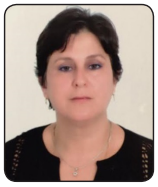

Optimization of bioethanol production from agro-biological resource at high temperature

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Abstract:

The cost of saccharine and starchy biomasses represents approximately 60% of the cost of producing first generation bioethanol. Inputs, seeds, crop irrigation and crop transportation are important energy factors to consider. In order to find alternative substrates to costly and food competing biomasses, we explored an agro-biological resource that is drought resistant and tolerant to a wide range of soil and climatic conditions: Prickly pear (Opuntia ficus-indica).

This work aims to optimize the production of first generation bioethanol by Kluyveromyces marxianus YMEK23, a thermoresistant yeast strain, from prickly pear juice; a substrate rich in sugars (98g L-1). The use of a Box-Behnken experimental design showed that the fermentation temperature and the medium pH are the main parameters influencing ethanol production. The impact of these factors was modeled in a second-degree polynomial equation. The results showed that the maximum amount of ethanol produced is 41 g L-1 obtained at 37°C and at pH of 5. However, supplementing nitrogen has a limited impact on ethanol production.

The kinetics of batch fermentation under optimum conditions, showed a very active fermentation metabolism of K. marxianus on this substrate, translated by an early and exponential production of ethanol as well as a rapid consumption of sugars. The maximum amount of ethanol (41 g L-1) was reached after 16 hours of fermentation only.

The high yield of ethanol obtained 0.43 g g-1 make prickly pear biomass an attractive and economical substrate for the production of bioethanol compared with the conventional substrates currently used by the biofuel industry.

Biography:

Latifa Jamai is an Assistant Professor at Sidi Mohamed Ben Abdellah University and a founding & leading member of Biodiversity, Bioenergy and Environment Consortium. Latifa holds a PhD in biochemistry and molecular biology, with highest honors, for research in "Improvement of the production of Biofuel "Ethanol" from starch by Candida tropicalis". Latifa has multiple scientific publications in renowned academic journals.

Recent Publications:

1- Production of bioethanol during the bioremediation of olive mill wastewater at high temperatures

2- Bioethanol production process using the non-conventional yeast Candida tropicalis

3- Production of ethanol from starch by free and immobilized Candida tropicalis in the presence of α-amylase

4- Physiological difference during ethanol fermentation between calcium alginate□immobilized Candida tropicalis and Saccharomyces cerevisiae

5- Biodegradation of polyphenols with immobilized Candida tropicalis under metabolic induction

6- Physiological difference during ethanol fermentation between calcium alginate-immobilized Candida tropicalis and Saccharomyces cerevisiae

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