

TITLE: EFFECT OF CHEMICAL PRE-TREATMENT ON CARBOHYDRATE RELEASE FROM CYANOBACTERIA *Spirulina platensis*

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ABSTRACT:

Research related to the biofuel production using microalgae (third generation biofuels) is achieving space in the world due to its greater sustainability, since they do not directly compete with the production of food by cultivable areas. *Spirulina platensis* is a microalga whose chemical composition is widely known, which has considerable potential for the production of biofuels. To design a viable process, it is necessary that the carbohydrates from the microalgae become fermentable sugars, as the hydrolysis of the microalgae biomass can be carried out in a chemical or enzymatic way. The objective of this work was to evaluate the effect of chemical pre-treatments (acid and alkaline) while releasing carbohydrates from the microalgae biomass. Two complete factorial experimental designs using central points were performed, considering as study factors the acid or base concentration and the temperature. After each pre-treatment, the carbohydrate released was evaluated by spectrophotometric and chromatographic methods. The results demonstrated that, for acid pre-treatment, both factors influenced carbohydrate release, and the highest percentage (53%) was obtained with 6% sulfuric acid and a temperature of 120°C. For alkaline pre-treatment, the most influential factor was temperature, and the highest percentage (44%) was obtained with 12% sodium hydroxide at 80°C. The results reveal that the use of chemical pre-treatment can be very useful when associated to another subsequent process of carbohydrates hydrolysis, in order to allow the release of all the fermentable sugars present in the biomass of the microalga, enabling the usage of this method for the biofuel production process.

Keywords: microalgae, acid pre-treatment, alkaline pre-treatment, biorefineries.

Development Agency: Universidade de Passo Fundo (PIBIC/UPF)