = 0.014$), indicating systemic oxidative damage. Cd in pneumatophores correlated strongly with MT in propagules ($r = 0.821$, $p = 0.023$), indicating a potential Cd detoxification pathway in these tissues.

Keywords: Ecotoxicology; Elemental Contamination; Urban mangrove.