

## CHAPTER I

### INTRODUCTION

Malaysia is blessed with chilies of different varieties and varying degree of pungencies from mild to very hot. One such chili variety developed by UKM is Cilibangi. The fruits are medium size and extremely hot. The hot and spicy taste of this variety makes it suitable to be used as raw material for hot pepper fermented sauce (Mo et al., 2015). Red chili peppers (*Capsicum annum*) is the main ingredient used for chili sauce production. Until now, the well-known chili sauce made from fermentation of chili fruits is made from a type of chili *Capsicum. frutescens* (Sota et al., 2013; Buzzanell et al., 1995). This product has a long history and it takes two to three years to be produced by spontaneous fermentation. Fermentation of chili fruits in 20% rock salt require at least four to six weeks relying in natural flora lactic acid fermentation for production of hot sauce (Koh, 2005).

Indeed, fermentation rate can be speedup by inoculating defined strain LAB as the starter for the production of fermented product. It facilitates to control over the initial phase of a fermentation process. A study done by Juan et al. (2015) showed stable and uniform fermented caper berry can be obtained by inoculating *Lactobacillus. plantarum* Lb 9 after 7 days of fermentation. This study was supported by Jagannath et al. (2015) who developed a functional food made from green leafy vegetables obtained by controlled lactic acid fermentation within 6 days fermentation.

*Lactobacillus plantarum* (*L. plantarum*) is recognized as salt-tolerance bacterial has been widely used for various type of vegetable fermentation. In fact, *L. plantarum* is the most essential species in pickle and sauerkraut production as it is recognized as high acidity producers in most fruit and vegetable fermentations (Simel et al., 2015; Wiander & Korhonen, 2011). *Lactobacillus pentosus* (*L. pentosus*) is a well-known commercial species in producing good flavor compound especially in dairy industry (Ruiz-Barba & Jimenéz-Diéz, 2012; Pan et al., 2014). It was applied as commercial starter in pilot scale application to shorten the fermentation time of black table olive (Servili et al., 2006). Until now, there is no research has been carried out on developing flavor producer LAB that suitable for vegetable fermentation especially in chili fermentation.

Developing a good starter culture need to consider a few criteria. The success of developing a fermented vegetable with unique flavor characteristic can be manipulated by selection of appropriate starter that can modify the flavor which is acceptable for consumers (Mariana et al., 2014; Andreja et al., 2012). The efficiency of LAB strain to carry out fermentation is dependent on pH value as well as total acid production (Albert et al., 2010). Rapid acid production with considerable amount of lactic acid formation tells the success of fermentation process (Simel et al., 2015).

Lactic acid fermentation resulted to production of different type of volatile organic compound that impart the aroma of food (Braga et al., 2015; Bryant & McClung, 2011). Presence of volatile compound interfered directly the sensory quality of the fermented vegetables (Pontes et al., 2009). Indeed inoculating the flavor producer LAB into the fermented chili mash is expected to accelerate the fermentation process

as well as improving the organoleptic properties offermented chili mash. Hence, the main purpose of this study is to select LAB strain that is the most suitable to be used as starter culture for fermented chili mash as well as understanding the changes of volatile organic compound in fermented chili mash.

## OBJECTIVES

Therefore the objectives of the study were:

- 1) To screen and identify LAB from autochthonous and allochthonous sources suitable for chili fermentation.
- 2) To study the effect of three LAB strains (*Lactobacillus plantarum* ALO1, *Lactobacillus pentosus* ALO2, and *Lactobacillus plantarum* AU2), fermentation time on physiochemical and microbiological profile of fermented chili mash.
- 3) To detect the different flavor compound fermented chili mash via (split and splittless mode) by GC-MS static headspace.