

FERMENTATION OF BANANA FRUIT TO PRODUCE BUTANO

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ABSTRACT

Banana dominates the export and domestic market of Taiwan. According to statistics of the past 5 years, an estimate of 300,000 tons of bananas is produced annually which make its yield the highest among all the pomological products in Taiwan. 10% are found to be below par in the midst of commercialization.

With the widespread of environmental awareness, the concept of energy conservation by recycling is becoming a highly plausible alternative. Butanol has shown great potential to be developed as a renewable energy source. It produces 25% more energy than that of gasoline and yet its properties remain similar to gasoline. Butanol is more miscible with gasoline than ethanol and it does not corrode pipelines easily as ethanol does.

To analyze the yield of butanol, different concentrations (2%, 6%, and 18%) of discarded banana fruit were added to three culture mediums of *Clostridium acetobutylicum*. A pure culture medium without added waste was also prepared as a controlled group. *Clostridium acetobutylicum* will utilize the banana fruit's high composition of carbon, vitamins, minerals and trace metals content. Hence, it is proven that the carbon content has a direct effect on the yield of butanol. In this process, acetone, ethanol and butanol are produced. ABE fermentation is allowed to occur for 120 hours under constant environmental conditions. Finally, gas chromatography was used to isolate and calculate the yield of butanol.

Experimental results showed that fermenting 2% of banana fruit for 120 hours produced the highest yield of 8.78 g / L of butanol and 3.25 g / L of acetone. Culture medium with added banana fruit decreased the formation rate of butanol, but increased the yield of butanol.

However, ethanol yield in all groups showed no significant difference. This means, addition of banana fruit to increase ethanol yield is not significant.

KEYWORDS: ABE Fermentation, Bioresource, Clostridium, Acetobutylicum