PHD RESEARCH PROPOSAL

Doutoramento em Engenharia da Refinação, Petroquímica e Química (EngIQ)

BIOREFINERY OF MACROALGAE: DEVELOPMENT AND IMPLEMENTATION OF PROCESSING STRATEGIES IN AN INDUSTRIAL UNIT IN PORTUGAL

Summary / Framework

Macroalgae have an enormous potential to be used as a feedstock for obtaining a multitude of products through a biorefinery approach. Over the last few years, the cultivation of macroalgae has proved to be a pathway with high potential for replacement products in food, pharmaceutical, cosmetic, nutraceutical and biomaterials applications. The biorefinery concept aims to convert macroalgae biomass in diverse products using a cascading approach from higher-to-lower value, including bioproducts such as polysaccharides (e.g. agar, carrageenan, fucoidan, alginates, starch and cellulose), long-chain polyunsaturated fatty acids (such as omega-3 docosahexaenoic acid and eicosapentaenoic acid), pigments (carotenes, xanthophylls, fucoxanthin, and peridinin), phycobiliproteins (phycocyanin and phycoerythrin) and phenolic compounds. The full value-chain of the biomass is the critical step since it is important to involve several market sectors. The success of the macroalgae business in Europe (or in the western world) is closely linked not only to the optimization of the industrial production process, but also to the optimization of the process-chain involved in obtaining added-value products from macroalgae: production, harvesting, dewatering, disruption, extraction, separation, purification and conversion. The focus of this PhD proposal is the development, optimization and implementation of strategies for the cultivation and biorefinery of macroalgae with the aim to exploit the maximum value of the biomass.