

**COMPARISON OF *Zingiber officinale* AND *Zingiber zerumbet*
ON ANTIMICROBIAL ACTIVITY AGAINST ENTERIC BACTERIA
AND PHYTOCHEMICAL SCREENING.**

INTAN NABIHAH BINTI AHMAD FADZIL

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirement for the
Degree of Bachelor Science (Hons.) Biology
In the Faculty of Applied Science
Universiti Teknologi MARA**

JULY 2018

This Final Year Report entitled “**Comparison of *Zingiber officinale* and *Zingiber zerumbet* against Antimicrobial Activity Against Enteric Bacteria and Phytochemical Screening**” was submitted by Intan Nabihah binti Ahmad Fadzil in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Science, and was approved by:

Faikah binti Awang @ Ismail
Supervisor
Faculty of Applied Sciences
Universiti Teknologi MARA (UiTM)
Negeri Sembilan, Kampus Kuala Pilah,
Pekan Parit Tinggi, 72000 Kuala Pilah
Negeri Sembilan

Lili Syahani binti Rusli
Coordinator FSG661 AS201
Faculty of Applied Sciences
Universiti Teknologi MARA (UiTM)
Negeri Sembilan, Kampus Kuala Pilah
Pekan Parit Tinggi, 72000 Kuala Pilah
Negeri Sembilan

Dr Aslizah binti Mohd Aris
Head of Biology School
Faculty of Applied Sciences
Universiti Teknologi MARA (UiTM)
Negeri Sembilan, Kampus Kuala Pilah
Pekan Parit Tinggi, 72000 Kuala Pilah
Negeri Sembilan

Date: _____

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	ix
ABSTRACT	xi
ABSTRAK	x
CHAPTER 1: INTRODUCTION	
1.1 Background Study	1
1.2 Problem Statement	4
1.3 Significance of Study	5
1.4 Objectives of Study	5
CHAPTER 2: LITERATURE REVIEW	
2.1 Ginger (<i>Zingiber officinale</i>)	6
2.1.1 Ginger's Chemical Composition	7
2.1.2 Medicinal Uses of Ginger	8
2.1.3 Antimicrobial Activities of Ginger	9
2.1.4 Antioxidant Activities of Ginger	10
2.2 Wild Ginger (<i>Zingiber zerumbet</i>)	12
2.2.1 Chemical Composition of Wild Ginger	13
2.2.3 Uses of Wild Ginger	13
2.3 Enteric Bacteria	
2.3.1 <i>Escherichia coli</i> Bacteria	14
2.3.2 <i>Salmonella</i> Bacteria	16
2.3.3 <i>Shigella</i> Bacteria	17
2.4 Phytochemical of Plants	
2.4.1 Steroids	18
2.4.2 Tannin	19
2.4.3 Anthocyanin	19
2.4.4 Flavonoid	20
2.4.5 Diterpene	20
2.4.6 Phenol	21

CHAPTER 3: METHODOLOGY		
3.1	Materials	
	3.2.1 Raw Materials	22
	3.2.2 Chemicals	22
	3.2.1 Apparatus	23
3.2	Methods	
	3.2.1 Preparation of Mueller-Hilton Agar	24
	3.2.2 Biochemical and Morphological Test for Bacterial Culture	25
	3.2.3 McFarland Turbidity Scale	28
	3.2.4 Obtaining Ginger Extracts	28
	3.2.5 Preparation of Infused Discs	29
	3.2.6 Phytochemical Screening	30
3.3	Data Analysis	
	3.3.1 Inhibition Zone	33
	3.3.2 Statistical Analysis	33
 CHAPTER 4: RESULTS AND DISCUSSION		
	4.1 Biochemical Test	34
	4.2 Phytochemical Screening	39
	4.3 Inhibition Zone	45
 CHAPTER 5: CONCLUSION AND RECOMMENDATIONS		
		52
 CITED REFERENCES		
		54
APPENDICES		
		61
CURRICULUM VITAE		
		63

ABSTRACT

COMPARISON OF *Zingiber officinale* AND *Zingiber zerumbet* ON ANTIMICROBIAL ACTIVITY AGAINST ENTERIC BACTERIA AND PHYTOCHEMICAL SCREENING.

Both species of the same genus, *Zingiber officinale* and *Zingiber zerumbet* are known to have biochemical properties such as antioxidants and antibacterial. In this experiment, methanol was used as the solvent. Both type of gingers was powdered and soaked in methanol for 24 hours. The extracts were rotary-evaporated to remove the excess methanol. The extracts of ginger and wild ginger and tested on three species of bacteria which are *E.coli*, *Salmonella spp* and *Shigella spp* by using disc-diffusion method. The positive control used was chloramphenicol with concentration of 30 μ g and the negative control is the solvent itself which is methanol. When tested with 100 mg/ml of extract concentration, *Z. officinale* showed slightly visible but weak inhibition zone on *Shigella spp* and *Salmonella spp* only. The results are done in triplicate to find and compare means between samples. The p value cannot be from t-test as there were no zone of inhibition for *Z. zerumbet* extracts thus the standard deviation cannot be calculated. Overall, *Z. officinale* extracts showed mild effectiveness in inhibiting *Salmonella spp* and *Shigella spp* bacteria. Screening of various phytochemicals was also conducted on both extracts of ginger using various reagents. The extracts only differ in presence of condensed tannin and anthocyanin in which only *Z. zerumbet* has condensed tannin whereas only *Z. officinale* has anthocyanin.