UNIVERSITI TEKNOLOGI MARA

PRELIMINARY SCREENING OF PREBIOTICS ON *LACTOBACILLUS PLANTARUM* L9 GROWTH CAPABILITY

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ABSTRACT

Lactobacillus plantarum (L. plantarum) is one of the probiotics that widely studied since the fact that, it has copious potential health benefits. In this study, growth *L. plantarum* was studied by addition of prebiotics and non prebiotics such as corn starch, gum Arabic and glucose. The fermentation of *L. plantarum* was done in shake flasks and incubated aerobically at $37^{\circ}C$ for 24 hours and the result was measured by optical density at 620nm wavelength (OD_{620}) using spectrophotometer. The fermentation media was prepared for 15 runs with different concentrations of prebiotics and non-prebiotic by following three factorial Box-Behnken designs. The principle of this study is to screen prebiotics by investigate the main and interaction effect on the cell growth of *L. plantarum*. In this experiment, *L. plantarum* fermentation revealed growth patterns which include lag phase, exponential phase, stationary phase and death phase. Based on the results, maximal optical density of *L. plantarum* was 0.226 OD_{620} which contain high proportion of corn starch. However, referring to specific growth rate of *L. plantarum*, it was high when the maximum presence of gum Arabic compared to corn starch. For further results, analysis of variance (ANOVA) indicated that all prebiotics and non-prebiotic had no significance difference ($p > 0.05$) on growth capability of this strain. Response surface methodology (RSM) predicted optimum concentrations of prebiotics, only concentration of gum Arabic and glucose was 4.8% and 4.0% respectively will gives significant and maximal OD_{620} (0.270). It is suggested that in future study, the range of selected prebiotics and probiotics should be diverse, thus experimental data would be more precise and reliable for future references.

CHAPTER 1

INTRODUCTION

1.1   Background of study

Probiotics can be defined as live microorganism that act as food supplements that

give beneficial health to human as a host (Quigley, 2010). Meanwhile a prebiotic is

opposite term which is known as non digestible food ingredient that beneficially

affects the host by stimulating the growth of bacteria thus can lead to improvement

of the host health mentioned by Fooks & Gibson (2002). According to them again

(Fook & Gibson, 2002), a probiotic like lactobacilli has several scientifically proved

health effects, such as improvement of an intestinal microbial balance, alleviation of

lactose intolerance symptoms, prevention of food allergy, antimicrobial and

antitumourigenic activities. In addition, prebiotics also offer a beneficial effect in

inducing antibiotics- associated diarrhea, traveller diarrhea, gastroenteritis,

normalizing bowel function, and reducing intestinal bowel syndrome (IBS) problems

(Tuohy et al., 2003).

In recent years, developing countries encounter many health related problem and one

of the most popular disease is related to cardiovascular disease which due to main

principle of elevated level of certain blood lipid (Pekkanen et al., 1990). In order to