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## Dewaka Banana As An Alternative Energy Source

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### Abstract

Dewaka's banana grows well and abundant bananas production in Merauke area, but with a little bit sour taste when they're ripe made this bananas often the second choice compared to another kind of bananas. The research has been conducted to determine concentration of bioethanol produced from dewaka's banana flour. Banana flour was obtained from crused the slices of dried bananas. Then concentration of ethanol can then be identified through a series of tests in the laboratory. The results of gas chromatographic analysis show that dewaka banana can be used as an alternative energy source with bioethanol content of 83.43%. The concentration was result of 5 (five) days fermentation with yeast. The hydrolysis which is used was acid hydrolysis, using hydrochloric acid. The optimum concentration of hydrolysis was 1.5 N HCl, the optimum temperature was 90°C, whereas the optimum hydrolysis time was 70 minutes.

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### INTRODUCTION

The world is lack of fuel because fuel from fossil is less. Bioethanol is an alternative to substitute the function of fuel. Bioethanol is an ethanol as the result of fermentation from biomass by helping of microorganism.

The raw material for bioethanol production was sugary ingredients, starchy and fibrous. Many reseaches have been done to make bioethanol from raw material such as cassava, sweet potato, sago, corn, molasses/drops and other wastes (banana weevil and cassava's bark), such as made by Nurdyastuti [2] and Solikhin [1].

Dewaka's banana grew well and abundant bananas production in Merauke area, but with a little bit sour taste when they're ripe made this bananas was often the second choice compared to another kind of bananas, such as

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kepok bananas. For today, unripe dewaka has been used in household industry as banana chips.

Another function of this banana was to make flour, but is still in the current study. But the sour taste of Dewaka's made the to used the flour as alternative energy sources. That's why the concentration of ethanol from dewaka's banana flour was need to know.

This study was aimed to determine the concentration of ethanol in dewaka's banana flour. This research was expected to obtain the availability of alternative energy sources, because of some dewaka banana was expelled caused it have sour taste.

### MATERIALS AND METHODS

The study was conducted at several locations, in Laboratory at Faculty of Agriculture, Musamus University such as the preparation of Dewaka's flour sample. The preparation was done twice, in August 2013 and October, 2013. In August 2013, the sample was sent to the Teknologi Pangan dan Hasil Pertanian laboratory, Faculty of Agricultural Technology, Gadjah Mada University for determinated proximate analysis and reduction sugars. Another sample was sent to Politeknik Negeri Makassar laboratory to analyze the hydrolysis of glucose to the determination of ethanol in this flour.

The materials which were used in this study are banana flour, yeast, and some consumable materials for testing samples. The device used was devices at preparation, testing sample and stationery. The yeast which is used in this study was fermipan (trademark of *Saccharomyces cerevisiae*).

Banana's flour was sent to Teknologi Pangan dan Hasil Pertanian laboratory and Politeknik Negeri Makassar laboratory for determinated proximate analysis, reduction sugar and bioethanol concentration. The cycle of the analysis consisted of : determination of optimum concentration of HCl in the hydrolysis of banana flour [1], determination of glucose content with Luff Schoorl method [2], determination of optimum temperature of hydrolysis [3], the optimum time of hydrolysis [4], the determination of glucose content before hydrolysis (Luff Schoorl method) [5], determination of glucose content to determine the optimum fermentation time [6], and to produce bioethanol depend on the optimum condition of fermentation [7].

The data which is taken was data of proximate, reduction sugar and concentration of bioethanol.

### RESULTS AND DISCUSSION

Before doing the hydrolysis analysis to get bioethanol, the proximate analysis has done first to know the main content of the materials such as water, ash, fat, protein, carbohydrate, crude fiber and calories of dewaka banana flour. Beside that, sugar reduction analysis was also performed to determine whether the material could be converted into bioethanol. Proximate analysis result and reduction sugar from the study can be seen in Table 1.

Table 1. The Proximate and Sugar Reduction Results.

Analysis	Average (%)
Water content	10.265
Ash	2.721
Fat	0.555
Protein fk:6,25	4.025
Carbohydrate by diff	82.435
Crude fiber	4.947
Calories (Cal/100 gr)	347.605
Reduction sugar	11.755

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