UNIVERSITI TEKNOLOGI MARA

BATCH ANAEROBIC FERMENTATION OF POMEGRANATE FRUIT: TIME-AXIS ANALYSIS OF SPECIES DIVERSITY

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

This research focuses on the anaerobic fermentation of pomegranate as well as the microbial analysis which will be conducted through a series of dilution, streaking on agar, and Gram staining in a period of 3 months. The purpose is to observe what type of microbes would exist from this fermentation during the course of 12 weeks. Theoretically, the outer skin layer of every fruit would exist a natural fauna of microorganisms which comes from the soil, water or air. When a fruit is left uneaten for a period of time, it would slowly disintegrate which is normally caused by the fungus present on the outer skin layer because most fruit contains high properties of antibacterial. According to Erkmen (2016), *Geotrichum candidum* is a fungus that could easily accumulate on a poorly sanitized processing equipment and contaminate the fruits and vegetables that are to be processed. Throughout the period of 12 weeks, there will be different types of fungus or bacteria present in the fermentation sample and therefore a time profile for this fermentation was produced at the end of this research.

Theoretically, on the outer skin layer of every fruit there would exist a natural fauna of aerobic and anaerobic microorganisms including bacteria and fungi which could come from the soil, water or air. When a fruit is left uneaten beyond its time of being ripe, it would fall to the ground. Then, the fungi will initiate the disintegration of the fruit by releasing enzymes which will attack the skin of the fruit. The reason being, most fruits have quite a hard layer of skin for protection. Once the skin is broken and the juicy inside of the fruit is exposed, the aerobic bacteria from the skin would proceed to slowly disintegrate the whole fruit to its basic elements.

When a ripe fruit is taken and eaten by humans or other creatures, the aerobic and anaerobic bacteria that are transferred from the skin of the fruit to the juicy inside of the fruit by the eater's hand upon breaking the skin are swallowed together with the fruit into the stomach. Since there is no oxygen in the alimentary canal, only the anaerobic bacteria will play a role in breaking down the fruit through an anaerobic