SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

Department of Sciences and Technology of Biomass - DCTB

Valorization of organic and inorganic wastes

UBiA – Environmental Biotechnology Researching Unit

The following PhD students are developing research in some of the areas referred below:

- **Maria Bernardo**
- **Rui Barbosa**
- **Susana Santos**

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LNEG

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Researcher

Assistant Professor
Integrated researcher of UBiA
PhD in Environ. Engineering
Grad. in Environ. Engineering

Objectives

Combustion residues – ashes:

1. To produce new materials for civil engineering works
2. To use them in wastewater treatment systems to remove nutrients and metals

Pyrolysis residues – chars:

1. To improve their properties in order to produce chars with high quality
2. To use the improved chars in wastewater treatment systems to remove metals

Potentially biodegradable organic wastes from agro-industries:

1. To improve biogas and methane yields through anaerobic co-digestion and pre-treatments
2. To produce bio-hydrogen through anaerobic fermentation

Methodology

Ashes:

- To incorporate fly and bottom ashes in new formulations of concrete
- To assess the mechanical, chemical and ecotoxicological properties of new materials
- To apply the ashes in chemical adsorption assays and to assess the removal kinetics

Chars:

- To submit the chars to thermal and chemical processes to improve their active sites
- To apply the improved chars in adsorption assays and to assess the removal kinetics

Organic wastes:

- To submit the wastes to thermal pre-treatments and co-mixtures previously to the anaerobic fermentation processes

Expected Results

Ashes:

- New formulations of concretes able to be used in coast protection
- New adsorption treatment system based in the use of ashes that can be able to reduce in more than 80% the concentrations of P and toxic metals

Chars:

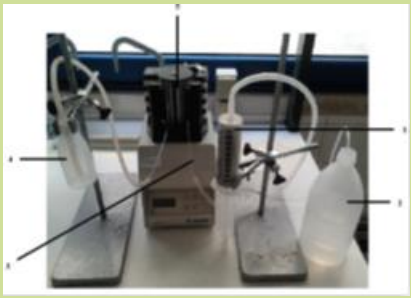
- New adsorption treatment system based in improved activated carbon that can be able to reduce in more than 80% the concentrations of toxic metals

Organic wastes:

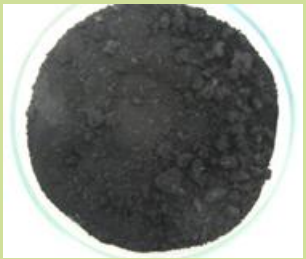
- New pre-treatment systems and co-mixtures formulations to improve the biogas yield in more than 20% (v/v) and to improve bio-hydrogen production in dark fermentations.

Concrete with biomass ashes

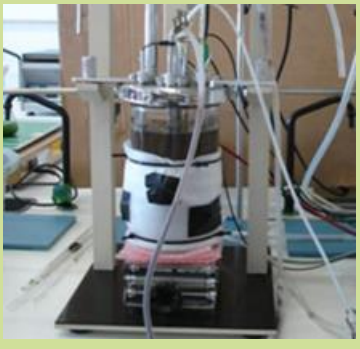
Fixed-bed column system with ashes to remove P



Treated char



Anaerobic fermentation



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