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Department of Agrotechnology Postharvest Science and Technology

Outline

- Research Focus
- Research Result
- Current Research
- Publication
- Joint Research Opportunity



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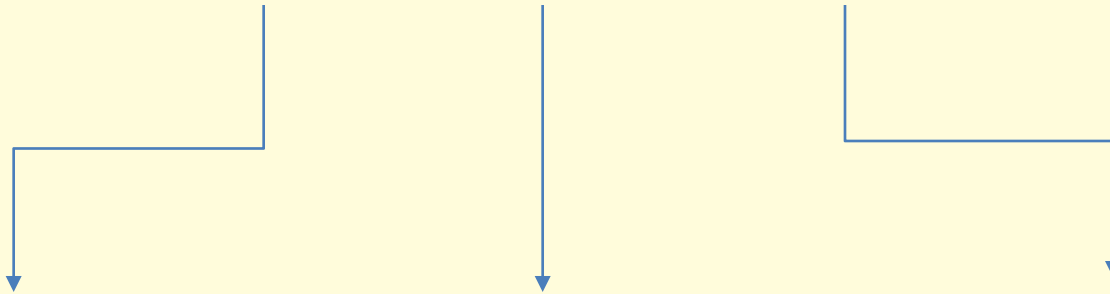


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Focus



HORTICULTURAL
PRODUCTS :
INDIGENOUS FRUIT
AND VEGETABLE

PACKAGING:
- Local Spicy
- Local Starch

CUT FLOWER
PRESERVATION



Our research on Tropical Fruit



Our research on Edible Film using local starch



The uses of essential oil as antimicrobial agent



Other works



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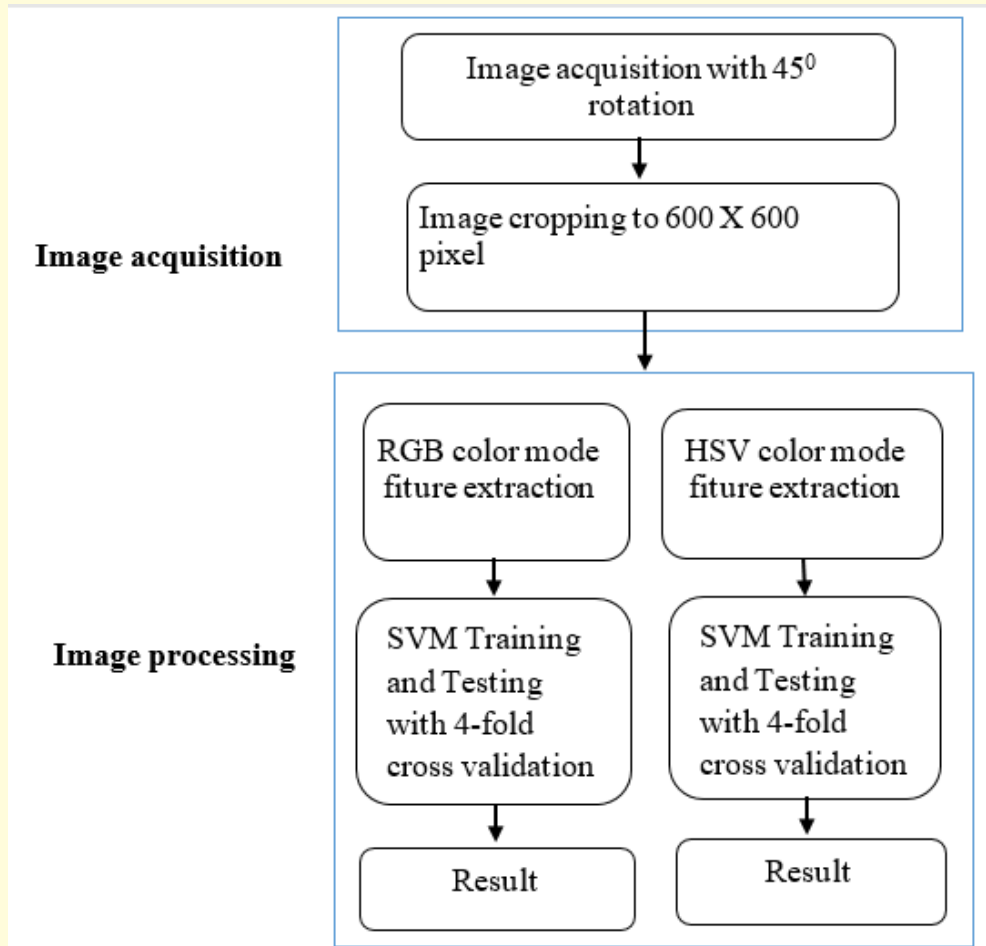


