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First Generation Bioethanol from Some Varieties of Dates Grown In the Region of El-Oued in the South of Algeria.

Mohammed Tayeb Oucif Khaled[1]*, and Ladjel Segni[2]

[1]Process Engineering Department, University Elchahid Hama Lakhder, BP789 El-Oued, Algeria.
[2]Process Engineering Department, UKM University Ouargla, 30000 Ouargla, Algeria.

ABSTRACT

Bioethanol is an innovative solution that is respectful of the environment and able to reduce pollution. The first generation bioethanol is produced from sugary or starchy foods by a fermentation process. In warm areas, arid and semi-arid areas, dates can be the best substrate for the production of bioethanol. After statistical study of the number and the production of palm dates in the state of El Oued and also after determining yield of bioethanol per kilogram of dates, our study shows that 1 hectare of date palm can produce either debt 68.85quintar of dates or 2409.75litres of bioethanol per hectare, not to mention the byproducts of fermentation: the nuclei of dates, fibers ...etc. The application of this technique of transformation encourages all kinds of date palms cultivations and facilitates the marketing of all varieties of dates.

Keywords: Bioethanol, fermentation, anaerobic, palm tree, dates, El-oued.

Corresponding author

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INTRODUCTION

Bioethanol is a fuel produced mainly from vegetable raw materials. The so-called first-generation bioethanol is produced from plant reserves organs store sugar as beet [1,2] and cane [3], starch such as wheat [4-5], corn [6-7], potatoes [8] and some vegetable oils [9,10,11] by a fermentation process. These organs reserves also being used for human food, biofuel production is in competition with food production.

The second generation bioethanol not use the plant storage organs but the whole plants or plant waste [12-15]. What is valued is the lignigne and cellulose plants. Third generation bioethanol is produced from algae [16-18].

The number of date palms in Algeria is over 18 million and the number of varieties that exceeds one thousand varieties[19-20]. The State of El Oued in the south of Algeria product 29.54% of the national production of date, The number of date palms in this State has a significant increase with a number nearing 3.4 million date palms for an area of over 36335 ha, producing about 231,2 thousand tons [21]. The dates of low market values represent approximately 50% of the total production of dates, these dates can be used as raw material for the production of bioethanol by biotechnological processes.

The work presented in this study is to estimate the production of bioethanol per hectare of date palm and compared this performance with yields of other agricultural products used as raw materials for the production of bioethanol.

MATERIALS AND METHODS

Vegetable matter

For this study we used four varieties of dates are: Ghars, Tinissine, Taquermeste and Boucheire. Fig.1 shows photos of these varieties.

Fig 1: Photo of dates: a- Variety Ghars, b- Variety Tinissine, c- Taquermest, d- Variety Boucheire

Statistics provided we have collected with the help of the agricultural interests of the state of El Oued.

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Biological materials

For the production of ethanol from dates was used dry baker's yeast, *Saccharomyces cerevisiae*. This yeast is kept in a cool, dry place. It is characterized by these abilities has fermented a significant amount of sugar. It is commercially available under several brands and acceptable prices.

Production of ethanol

Bioethanol is produced in the laboratory according to the protocol shown on the following flowchart (Fig.2).

