

Phytotechnology implementation in marine and freshwater environments: case study of floating wetlands

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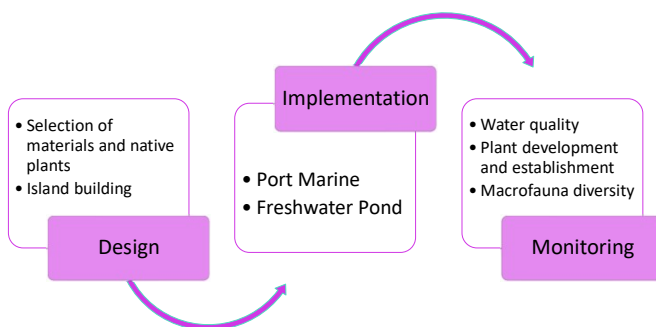
Introduction

Environmental biotechnology, such as bioremediation and phytoremediation, is a promising field that uses natural resources, including microorganisms and plants, to eliminate toxic organic contaminants from water, soils and air (Calheiros et al. 2020). This technology offers an attractive alternative to other conventional remediation processes due to its relatively low cost and environmentally friendly method. In this project, we used floating treatment wetland (FTW), an effective and sustainable technology for wastewater treatment. This method has been widely adopted for the treatment of various types of polluted waters, including agricultural runoff, stormwater, and industrial effluents. In FTWs, plants are vegetated on a floating mat while their roots are extended into contaminated water, acting as biological filters. Nutrients and potentially toxic metals/elements are absorbed from wastewater by plants through their roots, while organic matter is degraded by microorganisms forming biofilms on the roots and on the surface of the mat (Shahid et al. 2018). Thereby, in the present study it was implemented 4 FTW prototypes, of different materials and in different environments (marine and freshwater) to compare their efficiency and establishment on site.

Aim

- To compare a FWI of hand-assembled recycled material with a FWI commercial cork based system established in terms of water quality and macrofauna biodiversity in two environments: freshwater and marine.

Methodology



Results

According to a bibliographic review and the definition of plant species well known by the research group based on previous tests, 1 island of recycled material and 1 island of cork were implemented in each of the environments: marine (Port of Leixões) and freshwater pond (Paço de Calheiros). So far, the plants are in the acclimatization period and are developing well (Figure 1).

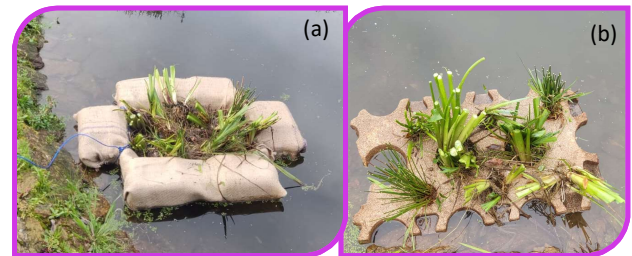


Figure 1: (a) FTW of recyclable material and (b) FTW of cork respectively after implementation in lagoon

Conclusion

In the present study 4 FTWs were implemented (with different floating materials: 2 of cork and 2 of hand-assembled recycled material), in order to compare the performance and their establishment in two environments: marine and freshwater. The marine environment was associated to a port marina and the freshwater environment to a pond. Selected plant species were considered for each environment. Monitoring of the system is being carried out along time concerning the associated biodiversity, plant establishment and floatability evaluation of the floating platforms. Based on the analysis of these results, this work hopes that these nature-based solution can contribute to better water management of water bodies, in order to involve the conservation and rehabilitation of ecosystems.

References

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