STUDY OF DIFFERENT PRETREATMENTS ON *Spirulina platensis* BIOMASS FOR BIOETHANOL PRODUCTION

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Aquatic biomass presents a large variety of compounds that can be used for the production of third generation (3G) biofuels, mainly carbohydrates, lipids, proteins and co-products, which can be obtained and used in the production of biofuels such as bioethanol from rich carbohydrate biomass [1]. Nowadays Spirulina platensis biomass can be considered as an alternative since it has a great capacity to produce carbohydrates [2]. This work presents a study of 3G biorefinery process from Spirulina platensis biomass; diverse types of hydrothermal pretreatments (autoclave 121 °C 20 min; freezing/thawing -4 °C and gelatinization 100 °C 10 min; gelatinization 100 °C 20 min; microwave 121 °C 20 min; ultrasound bath 20 min) and their effects on enzymatic hydrolysis with α-amylase and amyloglucosidase in order to obtain fermentable sugars were evaluated. Moreover, two fermentation strategies were evaluated; simultaneous saccharification and fermentation (SSF) and pre-saccharification and fermentation (PSF), the conditions used for the fermentation were pH 4.5, 35 ° C, 150 rpm and Saccharomyces cerevisiae yeast was employed, all strategies were used as alternatives in 3G bioethanol process. Results showed that the pretreatment with autoclave (121 ° C 20 min 5% solids) was better for the cellular breakdown and accessibility of enzymes to cellular matrix in the enzymatic hydrolysis. The treatment of pre-saccharification and fermentation (PSF) with 5 % solids pre-treated with autoclave at 121 ° C for 20 min and pre-hydrolyzed with α-amylase and amyloglucosidase after fermentation obtained a maximum yield of conversion of glucose to bioethanol of 79.34 %. Simultaneous saccharification and fermentation (SSF) was the best strategy for the obtention of bioethanol from pretreatment biomass of Spirulina platensis with a yield of 81.12 %. These results are good since there are no previously reported studies of the use of SSF for bioethanol from microalgae biomass production.

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