

***Plectranthus amboinicus* EXTRACT AND ALOE VERA GEL-BASED
COATING FOR TOMATOES**

NUR ALYA FARZANA BINTI AHMAD

**Final Year Project Proposal Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Chemistry With Management
In The faculty of Applied Sciences
Universiti Teknologi MARA**

FEBRUARY 2024

This Final Year Project Report entitled “*Plectranthus amboinicus* Extract and Aloe Vera Gel Based Coating for Tomatoes” was submitted by Nur Alya Farzana binti Ahmad in partial fulfilment of the requirements for the Degree Bachelor of Science (Hons.) Chemistry with Management, in the Faculty of Applied Sciences, and was approved by

Dr. Nurul Zawani binti Alias
Supervisor
B. Sc. (Hons.) Chemistry with Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Siti Nurlia Binti Ali
Project Coordinator
B.Sc.(Hons.) Chemistry with
Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Nur Nasulhah Binti Kasim
Head of Programme
B.Sc.(Hons.) Chemistry with
Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Date: _____

ABSTRACT

***Plectranthus amboinicus* EXTRACT AND ALOE VERA GEL-BASED COATING FOR TOMATOES**

Post-harvest quality becomes a concern as various physiological processes occur which leads to significant losses in fruit quality during the storage period. Currently, many edible coatings or films have been developed to extend the shelf life of fruits, but aloe vera gel coating incorporated with *Plectranthus amboinicus* extract remain largely unexplored. Coating is the best alternative, especially coating that is made of material that has antimicrobial properties that can help to inhibit the bacteria growth in fruits. Thus, the objective of this study is to prepare *Aloe Vera* gel-based coating by incorporating it with *Plectranthus amboinicus* extract, to determine the antimicrobial properties of *Aloe Vera* gel-based coating incorporated with *Plectranthus amboinicus* extract and to evaluate the characteristics of coated and uncoated tomato fruits during storage by analyzing its weight loss, the colour, total soluble solids and pH. The coating mixture was prepared and the antimicrobial activity of the coating was determined by using the zone of inhibition method, however there is no inhibition observed. AVG + PEE exhibit the minimum weight loss, slightly less red in colour as they exhibit higher L* value (42.35), lower total solubility solids (4.4%) and lower pH (4.35). AVG + PEE stand as the best treatment to retain the total soluble solid of tomatoes during storage period and it also stand as the best treatment to preserve the post-harvest quality of tomatoes at room temperature.

TABLE OF CONTENTS

	Page
ABSTRACT	ii
ABSTRAK	iii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF PLATES	ix
LIST OF SYMBOLS	x
LIST OF ABBREVIATIONS	xi
CHAPTER 1 INTRODUCTION	
1.1 Research background	1
1.2 Problem statement	4
1.3 Objectives	
1.4 Significance of study	6
CHAPTER 2 LITERATURE REVIEW	
2.1 <i>Plectranthus amboinicus</i>	8
2.1.1 Antimicrobial activity of <i>P amboinicus</i>	10
2.1.2 Antioxidant activity of <i>P. amboinicus</i>	11
2.1.3 Chemical composition of <i>Plectranthus amboinicus</i> extract	11
2.2 Aloe vera	12
2.2.1 Chemical constituent of Aloe vera	14
2.2.2 Aloe vera Gel (AVG) as coating	16
2.2.3 Antimicrobial properties of Aloe Vera Gel	17
2.3 Antimicrobial coating	18
2.3.1 Plant-based coating	19
2.3.2 Aloe vera gel coating with plant extract	21
CHAPTER 3 RESEARCH METHODOLOGY	
3.1 Chemicals and reagents	24
3.2 Collection of samples	24
3.2.1 Preparation of <i>P.amboinicus</i> extract (PEE)	24
3.2.2 Preparation of Aloe Vera Gel (AVG)	24

3.2.3	Preparation of AVG coating incorporated with PEE	25
3.3	Application of antimicrobial coatings on fruits	26
3.4	Antimicrobial activity of coating	26
3.4.1	Preparation of Mueller Hinton agar and Nutrient Broth	26
3.4.2	Preparation of inoculum	27
3.4.3	Preparation of disc filter paper and disc diffusion assay method	28
3.6	Quality Characteristic of Coated and Uncoated Fruits During Storage	29
3.6.1	Weight loss	29
3.6.2	Colour measurement	29
3.6.3	pH	30
3.6.4	Total Soluble Solids	30
CHAPTER 4 RESULTS AND DISCUSSION		
4.1	Preparation of Aloe vera gel coatings Incorporated with <i>P. amboinicus</i> extract	31
4.2	Antimicrobial activity of coating mixture	33
4.4	Weight loss	35
4.5	Colour	36
4.6	pH	38
4.7	Total Soluble Solid (TSS)	38
CHAPTER 5 CONCLUSION AND RECOMMENDATION		
5.1	Conclusion	40
5.2	Recommendation	41
CITED REFERENCES		42
APPENDICES		51
CURRICULUM VITAE		52