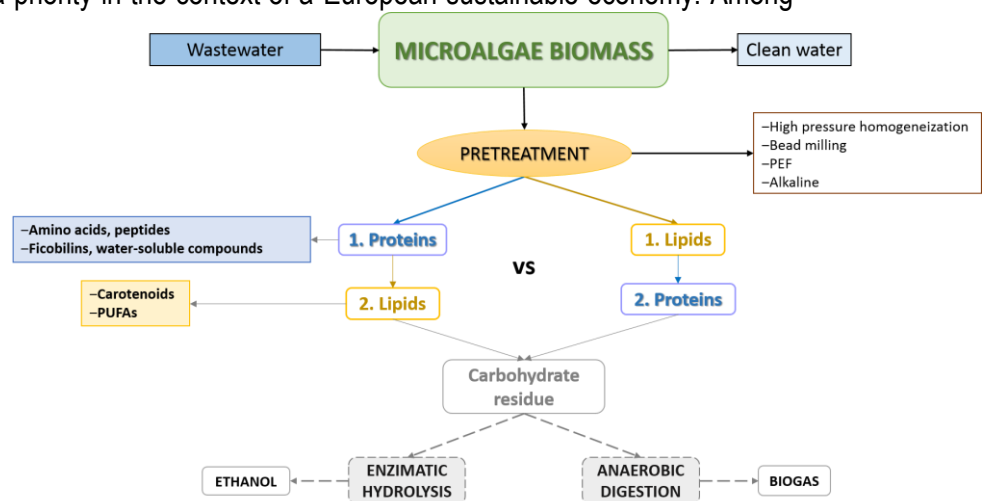


Title: Valorization of proteins and lipids from residual microalgae biomass from agroindustrial wastewater treatment.

Abstract: This project aims to develop an economic and sustainable process (based on biorefinery concept) to obtain bioproducts and bioenergy from residual biomass constituted of microalgae and bacteria grown using organic matter and nutrients naturally present in agroindustrial wastewaters, studying different options of extraction and purification for two of the main fractions present in this biomass, proteins and lipids.

Processes of food and agriculture industry generate a huge amount of residual liquid streams with high concentration of organic matter, nitrogen and phosphorous compounds, which confer an elevated economic potential. The most effective remediation of these wastewaters is carried out by consortia of microalgae-bacteria, a process that also manages to retain these contaminants compounds and hence enabling later retrieval and recovery of them. Given the increasing scarcity of natural resources and increased waste generation, the development of these processes should be and is a priority in the context of a European sustainable economy. Among all the possibilities, sequential recovery of the different biomass fractions (proteins, lipids and carbohydrates), applying the concept of biorefinery for its complete exploitation, appear as the preferred alternative. From each of these fractions a variety of products with economic interest can be obtained.



In this project, laboratory scale processes will be studied and optimized, to obtain peptides and amino acids from protein extracts, fatty acids from lipid fraction, pigments (chlorophylls, carotenoids, phycobilins), ethanol and precursors of bioplastics by fermentation of sugars from the remaining carbohydrate fraction after extraction of lipids and proteins, and / or biogas by anaerobic digestion of residual biomass. Basic steps of this process will be the pretreatment of the biomass (in order to break the cell wall and promote selective extraction of target fractions), and subsequent separation and purification of the obtained bioproducts. The diverse techniques, the alternative sequencing of extraction processes, and the operating conditions have an effect on the remaining components and the quality of bioproducts obtained, and will be evaluated. In addition, the potential applications of these bioproducts require special monitoring of bacterial activity and absence of pathogens and other toxic compounds in them.