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**USAGE OF EDIBLE COATING TO IMPROVE THE QUALITY  
AND SHELF LIFE OF TOMATO (*SOLANUM LYCOPERSICUM*)**

By

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A dissertation submitted in partial fulfilment of the requirement for the Degree of

Bachelor of Technology (B. Tech.) in the field of Food Technology

School of Industrial Technology

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## DECLARATION BY AUTHOR

This dissertation is composed of my original work and contains no material previously published or written by another person except where due reference has been made in the text. The content of my dissertation is the result of my work that I have carried out since the commencement of my research project and does not include a substantial part of work that has been submitted to qualify the award of any other degree or diploma in any university or tertiary institution.



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(NURHUDA BINTI HORMAT)

AUGUST 2020

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# TABLE OF CONTENT

	<b>Page</b>
<b>DECLARATION BY AUTHOR</b>	ii
<b>ACKNOWLEDGEMENT</b>	iii
<b>TABLE OF CONTENT</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	viii
<b>ABSTRAK</b>	ix
<b>ABSTRACT</b>	xi
<b>CHAPTER 1: INTRODUCTION</b>	1
1.1 Research Background	1
1.2 Problem Statement	3
1.3 Objectives	4
<b>CHAPTER 2: LITERATURE REVIEW</b>	5
2.1 Tomato ( <i>Solanum Lycopersicum</i> )	5
2.2 Scientific Classification	6
2.3 Maturity Stages	7
2.4 Quality Attributes	10
2.5 Nutritional Composition	11
2.6 Post-harvest Factor	12
2.6.1 Temperature	13
2.6.2 Pathogen	13
2.7 Edible Coating	14
2.7.1 Formulation of Edible Coating	14
2.8 Polysaccharides	16
2.8.1 Sodium Alginate	17
2.8.2 Pectin	19

<b>CHAPTER 3: MATERIALS AND METHODS</b>	20
3.1 Raw Material	20
3.2 Preparation of Coating Solution	20
3.3 Sample Preparation	21
3.4 Physicochemical Quality Changes Determination	22
3.4.1 Physiological Weight Loss	22
3.4.2 Determination of pH	22
3.4.3 Titratable Acidity (TA)	23
3.4.4 Total Soluble Solid (TSS)	23
3.4.5 Total Colour Change	24
3.5 Microbiological Analysis	25
3.6 Statistical Analysis	25
<b>CHAPTER 4: RESULT AND DISCUSSION</b>	26
4.1 Physiological Weight Loss	26
4.2 pH	28
4.3 Titratable Acidity (TA)	30
4.4 Total Soluble Solid (TSS)	32
4.5 Total Colour Change	34
4.6 Microbiological Analysis	36
<b>CHAPTER 5: CONCLUSION AND RECOMMENDATION</b>	39
5.1 Conclusion and Recommendation	39
<b>REFERENCES</b>	41

## LIST OF TABLES

<b>Table</b>	<b>Caption</b>	<b>Page</b>
2.1	Common types of tomato varieties planted in Malaysia	6
2.2	Taxonomic status of tomato fruits ( <i>Solanum lycopersicum</i> )	6
2.3	Nutritional composition of tomato	12
4.4	pH values of tomato fruits with the application of coating with pectin, sodium alginate and combination of both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	29
4.5	Titrateable acidity values of tomato fruits with the application of coating with pectin, alginate and both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	31
4.6	Total soluble solids values of tomato fruits with the application of coating with pectin, alginate and both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	33
4.7	Mesophilic aerobic bacteria on tomato fruits with the application of coating with pectin, alginate and combination of both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	36
4.8	Yeast and mold on tomato fruits with the application of coating with pectin, alginate and combination of both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	38

## LIST OF FIGURES

<b>Figure</b>	<b>Caption</b>	<b>Page</b>
2.1	Maturity index of tomato ( <i>Solanum lycopersicum</i> ).	8
2.2	General flow diagram of fruits and vegetables coating treatment	16
2.3	Structure of sodium alginate	18
3.3	Flowchart of sample coating preparation	21
4.4	Physiological weight loss (%) of tomato fruits with application of different coating materials during 15 days of storage at $\pm 10$ °C.	27
4.5	Total colour change of tomato fruits with the application of coating with pectin, alginate and both polysaccharides during storage in chilled temperature ( $\pm 10$ °C).	35



## LIST OF ABBREVIATIONS

<b>Abbreviation</b>	<b>Caption</b>
PCC	Per Capita Consumption
RH	Relative humidity
FAMA	Federal Agricultural Marketing Authority
TA	Titrateable acidity
TSS	Total soluble solid
HMP	High methoxyl pectin
LMP	Low methoxyl pectin
DE	Degree of esterification
FDA	Food and Drug Administration
DOA	Department of Agricultural
MyFCD	Malaysian Food Composition Database
USDA	United State Department of Agricultural
NCRS	Natural Resources Conservation Service
min	minute
rpm	revolution per minute
ml	millilitre
TPC	Total plate count
PCA	Plate count agar
PDA	Potato dextrose agar
CFU	Colony forming unit
$\Delta E$	Total colour change