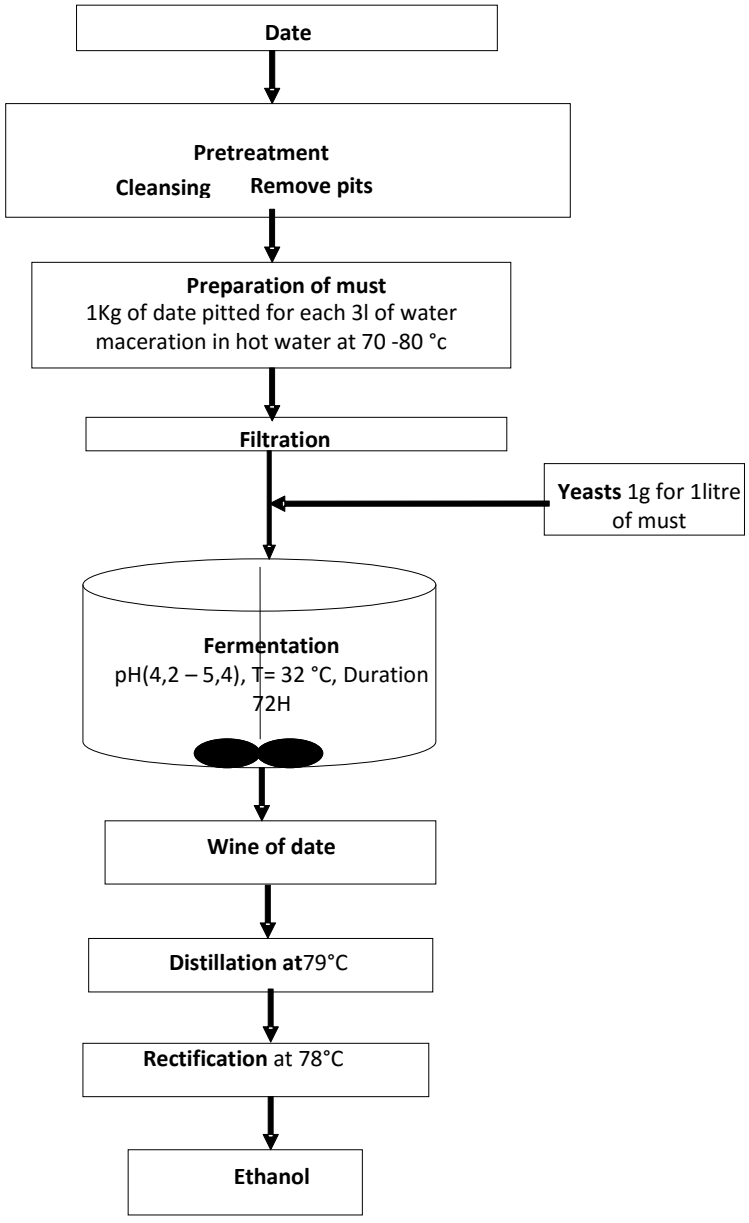

Fig. 2: Protocol producing bioethanol from dates

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RESULTS AND DISCUSSION

The price of dates Ghars variety is very high on the local market from the other three varieties, so the use of dates variety Ghars is unprofitable. The average return of the three varieties (Tinissine, Taquermeste and Boucheire) is 350 ml of ethanol per 1Kg of these varieties. According to the agricultural interests of the state, the 33580 hectares of palm produce 2312000 quintals of dates at the rate of production estimated at 68.85 quintals per hectare [21], the transformation of 50% of this production (dates of low market values) can produce 1204,875 liters of ethanol per hectare. The following table (table.1) comparing the price and yield of some food products used in the production of biométhanol.

Table 1: Price and bioethanol yield of some food products

	Yield t/ha [22]	Price $/t [22]	Biométhanol yield l/ha [23]
Wheat	2.82	184.33	2040
Corn	8.25	160.68	3000
Potato	29.4	263.68	2400

The production cost of bioéthanol from sugar beet is between 0.359 and 0.482 Euro/l [24], so that the processing costs are the lowest. The low price of these varieties of dates in the market promotes the production of bioethanol from dates which allows dates to be a good choice for ethanol production.

CONCLUSION

Wastes from dates varieties: Tinissine, Taquermeste and Boucheire grown in the region of Oued Souf can be converted into bioethanol by fermentation. We arrived at an average rate of ethanol production of about 350 ml per kilogram of dates. The rate of dates production in this state estimated at 68.85 quintals per hectare or 2409.75L of bioethanol per hectare, not to mention the byproducts of fermentation: the nuclei of dates, fibers ...etc.

The application of this technique of transformation encourages all kinds of date palms cultivations and facilitates the marketing of all varieties of dates. In addition to all that, the bio ethanol could be used as a bio-fuel because of its characteristics as a green energy.

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