



PhD Program in Civil, Chemical and Environmental Engineering May 2022 Call, XXXVIII cycle - Starting date: November 1 st 2022

Curriculum: Chemical, Materials and Process Engineering
Thematics: Sustainability of products

Project: Medium-low temperature pyrolysis of biomass to produce chemicals and biofuels

Keywords: Thermal cracking, biomass characterization, exhausted biomass, biofuel production.

Brief Description:

In the last years, considerable efforts have been made to find new solutions for replacing fossil raw materials with renewable sources. The main reason behind these efforts lies in the need to reduce greenhouse gas emissions and in the production of non-fossil origin biofuels and chemical intermediates.

After the recovery of compounds of interest, microalgae and different types of biomasses can be further treated by pyrolysis at medium-low temperature (300-600 °C).

Indeed, the thermal cracking of macromolecules in the biomass can lead to the production of liquid and gaseous products. Depending on the operating conditions or on the kind of biomass used, such products can find application as alternative biofuels.

At the same time, the possibility of obtaining chemical intermediates of interest for the industrial sector will be investigated.

The topics of research will cover the study of different matrices to be tested, the evaluation and optimization of the pyrolysis conditions (temperature, time, etc.), the development of analytical methods for a complete characterization of the liquid, gaseous and solid products.

The possibility of obtaining new products from biomasses and exhausted biomasses fully places this activity in the trend of green chemistry.

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