

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY "POLITEHNICA" BUCURESTI
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FACULTY OF CHEMICAL ENGINEERING AND BIOTECHNOLOGIES
DEPARTMENT OF BIORESOURCES AND POLYMER SCIENCE

DOCTORAL THESIS - Thesis summary

Microalgae Processing Work

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The first topic addressed in this PhD thesis is the effect of different stress factors on microalgae growth and production of valuable compounds and the main proposed objectives were: (1) designing and constructing facilities for ultrasound-assisted batch cultivation of microalgae, based on two types of equipment (MMM Clamp-on and Hielscher UP200St-G); (2) studying the effects of stress factors in the culture environment, by varying the composition of the medium, on biomass productivity and bio-compound production; the ability to purify dairy wastewater using microalgae; (3) highlighting the potential of ultrasound in terms of biomass productivity and valuable product content by implementing this type of treatment during the dairy wastewater treatment process; (4) factorial scheduling of experiments carried out in the ultrasound-assisted method for single-step extraction of total carotenoids and lipids from microalgae biomass.

For the second topic addressed in this PhD thesis, that is obtaining small olefins by Fischer - Tropsch synthesis, the main proposed objectives were: (1) improvement and testing of Fe-based catalysts by integrating metal ions (potassium, manganese, zinc) for the optimization of Fischer-Tropsch synthesis, in established formulations for iron-based catalysts, to improve catalytic activity, CO conversions, selectivities and yields in C₂ - C₄ unsaturated hydrocarbons; (2) using unconventional techniques (US) as a method of impregnating the active component on the support during the catalyst preparation phase to improve conversions and selectivities in the products of interest; (3) comparative study of several types of catalyst supports to determine the optimal formulation for obtaining the products of interest; (4) variation of the ratio of H₂ to CO to improve conversions and favor the production of unsaturated C₂ - C₄ hydrocarbons as major products.