

**EVALUATION OF ANTIBACTERIAL AND ANTI-
INFLAMMATORY ACTIVITIES OF *Senna alata* AND ITS
PHYTOCHEMICAL CONSTITUENTS**

NUR FALAH SHAHRI

**BACHELOR OF SCIENCE (Hons.) BIOLOGY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

AUGUST 2022

This Final Year Project Report entitled "**Evaluation of Antibacterial and Anti-Inflammatory Activities of *Senna alata* and Its Phytochemical Constituents**" was submitted by Nur Falahi binti Shahril in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology in the Faculty of Applied Sciences and was approved by

Dr. ~~Mohd~~ Akmal Hashim
Supervisor
B. Sc. (Hons) Biology
Faculty of Applied Sciences
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

Puan Zalina Binti Zainal Abidin
Programme Coordinator
B. Sc. (Hons) Applied Physic
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: _____

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF SYMBOLS	vi
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
ABSTRAK	ix
CHAPTER 1 INTRODUCTION	1
1.1 Background of study	1
1.2 Problem statement.....	4
1.3 Significance of study.....	5
1.4 Objectives of study.....	7
1.5 Research questions	7
CHAPTER 2 LITERATURE REVIEW	8
2.1 Scientific classification, origin, and geographical distribution.....	8
2.2 Antibacterial activity of <i>Senna alata</i>	9
2.3 Anti-inflammatory of <i>Senna alata</i>	21
2.4 Phytochemical constituents of <i>Senna alata</i>	36
2.3.1 Flavonoids	37
2.3.2 Anthraquinone.....	38
2.3.3 Alkaloid.....	39
2.3.4 Terpenoids.....	41
CHAPTER 3 METHODOLOGY	42
3.1 Materials.....	42
3.2 Methodology	42
3.2.1 Preparation of dried powder <i>Senna alata</i> leaves.....	42
3.2.2 Preparation of different percentage of ethanol.....	43
3.2.3 Preparation of plant extract	43
3.3 Anti-bacterial assay	44
3.3.1 Bacterial strains	44

3.3.2	Preparation of MHA agar.....	45
3.3.3	Determination of antimicrobial activity.....	45
3.3.4	Susceptibility Test.....	46
3.4	Anti-inflammatory assay.....	47
3.4.1	Preparation of iso-saline.....	47
3.4.2	Preparation of buffer solution.....	47
3.4.3	Inhibition of albumin denaturation.....	47
3.5	Phytochemical analysis extract of <i>Senna alata</i> leaves.....	48
3.5.1	Test for Flavonoids.....	48
3.5.2	Test for Tannin.....	49
3.5.3	Test for Alkaloids.....	49
3.5.4	Test for Saponin.....	49
3.5.5	Test for Terpenoid.....	50
3.6	Statistical Analysis.....	50
3.7	Experimental Design.....	51
CHAPTER 4 RESULT & DISCUSSION		52
4.0	Introduction.....	52
4.1	Extraction of <i>Senna alata</i>	52
4.2	Antibacterial assay.....	53
4.3	Anti-inflammatory assay.....	58
4.4	Qualitative Assay of Phytochemicals.....	61
CHAPTER 5 CONCLUSION & RECOMMENDATION		65
5.1	Conclusion.....	65
5.2	Recommendations.....	65
CITED REFERENCES		67
APPENDICES		73
CURRICULUM VITAE		82

ABSTRACT

EVALUATION OF ANTIBACTERIAL AND ANTI-INFLAMMATORY ACTIVITIES OF *Senna alata* AND ITS PHYTOCHEMICAL CONSTITUENTS

Senna alata has been used to treat wide range of microbial and inflammatory diseases in traditional medicinal practice. In relation to growing demand of plant-based drugs, call for this research, which aimed at evaluating the phytochemical contents, antimicrobial and anti-inflammatory activities of *S. alata*. Two different percentage of solvents were used; 70% and 95% of ethanol. The extracts were subjected to phytochemical screening using standard procedures, and the antimicrobial activity against two bacterial isolates which are *Escherichia coli* and *Bacillus licheniformis* were tested using Kirby bauer disc diffusion method. Phytochemical screening shows the presence of flavonoids, tannins, alkaloids, steroids, saponin and terpenoids in the leaves extract. The 95% ethanolic extract of *Senna alata* showed antibacterial activity with zone of inhibition (ZOI) diameter of 15.3 ± 1.2 mm, 12.3 ± 1.2 mm and 9.3 ± 1.2 mm while 70% of ethanolic extract showed 12.7 ± 2.5 mm, 11.3 ± 1.2 mm and 11 ± 2.4 mm on *Escherichia coli*. When tested on *Bacillus licheniformis*, 95% ethanolic extract of *Senna alata* showed 9.7 ± 0.9 mm, 7.3 ± 0.5 mm and 6.7 ± 1.2 mm ZOI, while for 70% ethanolic extract; 11.7 ± 1.2 mm, 9.7 ± 3.1 mm and 8 ± 1.6 mm were recorded. The results indicate that *Senna alata* leaves has the potential that can be harnessed to produce complementary medicine for antibacterial activity. For the anti-inflammatory activity test, the 95% ethanolic leaves extract of this plant showed 36.8 % of inhibition while diclofenac sodium exhibited 29.6 % of inhibition at the same concentration which is 0.25mg/ml. These results revealed that the leaves extract of *Senna alata* possesses significant anti-inflammatory activities based on the inhibition of protein denaturation.