

UNIVERSITI TEKNOLOGI MARA

**OPTIMIZATION OF *LACTOBACILLUS PLANTARUM* L5 WITH GUM
ARABIC : STATISTICAL APPROACH**

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TABLE OF CONTENT

TITLE PAGES	PAGES
APPROVAL SHEET	
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLE	v
LIST OF FIGURE	vi
LIST OF ABBREVIATIONS	vii
ABSTRACT	ix
CHAPTER ONE (INTRODUCTION)	
1.1 Background of Study	1
1.2 Statement of Problem	2
1.3 Objective	2
1.4 Significance of Study	3
1.5 Hypothesis	3
CHAPTER TWO (LITERATURE REVIEW)	
2.1 Hypercholesterolemia	4
2.2 Synbiotic	5
2.2.1 Probiotic	5
2.2.1.1 <i>Lactobacillus</i>	7
2.2.1.1.1 <i>Lactobacillus plantarum</i>	8
2.2.2 Prebiotic	9
2.2.2.1 Gum Arabic	10
2.3 Growth Pattern of Bacteria	11
2.4 Design of Experiment (DoE)	12
2.4.1 Response Surface Methodology (RSM)	12
2.4.2 Full Factorial Design	13
2.4.3 Analysis of Variance (ANOVA)	13
CHAPTER THREE (MATERIALS AND METHODS)	
3.1 Aseptic Technique	14
3.2 Probiotic Strain and Growth Condition	14
3.3 Growth Media	15
3.4 Prebiotic Substrates	16
3.5 Experimental Design	16
3.6 Cultivation Experiment	17
3.7 Specific Growth Rate and Mean Doubling Time	18
3.8 Statistical Analysis	19
CHAPTER FOUR (RESULT)	
4.1 Preliminary Study of <i>Lactobacillus Plantarum</i>	20
4.2 Growth Profile of <i>Lactobacillus plantarum</i> L5 in Rresence of Gum Arabic	23
4.3 Screening by using Full-factorial Design	26

ABSTRACT

Statistical approach using full-factorial design (3^2) and response surface methodology (RSM) analysis were used to study the main interaction effect between *L. plantarum* L5 and gum Arabic, a probiotic and prebiotic respectively. Three level concentration of *L. plantarum* L5 and gum Arabic were designed using design of experiment (DOE) with 5, 10 and 15% (w/v) and 1, 3 and 5% (w/v) respectively and supplemented in de Man Rogosa and Sharpe (MRS) carbohydrate-free medium. The experiment was conducted in different runs and anaerobically cultivated in 150 mL at 37°C for 24 hours. Only *L. plantarum* L5 concentrations has significant effect toward maximum cfu. Others responses such as specific growth rate (μ) and mean doubling time (T_d) gave no significant effect either by concentrations of *L. plantarum* L5 or gum Arabic. Even the factors have no significant effect, but at maximum level of cfu, specific growth rate and doubling time give the optimal value of concentration of gum Arabic and *L. plantarum* L5 which are 2.01E+08 cfu/ mL, 1.0 per hour and 0.68 minutes respectively.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Humans are the people who can get any diseases at anytime. According to Global Health Observatory (GHO) in World Health Organization (WHO) (2008), increased cholesterol is predicted to cause 2.6 million deaths from 4.5% of total and 29.7 million disability accustomed life years (DALYS), or 2.0% of total DALYS. According to News Strait Times, the numbers of individuals who suffer from hypercholesterolemia have risk factor for cardiovascular disease. National Health and Morbidity Survey (NHMS) (2011), also claimed that, the increases of risk from 20.7% in 2006 to 35.1% in 2005.

Conventionally, hypercholesterolemia can be treat by simvastatin to reduce the serum level of C-reactive protein (CRP) (Musial et al., 2001). In the past two decade, Chen and Kohilas (2013) have suggested that, the probiotics products may be a good alternative for treatment of cardiovascular disease (Chen & Konhilas, 2013). They also reported in *vivo* animal studies on the rats and treat the animals with mixed probiotics in addition to a high-fat-high-cholesterol basal diet to induce hypercholesterolemia. Besides Chen and Kohilas, (2013) mentioned that, the supplementation cause the reduction on serum of cholesterol.