

**ANTIOXIDANT AND ANTI-TYROSINASE ACTIVITIES OF  
*Fragaria x ananassa* Duch ETHANOL FRUIT EXTRACT AS  
ANTI-SKIN AGING**

**ALIN NABILA BINTI AZHAR**

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

**AUGUST 2022**

**ANTIOXIDANT AND ANTI -TYROSINASE ACTIVITIES OF *Fragaria x  
ananassa* Duch ETHANOL FRUIT EXTRACT AS ANTI- SKIN AGING**

**ALIN NABILA BINTI AZHAR**

**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**

**AUGUST 2022**

This Final Year Project Report entitled “**Antioxidant and Anti-Tyrosinase Activities of *Fragaria x ananassa* Duch Ethanol Fruit Extract as Anti – Skin Aging**” was submitted by Alin Nabila Binti Azhar in partial fulfilment of the requirement for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences and was approved by

---

Dr. Ahmad Suhail Bin Khazali  
Supervisor  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
02600 Arau  
Perlis

---

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

---

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

Date:     AUGUST 2022

## ABSTRACT

### **ANTIOXIDANT AND ANTI-TYROSINASE ACTIVITIES OF *Fragaria x ananassa* Duch ETHANOL FRUIT EXTRACT AS ANTI- SKIN AGING**

*Fragaria x ananassa* Duch. or commonly known as strawberry is a superfruit that is broadly utilized and valued not only due to its taste and aroma, but also due to its nutritional, functional and antioxidant properties. Strawberry are grown at temperatures below 25°C in Cameron Highland, Malaysia and have high antioxidant activity, which has been linked to the fruit's levels of phenolic and anthocyanin compounds. Skin aging is a biological condition that is caused by a combination of intrinsic factors as well as extrinsic factors. UV radiation is the primary cause of skin aging because it increases the level of reactive oxygen species (ROS) in the skin, causing cell damage, premature skin aging, and skin cancer. Hence, antioxidants from *F. x ananassa* could play important roles for the protection factor against oxidative stress and its negative consequences to human health. This research aims to analyse the antioxidant and anti-tyrosinase properties of *F. x ananassa* extract. Samples were extracted by maceration using 96% ethanol. DPPH radical scavenging assay was used to measure the antioxidant activity, while anti-tyrosinase activity was analysed using tyrosinase enzyme. The results showed that *F. x ananassa* extracts in ethanolic have antioxidant activity with an IC<sub>50</sub> value of 0.132 mg/mL. Meanwhile, tyrosinase inhibitory activity shows, *F. x ananassa* extract has little to no activity as compared to its positive control. According to the result of this study, *F. x ananassa* extract can be considered as source of bioactive compounds with promising antioxidant activity. It is suggested that, *F. x ananassa* extract has a potential as natural free radical scavengers and can be used as antiaging cosmetic ingredients.

## TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	iii
<b>ABSTRAK</b>	iv
<b>ACKNOWLEDGEMENTS</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF TABLES</b>	viii
<b>LIST OF FIGURES</b>	ix
<b>LIST OF SYMBOLS</b>	x
<b>LIST OF ABBREVIATIONS</b>	xi
<b>CHAPTER 1: INTRODUCTION</b>	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Significance of The Study	5
1.4 Research Questions	6
1.5 Objective of The Study	6
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 Normal Skin Structure	7
2.2 Skin Aging	11
2.3 Factors Causing Skin Aging	13
2.4 Molecular Mechanism of Skin Aging	15
2.4.1 Tyrosinase	16
2.4.2 Elastase	17
2.4.3 Hyaluronidase	18
2.4.4 Collagenase	20
2.5 Malaysia's Geographical Location	21
2.6 Skincare Application in Malaysia	25
2.7 Chemicals in Skincare Products	29
2.8 <i>Fragaria ananassa</i>	31
2.8.1 Harvest Location	36
2.8.2 Strawberry Products	37
2.8.3 Medicinal Properties of Strawberry	38
<b>CHAPTER 3: METHODOLOGY</b>	
3.1 Material and Method	40
3.1.1 Plant Materials and Preparation of Extract	40
3.1.2 1,1-Diphenyl-2-picrylhydrazyl (DPPH) Radical Scavenging Assay	41
3.1.3 Tyrosinase Inhibition Assay	42
3.2 Data Analysis	43