# **PENGGUNAAN SALUTAN BOLEH DIMAKAN UNTUK MENINGKATKAN KUALITI DAN JANGKA HAYAT TOMATO (*SOLANUM LYCOPERSICUM*)**

## **ABSTRAK**

Tomato adalah buah komersial yang mudah rosak dalam jangka waktu yang singkat kerana mengandungi kandungan lembapan yang tinggi. Oleh itu, jangka hayat yang lebih lama diperlukan untuk pemasaran dan memenuhi kepuasan pengguna yang lebih baik. Salutan yang boleh dimakan adalah salah satu cara yang berkesan untuk melambatkan proses kematangan buah dan penggunaan polisakarida telah didapati boleh meningkatkan jangka hayat dan kualiti buah-buahan dan sayur-sayuran. Tujuan penyelidikan ini adalah untuk mengetahui pengaruh pelbagai jenis salutan boleh dimakan iaitu alginat, pektin dan campuran kedua dua pektin dan alginat dalam memanjangkan jangka hayat tomato dengan (i) menilai keberkesanan salutan dalam meningkatkan ciri ciri fizikokimia tomato dengan menggunakan analisis fizikal dan kimia, dan (ii) menilai jangka hayat tomato bersalut yang menggunakan pelbagai jenis salutan dengan menggunakan analisis mikrobiologi. Tomato yang telah dilapisi dengan salutan yang berbeza telah disimpan di dalam suhu rendah ( $\pm 10$  °C). Beberapa analisis fizikokimia dan mikrobiologi seperti penurunan berat fisiologi, pH, keasidan yang dititrasi (TA) dan jumlah pepejal larut (TSS), jumlah perubahan warna, jumlah mesofilik aerobik dan jumlah yis dan kulat telah dijalankan. Hasil kajian menunjukkan bahawa, tomato dengan lapisan yang boleh dimakan telah melambatkan proses kematangan dengan kualiti yang lebih baik daripada yang tidak dilapisi. Sampel yang disalut dengan lapisan pektin dapat mengurangkan kehilangan kelembapan dan, dengan itu, mengurangkan penurunan berat badan secara fisiologi pada lapisan tomato manakala alginat menunjukkan kesan positif dalam menurunkan penampilan warna

merah pada tomato semasa penyimpanan. Tambahan lagi, sampel yang dilapisi dengan pektin + alginat menunjukkan kesan positif dalam menanggukkan proses pematangan tomato dengan mengurangkan nilai pH tomato yang dijangkakan meningkat seiring dengan kemajuan tahap pematangan. Untuk hasil mikrobiologi, bahan salutan berasaskan alginat atau pektin dapat mengurangkan pertumbuhan mikrob dengan ketara. Tidak ada trend yang diperhatikan untuk hasil TA dan TSS. Nilai TA dijangka menurun sementara nilai TSS dijangka meningkat sepanjang masa penyimpanan. Kajian mengenai penentuan kadar pernafasan, penghasilan etilena, kapasiti antioksidan, kandungan fenolik total dan penilaian deria perlu diterokai lebih lanjut pada tomato yang dilapisi dengan lapisan yang boleh dimakan.

**USAGE OF EDIBLE COATING TO IMPROVE THE QUALITY AND SHELF  
LIFE OF TOMATO (*SOLANUM LYCOPERSICUM*)**

**ABSTRACT**

Tomatoes are commercially perishable fruit within a short period of time because they contain high moisture content, thus longer shelf life is needed for better marketing and fulfil consumer satisfaction. Edible coating is one of the most effective way to slow down the process of fruit maturity and polysaccharides as edible coating, has been found to improve the shelf life and quality of fruits and vegetables. The aim of this research is to determine the influence of different types of edible coating which are alginate, pectin and a mixture of both pectin and alginate in extending the shelf-life of tomato by (i) evaluate the effectiveness of coating in improving the physicochemical characteristics of tomato by using physical and chemical analysis and (ii) evaluate the shelf life of coated tomato using different types of coating by using microbiological analysis. Tomatoes were coated with different coating and stored at a  $\pm 10$  °C. Several physicochemical and microbiological analysis such as physiological weight loss, pH, titratable acidity (TA), total soluble solid (TSS), total colour change, total aerobic mesophilic count and total yeast and mold were performed. The result showed that tomatoes with coating has delayed ripening process with better quality than the uncoated ones. Sample coated with pectin coating could retard the moisture loss and, thus, reduce the physiological weight loss in tomato while alginate coating showed a positive effect in lowering down the appearance of red colour on tomato during storage. Furthermore, sample coated with pectin+ alginate showed a positive effect in retarding the ripening process of tomato by reduce the pH value of tomato that expected to be increase with advancement of ripening stages. For microbiological

results, alginate and pectin-based material for coating significantly reduced the microbial growth. No trend was been observed for TA and TSS result. TA values been expected to be decline while TSS values was expected to be increases along the storage time. Studies on determination of respiration rate, ethylene production, antioxidant capacity, total phenolic content and sensory evaluation need to be further explored on tomato coated with edible coating.