UNIVERSITI TEKNOLOGI MARA

EFFECTS OF GROWTH PARAMETERS ON *LACTOBACILLUS PLANTARUM* L9 USING FACTORIAL DESIGN

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ABSTRACT

Lactobacillus plantarum (*L. plantarum*) is one of the common bacterial strains that have many potential health benefits to the host organism. In this study, growth of *L. plantarum* was studied by integrating design of experiment to optimize its production. 2^2 Factorial designs was used to optimized the parameters involve in the fermentation and the experiment was replicated twice. Fermentation of the bacterial strain was performed in the incubator shake flask and the result (OD_{620}) was measured every 2 hour within 24 hour using UV-Visible spectrophotometer. In this experiment, the main concern is to choose the best parameters in order to produce optimum amount of *L. plantarum* by investigate the main effect and interaction effect of incubation temperature and agitation speed on maximum OD and specific growth rate. Based on the results that obtained from this study, the growth of *L. plantarum* L9 can be achieved at the best optimal temperature 37°C with any of agitation speed either 100 rpm or 200 rpm. Even though the growth kinetic showed that temperature 37°C with any of agitation speed either 100 rpm was experienced rapid growth of *L. plantarum* L9, the probability showed that only temperature ($p = 0.007$) that have a significant effect on the growth of the bacteria.

CHAPTER 1

INTRODUCTION

1.1 Background of study

The intestinal tract in the human body contains a large amount of microbes that give beneficial health to human as a host. Probiotics usually derived from foods have many beneficial properties for the host as the administration of probiotics can change the intestinal microflora (Mine, 2014). There is a relationship that exists between intestinal microflora. The relationship is very specific and if the balance of organism is altered, it will result in illness. Children are encourages in consumption of probiotic because probiotics mostly have positive effect on the host (Gismondo, Drago, & Lombardi, 1999).

In more recent years, most of the countries around the world give a lot of interest in the use of probiotics bacteria for many purposes. It includes for health promotion and diseases prevention in scientific community, consumers and also food producers. There are many bacterial strains that being use as probiotics but the most common are *Lactobacillus, Lactococcus, Enterococcus and Bifidobacterium* (Anna Belicová, 2013).