

CIVIL AND ENVIRONMENTAL ENGINEERING

MUR DM 117/ENI - Optimization of technologies related to planar photobioreactor for the production of microalgal biomass for environmental and energy purpose

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Context of the research activity	<p>Title: "Optimization of technologies related to planar photobioreactor for the production of microalgal biomass for environmental and energy purpose"</p> <p>The activity of the doctoral scholarship will be aimed at the development of engineered apparatus for the maximization of microalgal growth. We will work on the management of light in terms of quality and quantity suited to each individual algal strain. The processes for administering carbon dioxide from pure sources will be optimised. Finally, several different growth protocols will be evaluated for each individual strain in order to obtain specific bio products.</p> <p>Progetto finanziato nell'ambito del PNRR - DM 117/2023 - CUP E14D23001990004</p>
Objectives	<p>The activity will focus on experimental equipment, patented in collaboration with the Polytechnic of Turin, whose innovations allow to finely manage the main microalgal growth parameters. Specifically, the activity will be organized in improving and fine-tuning the process controls, and also to be able to manage them through computer simulation models (biokinetic model). This activity will therefore involve hardware changes to the actual experimental equipment on which it will be decided to operate, the choice of the appropriate equipment to be implemented, the calibration of the sensors, the development of the control and implementation algorithms, the verification of the correct acquisition of data and the remote management of the system. The next phase will be to hook up to the hardware an adequate biokinetic model, which allows in real time to modify the controlled growth parameters and govern them. This activity will be carried out by performing numerous experimental tests useful for data collection, which will constitute the</p>

database to draw on for the development of the model and for the verification of the execution of the model once implemented on the experimental apparatuses. The objective of the doctoral activity will be to choose the most suitable microalgal species for the purposes of ENI, both in terms of carbon biofixation and production of second metabolites with a certain degree of profitability. At the end of the activity, useful results will be produced for the realization of simplified hardware equipment capable of producing algal biomass with the required characteristics at a cost compatible with the provisions of the market that will receive the finished product.

Skills and competencies for the development of the activity

Buona conoscenza delle pratiche di laboratorio, esperienza pregressa in ambito di accrescimento microalgale, dimestichezza nell'acquisizione di dati da sorgenti analogiche e digitali, post processing di serie numeriche con strumenti avanzati quali matlab o phyton, conoscenza dei processi legati all'assorbimento di anidride carbonica con metodi fototrofici.