UNIVERSITI TEKNOLOGI MARA

BIODIVERSITY ANALYSIS OF LACTIC ACID BACTERIA (LAB) IN NATURALLY FERMENTED *GARCINIA MANGOSTANA* (GM) PERICARP

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ABSTRACT

This study aims to isolate bacterial species and to enumerate the Lactic acid bacteria (LAB) species of Garcinia Mangostana (GM) pericarp cider at different fermentation stages as well as to establish bacterial growth profile during fermentation of GM pericarp. Throughout the fermentation process, cell mass concentration is determined by using cell dry weight method. The highest cell dry mass obtained was 0.008 g at day 29 meanwhile the lowest was 0.001 g at day 88. Due to secretion of Lactic acid by LAB, the pH of the fermentation broth decreasing and overall pH range recorded at 3.46 to 4.00. Since the main concern of this paper is biopreservation and food safety of the GM cider, at this range of pH common foodborne pathogen unable to growth and survive. It was detected that LAB is a predominant species of microorganism present in the cider (2.85 – 6.04 log CFU/ml). The Gram stain done on the samples show the bacteria present starting at the beginning until the end the fermentation has a purple, violet stain when observed under microscope. Most of the sample appeared Staphylococcus, Staphylobacilli, Streptococcus and Streptobacilli. Based on this gram stain, LAB is the dominant bacteria that present during the fermentation period. During fermentation carried out, there were three phases where different strain of LAB dominated the cider.

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INTRODUCTION

1.1 RESEARCH BACKGROUND

According to National Cancer Institute, about 1.6 million of world population suffered from cancer in year 2016 and the numbers keep increasing annually. Until today, there is no treatment has been found and the only way to reduce the aggressiveness of the cancer is by chemotherapy session which is costly. Garcinia Mangostana (GM) or known as Mangosteen by local is common tropical fruit in subtropical region. Also known as "queen of fruit", it is believed that Mangosteen has a medicinal value contained in the pericarp that can acts as immunomodulatory, antioxidant as well as anticancer. This therapeutic value contributed by the richness of xanthone, phenolic and mangostins content in the pericarp (Yu, et al., 2009). GM pericarps can be utilized as nutraceutical product and currently with sell worth of USD 800 million in 2008. By consuming active ingredient contained in the pericarp, risk of cancer and degenerative diseases can be decrease according to the epidemiological reports.

GM fruit has its own defense system against microbial where it secrete a yellowish substance when the pericarp is damaged. This antimicrobial substance contained various bioactive components such as α-mangostin, β-mangostin, γ-mangostin, garcinone B, and garcinone E and these component can be classify as xanthone alongside with components such as mangostinone, tanins and falavnoid (Shibata, et al., 2013). Some study believed α-mangostin and γ-mangostin can acts as metastasis inhibitor of cancerous p53 mutant cell that caused breast cancer to human in animal model. Besides that, these components also able to act as anti-oxidant, anti-bacteria and it have an anti-inflammatory properties. When consumed, it inhibits the release of biological component from bone marrow-derived mass cell (BMMC) which related to the immune response. Response such as skin inflammation and allergic has been studied using BNMC obtained from male mice at different concentration of α-