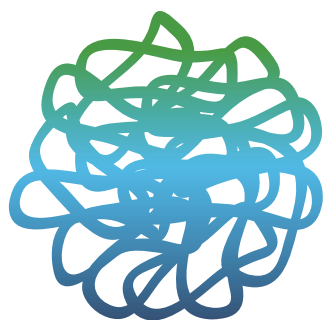


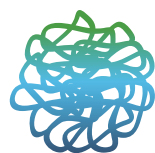
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BOOK OF ABSTRACTS

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ECOFIBRAS PROJECT: A STRATEGY TO IMPROVE ECOSYSTEMS AFFECTED BY INVASIVE PLANT SPECIES IN MACARONESIA

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ABSTRACT

This work summarises the objectives and first findings of ECOFIBRAS project, a research project funded by Interreg MAC programme for the research and development at the Macaronesian region. The main project objective is the valorization of residues from control campaigns of invasive plant species, by the obtaining of cellulose fibres for their use in composites.

INTRODUCTION

Invasive species are a threat to the preservation of ecosystems, being their presence especially dangerous in areas with high biodiversity. Macaronesian region, formed by the archipelagos of Canary Islands, Madeira and Azores, accounts for about a 25 % of the plants mentioned in the habitats Directive (Protection of biodiversity, Natura 2000; 92/43/CEE), although it only represents a 0.2% of the European Union territory (1), being most of them considered as endemic species.

A number of invasive plant species is affecting natural ecosystems, endangering some of the endemisms found in this region. ECOFIBRAS project aims at achieving a better environmental state of preservation of natural ecosystems by studying the distribution of four invasive plant species in the three Macaronesian archipelagos, performing a biological, chemical and physical characterization of them and trying to valorize them to obtain composite materials, with the final objective of supporting periodic actions of ecosystems cleaning. In particular, plants studied within Ecofibras framework are cane (*Arundo donax* L.), fountain grass (*Pennisetum setaceum*), castor oil (*Ricinus communis* L.) and century plant (*Agave Americana* L.); the first of them is included in the list of 100 most dangerous invasive species catalogue published by the International Unit of Conservation of Nature (IUCN) (2), being all of them considered in the Spanish catalogue of invasive species (3).

RESULTS AND CONCLUSIONS

ECOFIBRAS project is on the last year of project, finishing in December 2019. Results obtained from the first activities have allowed establishing an updated map of the presence of the four species of study in the Macaronesian archipelagos, being this update mainly focused on protected areas, such as spaces included in Natura 2000 regions, LIC, natural parks... As a summary, it can be concluded that *Arundo* can be found in the three archipelagos, as well as *Ricinus*, although this last is only found in antropized spaces. *Agave* and *Pennisetum* can only be considered as dangerous in Canary Islands, although some first populations of *Pennisetum* have been found in Madeira.

Biological, chemical and physical characterization of the four species was performed, including reproductive strategies assessment. Some mechanical devices were developed for the extraction of cellulosic fibres from these plants, also characterizing them in terms of infrared spectrum, scanning

electron microscopy, thermogravimetric analysis and chemical composition determination.



Fig.1 Some elements designed and manufactured for fibres obtaining (*Arundo donax L.*, *Agave Americana* and *Pennisetum setaceum*, from left to right)

This allowed blending obtained fibres with different polymer matrices (polyethylene, polypropylene and polylactic acid), in different ratios, from 5 to 40 %, to be processed by compression or rotational moulding. Figure 1 shows the aspect of some of the obtained composites.

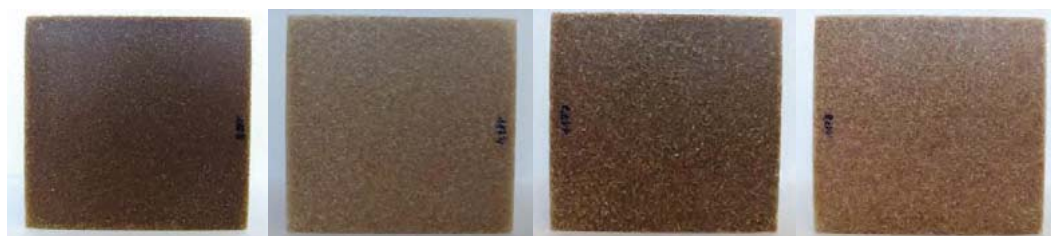


Fig.2 Pictures of some composites obtained by rotational moulding with 10 % of *Ricinus communis*, *Arundo donax L.*, *Pennisetum setaceum* and *Agave americana* fibres (from left to right)

This study is a first approach to the valorization of residues obtained from periodic campaigns of control of these species, performed by public authorities, usually at local level. It is important to highlight that the main objective of this research is not focused on the production of an economic profitable activity, but to the reduction of wastes to be disposed from ecosystems maintenance actions and the investment of potential incomes into preservation policies.

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