

**ANTI-SKIN AGING EFFECT OF *Centella asiatica* AND *Cosmos caudatus*
EXTRACTS**

KU FATIN NURDIANA BINTI KU FAIROS NIZAM

**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 “**Anti-Skin Aging Effect of *Centella Asiatica* And *Cosmos Caudatus* Extract**” was submitted by Ku Fatin Nurdiana Binti Ku Fairis Nizam 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

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

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

Date: _____

ABSTRACT

ANTI-SKIN AGING EFFECT OF *CENTELLA ASIATICA* AND *COSMOS CAUDATUS* EXTRACT

Many scientific studies have demonstrated the anti-skin aging effects of *Centella asiatica* and *Cosmos caudatus* extracts. Skin aging is defined as the changes in the skin, structurally and functionally, due to aging. Reactive oxygen species (ROS) is central in skin aging and we hypothesized that neutralizing ROS may be the key in combating aging. Natural-based compounds are becoming essential in skincare industry as chemical or synthetic compounds may cause adverse effects. *Centella asiatica*, which has a lot of bioactive compounds such as flavonoids and madecassoside, can be utilized as an antiaging ingredient to moisturize smooth, and soothe the skin. Similarly, *Cosmos caudatus* also acts as an antiaging agent as it contains several bioactive compounds that are potent antioxidants such as proanthocyanidins. Due to their high antioxidant activities, it was hypothesized that these extracts possess antiaging activity. In these experiments, *Centella asiatica* and *Cosmos caudatus* extracts were tested for diphenyl-picrylhydrazyl (DPPH) radical scavenging activity and for tyrosinase inhibition action. *Centella asiatica* extract exhibited 62.00% of DPPH radical scavenging activity at 0.15 mg/ml while *Cosmos caudatus* extract exhibited 69.72% of DPPH radical scavenging activity at 0.15 mg/ml. IC₅₀ value of *Cosmos caudatus* activity was determined to be 0.018 mg/ml and the IC₅₀ value of *Centella asiatica* at 0.012 mg/ml. *Centella asiatica* inhibited 29.97% activity of tyrosinase activity whereas *Cosmos caudatus* inhibited 40.91% tyrosinase activity. Both extracts showed significant antioxidant and anti-tyrosinase activities. Based on these findings, the hypothesis is accepted as both extracts exhibit DPPH scavenging activity and anti-tyrosinase activity. However, the causal relationship between these two activities still requires further studies. Nonetheless, both extracts show promising results and may be further developed into safe and efficacious skincare products.

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	vii
LIST OF SYMBOLS	viii
LIST OF ABBREVIATIONS	ix
CHAPTER 1 INTRODUCTION	
1.1 Background of the study	1
1.2 Problem statements	3
1.3 Significance of the study	5
1.4 Research questions	6
1.5 Objective of the study	6
CHAPTER 2 LITERATURE REVIEW	
2.1 Introduction to human skin	7
2.1.1 ECM in the skin	10
2.2 Skin Aging	14
2.2.1 Molecular Mechanism of Skin Aging	16
2.3 Enzymes in skin	19
2.3.1 Elastase	20
2.3.2 Collagenase	20
2.3.3 Tyrosinase	21
2.3.4 Hyaluronidase	22
2.4 Skin Aging in Malaysia	22
2.4.1 Cosmetic industry in Malaysia	25
2.4.2 Chemical in skincare products	26
2.5 Plants	28
2.5.1 <i>Centella asiatica</i>	28
2.5.2 <i>Cosmos caudatus</i>	30
CHAPTER 3 METHODOLOGY	
3.1 Plant material and preparation of extracts	33
3.1.1 <i>Centella asiatica</i>	33

3.1.2 <i>Cosmos caudatus</i>	34
3.2 1,1-Diphenyl-picrylhydrazyl (DPPH) radical scavenging assay	34
3.3 Tyrosinase inhibition assay	35
3.4 Statistical analysis	36
CHAPTER 4 RESULT AND DISCUSSION	
4.1 Result	37
4.1.1 1,1-Diphenyl-picrylhydrazyl (DPPH) Radical Scavenging Assay	37
4.1.2 Tyrosinase Inhibition Assay	40
4.2 Discussion	41
4.2.1 1,1-Diphenyl-picrylhydrazyl (DPPH) Radical Scavenging Assay	41
4.2.2 Tyrosinase Inhibition Assay	43
CHAPTER 5 CONCLUSION AND RECOMMENDATION	
5.1 Conclusion	44
5.2 Recommendation	45
5.2.1 The extraction methods.	45
5.2.2 The extraction processes	46
5.2.3 Aging-related enzymes assays	46
CITED REFERENCES	47
APPENDICES	54
CURRICULUM VITAE	55
GANTT CHART	57