

**BIOETHANOL PRODUCTION FROM *TACCA*
LEONTOPETHALOIDES STARCH BY CO-
CULTURING OF RAGI TAPAI WITH
SACCHAROMYCES CEREVISIAE IN A STIRRED
BIOREACTOR TANK**

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ABSTRACT

Bioethanol can be produced from fermentation of *Tacca leontopetaloids* starch by culturing or co-culturing *Saccharomyces cerevisiae* and ragi tapai in bioreactor. The comparison study between different cultures for fermentation was done which were single culture of *S.Cerevisiae*, and co-culturing of ragi tapai with *S.Cerevisiae*. The results show that for single culture, the production of ethanol was averages at 0.2774 g/l which is lower than co-culture which is averages at 0.2805 due to co-culture has better condition to produce more ethanol effectively. The fermentation had been done for 72 hours and the sample was taken every 2 hours for 12 hours and every 6 hours for 60 hours. The total 16 samples was collected throughout the experiment. Glucose content, ethanol and cell dry weight analysis were used in this experiment to observe the production of ethanol.

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CHAPTER ONE

1. INTRODUCTION

1.1 BACKGROUND STUDY

This research is mainly to produce bioethanol. There are many ways to produce ethanol, but in this research, it is decided to use fermentation to do it. By fermentation, there are few things need to be considered such as the culturing methods, fermentation methods and type of culture used as well. There are wide variety of starches to be chosen to complete this research such as *Tacca leontopetaliods* (*T.Leontopetaloids*) starch, potato starch and sweet potato starch. All of them has its own advantages and disadvantages. With all consideration taken, it is decided to take *T.Leontopetaloids* starch as starch for this research.

There are also many type of microbes can be chosen, one of it are *Saccharomyces cerevisiae* (*S.cerevisiae*). The microbes are important because it is key to producing ethanol. It will consume provided sugar and will produced ethanol as product. The chosen microbes is *S.cerevisiae* mainly because it is easy to get and one of the best yeast to produce ethanol (Hajar et al., 2017; Thatoi, Dash, Mohapatra, & Swain, 2016).

There are three different culture types that can be used and the chosen culture are co-culture. Co-culture is proven better then pure culture and mixed culture is not suitable for the research. In this study, the culture used are by co-culturing of *S.cerevisiae* and ragi tapai.

Therefore, the title of this research are ‘Bioethanol production from tuber starch by co-culturing of ragi tapai with *S.cerevisiae* in a stirred bioreactor tank’.

1.2 OBJECTIVES

- To produce bioethanol from tuber starch by co-culturing of ragi tapai with *saccharomyces cerevisiae* in a stirred bioreactor tank
- To study effect of different culture in bioethanol production