

IMPACT OF TEMPERATURE INCREASE AND LEAD EXPOSURE ON ABC PROTEIN ACTIVITY IN THE WHITE CLAM

Izabela Dill e Caldas; Richard Furtado Franco; Regina Coimbra Rola; Marta Marques Souza.

Universidade Federal do Rio Grande - Rio Grande - Rio Grande do Sul
Programa de Pós Graduação em Ciências Fisiológicas

INTRODUCTION: The increasing emission of greenhouse gases has led to a rise in global temperatures, threatening the balance of ecosystems. Simultaneously, metals such as lead (Pb) are found at concerning concentrations in the Lagoa dos Patos (RS) and adjacent coastal zones. The simultaneous exposure to elevated temperatures and metal contamination poses a challenge to aquatic biota, potentially compromising cellular defense mechanisms such as the activity of ATP Binding Cassette (ABC) family proteins. **OBJECTIVE:** To analyze the effects of lead exposure (0.01 and 0.2 mg/L Pb) combined with thermal stress (25 °C) on ABC protein activity in tissues of the bivalve *Amarilladesma mactroides*. **MATERIALS AND METHODS:** Animals were collected from Cassino Beach and maintained at 22 °C for 7 days. A subset of the animals was gradually acclimated to increased temperature (+1 °C/day) until reaching 25 °C (based on Intergovernmental Panel on Climate Change projections). During a 96-hour exposure, the animals were divided into the following groups: control group, Pb I (0.01 mg/L Pb, limit established by CONAMA), Pb II (0.2 mg/L Pb, maximum value found in the estuary) maintained at 20 °C; thermal stress (ET), Pb I + ET, and Pb II + ET, maintained at 25 °C. ABC activity was analyzed in the gills and mantle, measured based on Rhodamine B accumulation and fluorescence in these tissues. Data were subjected to two-way Analysis of Variance (ANOVA) to identify significant differences between treatments. **RESULTS AND CONCLUSION:** In both tissues, lead exposure increased ABC protein activity at 20 °C. The same effect was observed at 25 °C and with the combination of elevated temperature and 0.01 mg/L Pb. However, in the presence of 0.2 mg/L Pb at 25 °C, ABC activity was inhibited. These results suggest that global temperature rise may negatively affect the ability of bivalves to eliminate toxic compounds, especially in environments contaminated with significant concentrations of heavy metals, thereby compromising cellular defense and organism health.

Keywords: Climate change; heavy metals; Thermal stress; *Amarilladesma mactroides*; Marine bivalves.

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