Oxidative stress in *Laguncularia racemosa* environmentally exposed to mercury and copper in two mangroves in the state of Rio de Janeiro, Southeastern Brazil

Camila Nunes Santos Lima[1]; Pedro Magno Avelar Araújo[1]; Rebeca Dias Coutinho[1]; Erick Dias Campanelli[1]; Tatiana Dillenburg Saint'Pierre[2]; Fábio Veríssimo Correia[3], Rachel Ann Hauser-Davis[1]

[1]Laboratório de Avaliação e Promoção da Saúde Ambiental (LAPSA), Instituto Oswaldo Cruz, Fiocruz, Rio de Janeiro, RJ, Brazil
[2]Laboratório de Espectrometria Atômica (LABSPECTRO), Departamento de Química, PUC-Rio, Rio de Janeiro, RJ, Brazil
[3]Universidade Federal do Estado do Rio de Janeiro (UNIRIO), Departamento de Ciências Naturais, Rio de Janeiro, RJ, Brazil

Introduction: Mangroves are important ecosystems, frequently impacted by anthropogenic activities (Mochel, 2016; Souza, et al., 2018). Rodrigo de Freitas Lagoon and Sepetiba Bay, in the state of Rio de Janeiro, are highly urbanized mangrove areas exposed to both organic and inorganic pollution. Metal assessments in mangrove plants displaying bioindicator potential, such as White mangrove (*Laguncularia racemosa*), in these areas, however, are still lacking, and even less so concerning oxidative stress effects.
Objective: Determine the profiles of the toxic mercury (Hg) and essential copper (Cu) in *L. racemosa* organs from Rodrigo de Freitas Lagoon and Sepetiba Bay and correlate their concentrations to oxidative stress cellular damage biomarkers.
Material and methods: Leaves, stems and roots from the two areas were freeze-dried, and 100 mg aliquots analyzed by ICP-MS for Cu and Hg determinations following acid digestion and heating at 100 ºC for 5 hours. Protein carbonylation and lipid peroxidation were determined by UV-spectrophotometry at 450 and 535 nm, respectively. The Shapiro-Wilk test indicated data non-normality, so nonparametric tests were applied.
Results and conclusion: In Lagoa Rodrigo de Freitas, Cu ranged from 3.48 ± 5.72 to 7.37 ± 1.75 mg kg^{-1}, and Hg appeared in low levels (0.04 ± 0.00 to 0.0995 ± 0.0577 mg kg^{-1}) across plant tissues. Lipid peroxidation was highest in stems (0.0044 ± 0.0033 mg kg^{-1}) and lowest in roots (0.0001 ± 0.0019 mg kg^{-1}), while protein carbonylation peaked in roots (7.24 ± 6.38 mg kg^{-1}) and leaves (6.88 ± 4.32 mg kg^{-1}). Significant correlations were found between Cu in roots and peroxidation in leaves ($r = 0.79$), and Cu in stems and carbonylation in leaves ($r = -0.75$). In Sepetiba, Hg was higher (up to 0.1914 ± 0.126 mg kg^{-1} in leaves), and Cu showed strong correlations with lipid peroxidation and protein carbonylation in various tissues ($r = 0.66–0.76$, $p < 0.05$). No consistent Hg-biomarker correlations were observed. Correlations between Hg in soil and in *L. racemosa* leaves have been previously observed in mangroves in estuaries in the state of Espírito Santo, Brazil, reinforcing its potential as a bioindicator of metal contamination (Souza et al., 2014).

Keyword: Mangrove vegetation; Metals; Oxidative stress; Biomarkers.

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