UNIVERSITI TEKNOLOGI MARA

MICROBIOLOGICAL PROPERTIES AND MOLECULAR PROFILING OF MICROBIAL ECOSYSTEMS DURING SPONTANEOUS FERMENTATION OF *CARICA PAPAYA* LEAVES

SITI NORKHAZWANI BINTI ABDUL KHATAB

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ABSTRACT

Spontaneous fermentation has been identified that it can improve the quality of foods characteristics. It defined that this fermentation undergoes naturally without any starter culture. The microflora at the leaves in the fermentation will give the result on the unknown microorganisms present. This study was conducted to investigate the microbiological properties that present in the fermentation process. This fermentation is conducted for 100 days and this study is isolated, identified and characterized the microorganisms associated with the fermentation Carica papaya leaf on different selective media. Their biochemical characteristics have been investigated by using phenotypic characterization which was gram staining and catalase production. Based on the result on MRS media, all pure isolates of MRS media resulted were staining and mostly were catalase positive. The negative catalase results occurred due to contamination happened. For result on PCA, DRBC, BHI, Urea and MacConkey media, the media resulted were staining and were given positive catalase results. For further methods to know the community of the microbial, molecular profiling method has been used. The microorganisms that present in this study were genus *Lactobacillus, Bacillus Pichia, Candida, Entrobacter, Klebsiella, Cronobacter, Saccharomyces* and *Lactococcus. Lactobacillus plantarum* was one of the Lactic Acid Bacteria and was the most frequently isolated bacteria in this study. The *Bacillus* genus also was detected throughout the fermentation process starting from the Day 60 until the end of the fermentation process. At the beginning of the fermentation process, Bacillus genus does not detected. This study indicated that *Lactobacillus spp*. was the predominant microorganisms that present in this fermentation of the *Carica* papaya leaves.

CHAPTER 1

INTRODUCTION

1.1 Background

Carica papaya Linn or commonly known as papaya is tropical fruit because of it usually has been cultivated in the tropical region that often seen in orange-red, yellow orange and yellow green colour of the skin. This *Carica papaya* Linn is from the *Caricaceae's* family (Ayoola & Adeyeye. 2010). *Carica papaya* is the genus in the family of *Caricacea*. This plants are belong to the group of plants that known as Laticiferous plants. Fermentation has been known as one of the oldest method in the world in order to preserve food (Nuraida L. 2015). Fermentation process usually has been used widely in the Food and also Pharmaceutical industries. By using fermentation, the shelf life of the foods can be improved (Ranjan M et al. 2014). There are some traditional fermented foods that have been popular internationally such as *kimchi* (Chang et al. 2008). Other traditional fermented food such as tempe (Nurdini et al.2015), *Nem chua* (Vietnam) (Nguyen. 2015), gundruk (Himalaya) (Tamang et al. 2005).

Fermentation also has been used because the production method is largely low technology at household scale with majority of the processes of the production that has employ spontaneous fermentation using naturally microorganisms that present in the raw materials. However, the use of the starter culture developed from the repeated of back-slopping processes to perform the best adapted strain (Hozapfel, 2002). Because of this reason, the fermentation method has been recommended as the method for the food preservation and the method to nourish the population in impoverished areas (Hozapfel, 2002). Recent studies has revealed that fermented food which has lactic acid bacteria (LAB) has role in promoting positive health impacts because LAB has known as probiotics which it can give benefit to toxic inactivation, immune stimulation and lowering plasma cholesterol. Other than that, LAB also has preventing and treating diarrhea and inhibits the growth of the foodborne pathogenic (Nuraida L. 2015).

Plants are commonly used for medicinal purpose because they are generally cheap and the best sources of the pharmacologically substances that actives. They are also