

**A REVIEW ON COMPARISON OF PHENOLIC,
FLAVONOID AND TANNIN CONTENTS IN *Annona
muricata* AND *Orthosiphon stamineus* FOR ANTIDIABETIC
MEDICATION**

SITI NURATHIRAH BINTI MD ZOHER

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

JULY 2022

**A REVIEW ON COMPARISON OF PHENOLIC, FLAVONOID AND
TANNIN CONTENTS IN *Annona muricata* AND *Orthosiphon stamineus*
FOR ANTIDIABETIC MEDICATION**

SITI NURATHIRAH BINTI MD ZOHER

**Final Year Project Report Submitted in
Partial Fulfilment of the Requirements 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 entitled “A Review on Comparison of Phenolic, Flavonoid and Tannin Contents in *Annona muricata* and *Orthosiphon stamineus* for Antidiabetic Medication” was submitted by Siti Nurathirah binti Md Zoher 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. Khairunnisa binti Ahmad Kamil
Supervisor
Senior Lecture
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Muhammad Syukri Noor Azman
Project Coordinator
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Zalina Zainal Abidin
Programme Coordinator AS201
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Date: _____

ABSTRACT

Annona muricata and *Orthosiphon stamineus* species are known traditional herbs for medication uses, claimed that their phenolic and flavonoid contents may help in antidiabetic activities and its complications. Studies have been conducted from various researchers on both of these leaves in proving the effectiveness in treating diabetes. The aim of this review is to assemble the data on phytochemical properties including phenolic, flavonoid and tannin content present in both *A. muricata* and *O. stamineus* leaves based on literature data published in journals. Furthermore, this review also discusses the phytochemical contents relationship on controlling and lowering the blood sugar level and also increasing insulin sensitivity in hyperglycemia. Phenol and flavonoid have the ability to form a covalent connection with the α -amylase enzyme. The flavonoid containing hydroxyl groups and β ring replacement inhibit α -glucosidase and α -amylase. The phytochemical content might protect pancreatic β -cells of diabetic rats tested when treated with *A. muricata* and the plant extract help by improving peripheral glucose absorption. This review is focusing on research history of traditional uses, proving that both plants species contains active compounds for medication in antidiabetic treatment as well as *in vitro* and *in vivo* studies on the leaves extract.

TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF SYMBOLS	vii
LIST OF ABBREVIATIONS	viii
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Significance of study	4
1.4 Objectives of study	5
1.5 Research question	5
CHAPTER 2 LITERATURE REVIEW	
2.1 <i>Annona muricata</i>	6
2.1.1 Medicinal value of <i>Annona muricata</i>	7
2.1.2 Commercialization of <i>Annona muricata</i>	8
2.2 <i>Orthosiphon stamineus</i>	9
2.2.1 Medicinal value of <i>Orthosiphon stamineus</i>	10
2.2.2 Commercialization of <i>Orthosiphon stamineus</i>	11
2.3 Diabetes mellitus	11
2.3.1 Synthetic drug used in treating diabetic	13
2.4 Technical used of extraction, HPLC and FTIR	14
2.5 Relationship between phenolic, flavonoid and tannin content on antidiabetic activity	16
2.5.1 Phenolic content	19
2.5.2 Flavonoids	19
2.5.3 Tannins	20
2.6 <i>In vitro</i> and <i>in vivo</i> test animal model for evaluating antidiabetic activities	21
2.6.1 <i>In vitro</i> assays	22
2.6.2 <i>In vivo</i> animal models	24
CHAPTER 3 CONCLUSION AND RECOMMENDATION	28
CITED REFERENCES	30
CURRICULUM VITAE	36