UNIVERSITI TEKNOLOGI MARA

MICROBIAL BIODIVERSITY PROFILING OF SPONTANEOUS FERMENTATION OF *GARCINIA MANGOSTANA* PERICARPS

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ABSTRACT

The spontaneous fermentation of *Garcinia Mangostana* pericarps was carried out over 90 days of period in order to enumerate the population dynamic of fermented mangosteen pericarps. The fermentation was conducted anaerobically in 50L benchtop bioreactor. Then, the samples was collected on each sampling day at day 5, 10, 20, 30, 45, 60, 75 and 90. The collected samples were cultivated on four different type of media which are Mac Conkey (MC), Man Ragosa Agar (MRS), Plate Counting Agar (PCA) and Potato Dextrose Agar (PDA) in order to determine the presence of *Enterobacteriaceae,* Lactic Acid Bacteria, Total Bacteria and Yeast respectively. DNA of bacteria and yeast were extracted and followed by PCR amplification using universal primer set. The sequencing of 16S rDNA gene of bacterial isolates yielded 5 genera and 7 species which are *Enterococcus* (1 species), *Bacillus* (1 species, *Gluconobacter* (1 species), *Enterobacter* (2 species) and Azotobacter (1 species) while the sequencing result of 5.8S-ITS rDNA gene of random selected isolates on PDA media from all sampling days yielded only 2 genera with 5 species including *Hanseniaspora* (4 species) and *Candida* (1 species). An *Enterococcus faecalis* which is one of the common species of Lactic Acid Bacteria (LAB) was become major bacterial group that presence in random selected isolates. The LAB has an ability to improve the nutritional value of food by providing and acidic condition in fermented food. In this acidic condition shows that the pathogens could not survive started from day 10 until the end of fermentation. However, in this study the small amount of LAB population was identified due to the limited number of random selected isolates.

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TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

1.1 Research Background

Garcinia mangostana L. or mangosteen is a tropical evergreen fruit tree that is from Clusiaceae family (Obolskiy, Pischel et al. 2009). It consists of white pulp in an inner part while the dark purple pericarp in an outer part of the fruit (Berenice, 2017). The mangosteen is called as 'Queen of Tropical Fruit' because of their remarkably pleasant flavour (Obolskiy, Pischel et al. 2009). This kind of fruit tree is commonly cultivated in Southeast Asia such as Philippines, Thailand, Indonesia and Malaysia. It is required about 10 or more years to become completely mature which is ranges from 6 to 25m in height (Gutierrez-Orozco and Failla 2013). In the past hundreds years, the different part of G. mangostana such as bark, roots and fruit hull have being used in Southeast Asia as a source of medicine. It is widely used to treat many kind of diseases because of their medicinal and health properties.

The vast amount of xanthones in mangosteen is belong to polyphenols class. It have being reported that the diverse structure and chemical properties of xanthones have multiple of health promoting properties such as anti-oxidant, anti-cancer and anti-inflammatory activity(Li, Thomas et al. 2013). There are many others biological active compounds that can be found in the mangosteen rind such as tannins, phenols, terpenes and anthocyanins (Shan et.al, 2011). From the Nutrients journal, Fabiola Gutierrez-Orozco and his colleague, Mark L. Failla, reported an interest towards mangosteen fruit and xanthones has significantly increase based on the number of scientific reports that have being found in Science Direct, Google Scholar, Scirus and PubMed by using mangosteen and xanthones as search keywords. In 1980 to 2008, the reports retrieved is about 158 while from 2008 until March 2013, the retrieved reports is abruptly increase. The number of articles is about 454 published articles Plate 1.