ANTIOXIDANT ACTIVITY OF CLOVES (Syzygium aromaticum) AS A MEDICINE POTENTIAL

NURUL NAJWA BINTI HISHAM

Final Year Project Submitted in Partial Fulfilment of the Requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry in the Faculty of Applied Sciences Universiti Teknologi MARA

AUGUST 2023

This Final Year Project entitled "Antioxidant Activity of Cloves (*Syzygium aromaticum*) as a Medicine Potential" was submitted by Nurul Najwa binti Hisham in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

En. Dzulkifli bin Osman Supervisor B. Sc. (Hons.) Applied Science Faculty of Applied Sciences Universiti Teknologi MARA 02600 Arau Perlis

Dr Siti Nurlia binti Ali Project Coordinator B. Sc. (Hons) Applied Chemistry Faculty of Applied Science Universiti Teknologi MARA 02600 Arau Perlis Dr. Nur Nasulhah binti Kasim Head of Programme B. Sc.(Hons.) Applied Chemistry Faculty of Applied Science Universiti Teknologi MARA 02600 Arau Perlis

Date: August 2023

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABREVIATIONS	viii
LIST OF SYMBOLS	ix
ABSTRACT	х
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Significance of Study	3
1.4 Objectives of Study	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 Syzygium aromaticum	5
2.2 Phytochemical composition	7
2.2.1 Eugenol	7
2.2.2 Eugenyl Acetate	8
2.2.3 β -caryophyllene	9
2.3 Phytochemical screening	11
2.4 Biological activity	11
2.4.1 Antioxidant activity	11
2.4.2 Method for antioxidant activity determination	13
2.5 Extraction Method	14
2.5.1 Maceration	15

CHAPTER 3 METHODOLOGY	16
3.1 Materials	16
3.1.1 Raw Materials	16
3.1.2 Apparatus	16
3.1.3 Chemical	16
3.2 Method	17
3.2.1 Sample preparation	17
3.2.2 Extraction of Syzygium aromaticum	17
3.3 Instrumentation	17
3.1 Rotary evaporator	18
3.2 UV-vis spectrophotometer	19
3.4 Phytochemical screening	20
3.4.1 Mayer's Test for Alkaloids	20
3.4.2 Saponins Test	20
3.4.3 Shinoda's Test for Flavonoids	20
3.5 Determination of biological activity of Syzygium aromaticum	21
3.4.1 Preparation of cloves sample and standard ascorbic acid for antioxidant properties test	21
3.4.2 Radical scavenging activity by using DPPH method	21
3.6 Methodology flowchart	22
CHAPTER 4 RESULTS AND DISCUSSION	23
4.1 Phytochemical screening of Syzygium aromaticum extract	23
4.2 Antioxidant activity of Syzygium aromaticum by DPPH	26
4.2.1 Absorbance and DPPH scavenging activity of methanolic cloves sample	26
4.2.2 Absorbance and DPPH scavenging activity of standard ascorbic acid	27
4.2.3 Antioxidant activity	28
CHAPTER 5 CONCLUSION AND RECOMMENDATION	30
5.1 Conclusion	30
5.2 Recommendation	31
CITED REFERENCES	33
CURRICULUM VITAE	37

ABSTRACT

ANTIOXIDANT ACTIVITY OF CLOVES (Syzygium aromaticum) AS A MEDICINE POTENTIAL

Medicinal plants are gaining popularity due to the effectiveness, low cost, and lack of side effects associated with drugs derived from them. It has been used to treat a variety of diseases because they have potential pharmacological activities such as antimicrobial, antioxidant and anti-inflammatory. Clove (Syzygium aromaticum (L.) (Family Myrtaceae) is a vital herb in traditional medicine, with a wide range of biological activity. Clove phytochemical constituents include a wide range of chemical compounds including phenolics and hydrocarbon compounds. The therapeutic value of a medicinal plant is determined by phytoconstituents, either individually or in combination. Some of the important phytochemicals with diverse biological activities are alkaloids, flavonoids, phenolics, tannins, saponins, steroids, glycosides and terpenes. The identification of phytochemicals can predict a plant's pharmacological activity. This study provides an overview and details of S. aromaticum phytochemical and antioxidant activity. The results obtained for the phytochemical screening of the cloves is the presence of alkaloids that being detected with the presence of yellow precipitate. The presence of orange colour indicates the presence of flavonoids in cloves sample and the presence of persistent frothing indicates the presence of saponins. Antioxidant activity of the cloves has been investigated with IC₅₀ value of standard ascorbic acid is 10.00 mg/mL meanwhile IC₅₀ value of methanolic cloves sample is 0.65 mg/mL.