THE IMPACT OF SUBSTRATE IN HEAVY METALS CONTENT IN LIMPETS FROM AN OCEANIC ARCHIPELAGO

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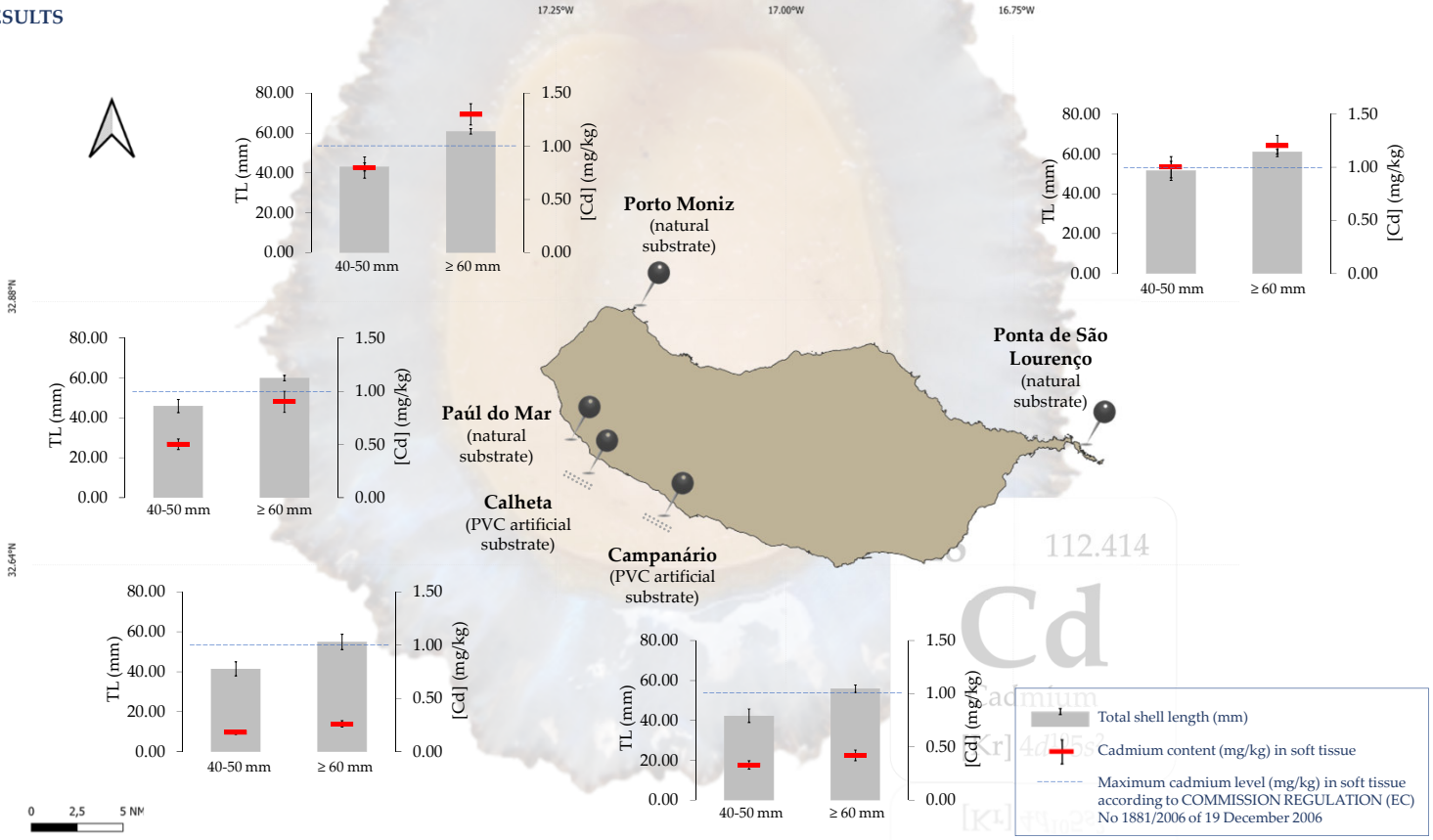
ABSTRACT

Oceanic islands of volcanic origin, such as Madeira archipelago (Northeast Atlantic Ocean), typically present high levels of heavy metals of geogenic origin, namely cadmium (Cd), easily mobilized to the surrounding ecosystems. Limpets are vulnerable to bioaccumulation of heavy metals in soft tissues due to their grazing feeding habits. In this study, authors focused on *Patella aspera*, one of the most economically relevant limpet species in the Autonomous Region of Madeira. Soft tissues of limpets collected from three subtidal coastal zones and two from PVC artificial substrates on offshore structures were analysed. The results showed that cadmium content in soft tissue of limpets from PVC artificial substrates were much lower than those collected from the natural substrates. Furthermore, it may constitute a possible approach to the cultivation of limpets in offshore structures that could help in mitigating the incidence of cadmium in this shellfish, increasing food security associated with the consumption of limpets.

METHODOLOGY

Samples were collected from different locations of Madeira Island between July and September 2023. Ponta de São Lourenço, Porto Moniz and Paúl do Mar were selected has sampling locations for natural substrates. Calheta and Campanário aquaculture structures were the PVC artificial substrates from which limpets were collected for analysis. Soft tissue was separated from the shells and analysed through graphite furnace atomic absorption spectrophotometry (EN 14084:2003).

RESULTS



All locations under study showed that the upper length range (> 60 mm) presented a higher concentration of cadmium than the lower length range (40-50 mm), supporting the principle of bioaccumulation, already described for these matrices. In Porto Moniz and Ponta de São Lourenço, the cadmium content in the upper length range exceeded the maximum EU legislated limit (1.30±0.10 and 1.20±0.10 mg/kg, respectively). At Paúl do Mar, the cadmium levels for higher length range (0.90±0.10 mg/kg) was near to the maximum content allowed. **In the other hand, for artificial PVC structures, both length ranges presented much lower cadmium content for both studied locations (< 0.5 mg/kg).**

CONCLUSIONS

Limpets are a highly appreciated delicacy in this region of Portugal, both by tourists and the local population. Limpets from offshore structures, after natural settlement, demonstrated lower concentrations of cadmium, when compared to those collected in natural substrate, of basaltic origin. Thus, the use of floating, submerged structures can be a solution for reducing the concentration of cadmium in the edible part of limpets, without the visual impact that offshore aquaculture structures can have.

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