Cultivation of red macroalgae in Northeastern Brazil: Optimization of processes for the production of organic compounds with economic importance

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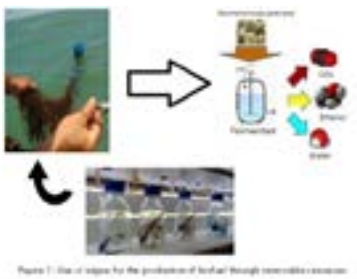
The first studies on the economic use of marine macroalgae in Brazil, arose in the decade of 70. Besides the ecological importance, they are used worldwide as food, fertilizers, biopharmaceuticals and ficocoloides as biomass for the production of biofuels. Marine macroalgae have rapid growth, high levels of carbohydrates, and can be grown in wastewater, without the use of land and agricultural inputs. The Laboratory of Carbohydrates and Lectins (Carbolec) in partnership with the Laboratory of Biotechnology Algae and Processes (BioAP), both of the Federal University of Ceará, Brazil, conduct research in the area of cultivation, developing and optimizing new technologies, directing the species cultivated for hydrolysis processes in order to produce ethanol and organic acids. The macroalgae *Gracilaria birdiae, Hypnea musciformis and Solieria filiformis* were cultivated in the open sea at the beach of Flecheiras, municipality of Trairí, Ceará. The cultivation (open sea) was performed using the "long-line" technique, and in the laboratory the spore culture technique was used. For the hydrolysis, the dry alga was hydrolyzed in acid solution, the residues were weighed and the hydrolyzed volume was recovered. The sterile hydrolyzate was fermented by *Saccharomyces cerevisiae* yeast strains. Aliquots were collected from the fermentation medium to analyze the fermentation products. The concentrations of these products were determined by High Efficiency Liquid Chromatograph. Promising results have emerged in the growing area, where daily growth rates were satisfactory with an average of 5.0%. In the laboratory, the technique of spore culture using the species *G.birdiae* proved effective for its applicability to seedling production and repopulation of degraded areas. Tests applying acid hydrolysis of cultured macroalgae showed that mild hydrolysis conditions are capable of generating significant yields of fermentable carbohydrates when compared to lignocellulosic materials. Thus, the use of algae for the production of biofuel through renewable resources reduces environmental impacts.



Results and Conclusions:

1. Sukwong P, Ra C H, Sunwoo I Y, Tantratian S, Jeong G T and Kim S K (2018) Improved fermentation performance to produce bioethanol from Gelidium amansii using Pichia stipitis adapted to galactose. Bioprocess Biosyst. Eng. 41(7):953-960.

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Biography

Natássia A Ribeiro has her expertise in biological compounds extracted from seaweed and its biological activities. She has completed her Graduation degree in Biological Sciences and her Master's and Doctoral degree in Biochemistry at Federal University of Ceará, Fortaleza, Brazil. Upon graduation, she has worked with anticoagulant, antithrombotic and pro-inflammation activities. In her Masters and Doctoral degrees, she has worked with the antinociceptive and anti-inflammatory activities, always using biomolecules such as polysaccharides of algae. Currently, she is working with the use of algae in food and participates in a project to grow algae in laboratories and its use to generate ethanol and organic acids.

Notes: