

**ANTIBACTERIAL SHOWER GEL FROM
Clitoria ternatea Linn LEAVES EXTRACT**

NURAINA AQILAH BINTI ISMAIL

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

JULY 2022

This Final year project report entitle “**ANTIBACTERIAL SHOWER GEL FROM *Clitoria ternatea* Linn LEAVES EXTRACT**” was submitted by Nuraina Aqilah Binti Ismail, in partial fulfillment of the requirements for the Degree of Bachelor of Sciences (Hons.) Biology, in the Faculty of Applied Science and was approved by

Dr. Nurul Zawani Binti Alias
Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Science
Universiti Teknologi MARA
02600 Arau
Perlis

En. Syukri Bin Noor Azman
Project Coordinator
B. Sc. (Hons.) Biology
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Pn. Zalina Binti Zainal Abidin
Head of Programme
B. Sc. (Hons.) Physics
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: July 2022

ABSTRACT

ANTIBACTERIAL SHOWER GEL FROM

Clitoria ternatea Linn LEAVES EXTRACT

Clitoria ternatea Linn, also known as butterfly pea plant by natives, is a major plant used in Ayurveda and traditional medicine all around the world. It is also used for a variety of purposes in the food and cosmetic industries. In this study, the leaves part of *Clitoria ternatea* Linn was extracted by Soxhlet extraction method and ethanol was used as the solvent. After extraction, the percentage yield of the ethanolic leaves extract of *Clitoria ternatea* L. attained was 5.57%. This study aims to determine the phytochemical constituents present in the crude extract of *Clitoria ternatea* L. leaves by qualitative preliminary phytochemical screening tests. Major chemical constituents identified in the leaves extract are alkaloids, tannins, glycosides, saponins, phenols and coumarins. The objective of this study is also to evaluate the antibacterial activity of *Clitoria ternatea* Linn ethanolic leaves extract by antibacterial agar disc diffusion assay against two distinct bacterial strains which are Gram-positive and Gram-negative bacteria. The antibacterial activity of leaves extract is the highest at concentration of 30 ppm as it showed the highest mean of inhibition zone for *Bacillus licheniformis* and *Escherichia coli* which are 16.33 mm and 14.67 mm respectively compared to 20 ppm and 10 ppm. This study also aims to produce an antibacterial shower gel from 30 ppm of *Clitoria ternatea* L. leaves extract by using a liquid soap base. The mean of inhibition zone for shower gel against *B. licheniformis* is higher than *E. coli* which is 11.33 mm and 10.33 mm respectively. However, shower gel showed devoid antibacterial activity at 30 ppm since its mean inhibition zone for both bacteria is less than 12 mm and categorized as no inhibitory effects due to low concentration of leaves extract. Therefore, from this study, it can be concluded that the leaves extract of *Clitoria ternatea* Linn contains many active phytoconstituents which contributing to antibacterial activity against Gram-positive and Gram-negative bacterial strains.

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF SYMBOLS	ix
LIST OF ABBREVIATIONS	x
CHAPTER 1 INTRODUCTION	
1.1 Research background	1
1.2 Problem statement	4
1.3 Research questions	5
1.4 Significance of study	6
1.5 Objectives of study	6
1.6 Scope and limitations of study	7
CHAPTER 2 LITERATURE REVIEW	
2.1 Biology and traditional uses of <i>C. ternatea</i> leaves	8
2.2 Phytochemical constituents of <i>C. ternatea</i> leaves	12
2.3 Antibacterial activity of <i>C. ternatea</i> leaves	18
2.4 Other biological activities of <i>C. ternatea</i> leaves	23
2.5 Formulations of antibacterial shower gel	24
CHAPTER 3 RESEARCH METHODOLOGY	
3.1 Sampling	27
3.2 Reagents	27
3.3 Apparatus	28
3.4 Soxhlet extraction	28
3.5 Phytochemical screening tests	
3.5.1 Test for Alkaloids	29
3.5.2 Test for Tannins	29
3.5.3 Test for Glycosides	30
3.5.4 Test for Steroids	30
3.5.5 Test for Saponins	30
3.5.6 Test for Flavonoids	31
3.5.7 Test for Phenolics	31
3.5.8 Terpenoids	31
3.5.9 Anthraquinones	32

3.5.10	Leuco-anthocyanins	32
3.5.11	Coumarins	32
3.5.12	Quinines	32
3.5.13	Gum and mucilage	33
3.6	Antibacterial activity	
3.6.1	Preparation of Mueller-Hinton agar (MHA)	33
3.6.2	Preparation of Nutrient Broth (NB)	34
3.6.3	Preparation of inoculum	35
3.6.4	Preparation of <i>Clitoria ternatea</i> L. leaves extract dilutions	36
3.6.5	Preparation of disc filter papers	37
3.6.6	Inoculation procedure for antibacterial agar disc diffusion assay	38
3.7	Preparation of antibacterial shower gel	
3.7.1	pH testing	39
3.7.2	Physical appearances and sensory testing	40
3.7.3	Antibacterial activity of antibacterial shower gel from <i>C. ternatea</i> L. leaves extract	41
3.8	Flowchart	41
CHAPTER 4 RESULTS AND DISCUSSION		
4.1	The percentage yield of crude extract of <i>Clitoria ternatea</i> L. leaves	44
4.2	Phytochemical screening tests of <i>Clitoria ternatea</i> L. leaves extract	45
4.3	Antibacterial activity of <i>Clitoria ternatea</i> L. leaves extract	48
4.4	Antibacterial shower gel from <i>Clitoria ternatea</i> L. leaves extract	
4.4.1	pH testing	53
4.4.2	Physical appearances and sensory testing	54
4.4.3	Antibacterial activity of shower gel	57
CHAPTER 5 CONCLUSION AND RECOMMENDATION		
5.1	Conclusion	60
5.2	Recommendation	61
CITED REFERENCES		63
APPENDICES		67
CURRICULUM VITAE		75