

Engineered and reusable nanoporous carbons for advanced water treatment.

1st Progress Report FCT. Empower +

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ABSTRACT

The main objective of the EMPOWER+ project is to develop new high-performing GACs and PACs and reusable magnetic powdered activated carbons (MPACs), prepared by steam and CO₂ activation of pine nut shells (PNS/Steam and PNS/CO₂ activated carbons) following the protocol developed for PACs under the framework of LIFE Impetus project.

The first year of EMPOWER+ project was mainly focused on the development of the activated carbon materials, with controlled particle sizes, and on their characterization (task 1 and 2). The developed and commercial PACs were tested (task 3) with waters from the treatment train of a drinking water treatment plant. Assays started with fractions <20 µm of PNS/steam and commercial PACs for NOM and pharmaceutical compounds (PhCs) removal, following procedures already implemented by LNEC. The settleability tests started by evaluating the PAC fraction 20-36 µm. Preliminary assays addressing the reuse of GAC exhausted with PhCs (task 7) were performed aiming to evaluate the effect of the adsorbate and of the particle size on the thermal regeneration process

The EMPOWER+ project main outputs during 1st year included 5 final projects of graduation students; 3 Summer & ERASMUS internships, 1 oral and 3 poster presentations in national conferences.

Keywords: Activated carbon adsorption; Novel activated carbons; Drinking water treatment; Column and hybrid adsorption processes; Pharmaceutical compounds