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Bioethanol production by immobilized *Saccharomyces cerevisiae* using different lignocellulesic materials

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Abstract

Ethanol from biomass is an attractive and sustainable energy source for transportation fuel to substitute gasoline. Second generation ethanol production utilizes cheaper and non-food feed stocks like lignocelluloses or municipal solid waste, could make ethanol more competitive to fossil fuels. Basically, most of the raw materials used for the production of bio ethanol were corn grain and sugar cane. However, it is also important to see the potential of the other agricultural raw materials rich in fermentable carbohydrates such as tomato wastes and straw since it is available in Palestine and cheaper compared to the others.

The aim of the present study is the production of low cost cellulosic ethanol using basically the agro wastes like tomato waste and wheat straw and make a comparison between the efficiency of free and immobilized yeast cells in calcium alginate matrix with microwave-assisted acidic pretreatment.

In this study we have investigate the efficiency of immobilization technique for bioethanol production using *Saccharomyces cerevisiae* strain which isolated from yogurt. This strain was identified according to morphological and biochemical characterization tests.

Microwave-assisted acidic pretreatment were performed for both wheat straw and tomato waste and show high improvement in reducing sugar amount compared with convection mode of heating of dilute 7%HCl and 5%H_2SO_4 hydrolysis. Calcium alginate was used as immobilization matrix for *Saccharomyces cerevisiae*. The maximum amount of ethanol **(641mg/g)** produced by free cells when used straw pretreated with microwave-assisted 5%H_2SO_4 hydrolysis and (**543.51 mg/g)** for Tomato waste using immobilized cells with microwave-assisted 7%HCl hydrolysis.

Key words: Bioethanol**,** *Saccharomyces cerevisiae*, Immobilization, Microwave, Wheat straw, Tomato waste.