Research

- Image Processing
 - Purpose : to design program for Mangosteen maturity index classification and anthocyanin content using non destructive methods (SVM)



Procedure



Process flow of the research

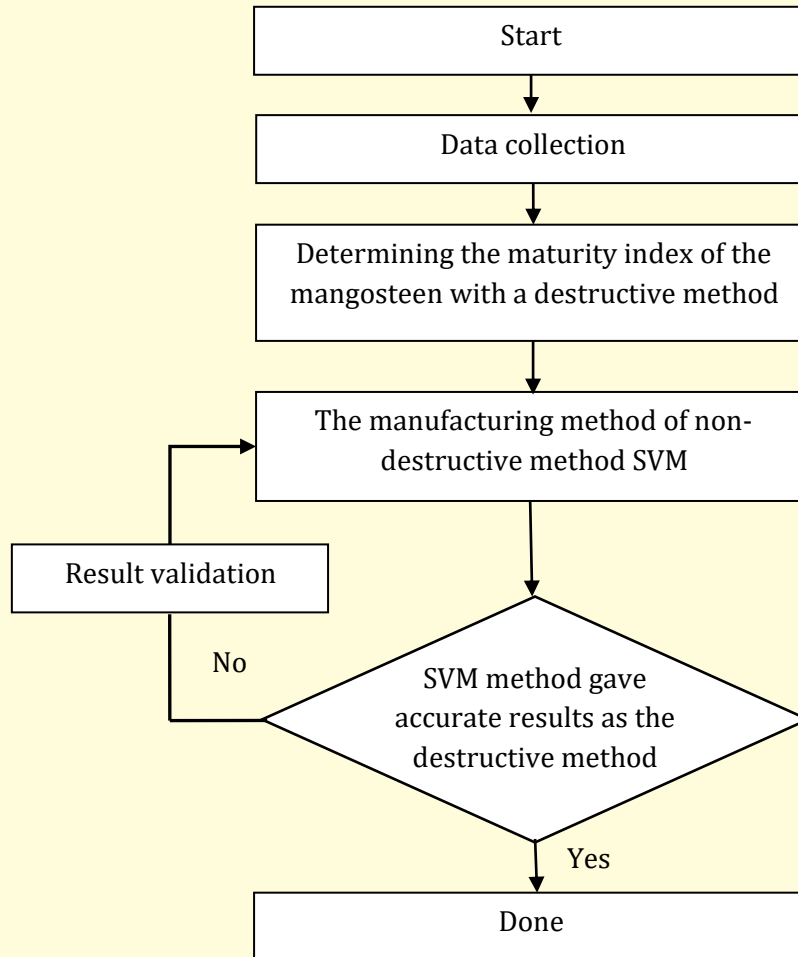


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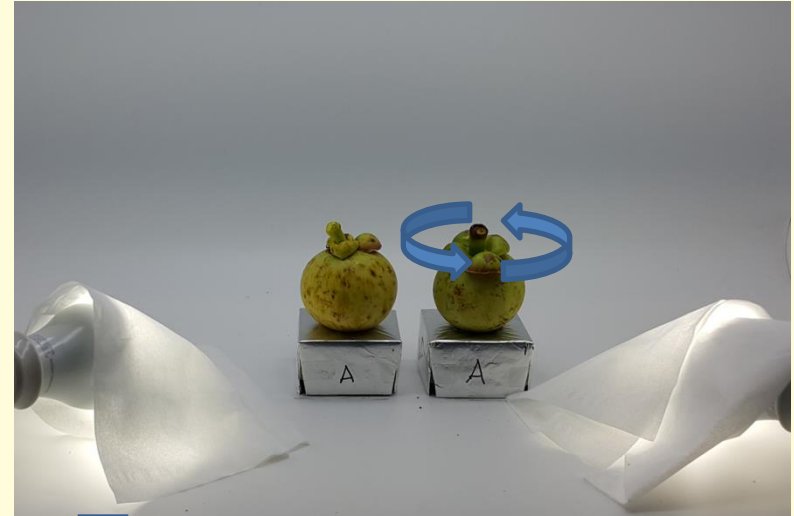
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Procedure



Procedure



Result

Accuracy of stage detection using mean, median and standard deviation of R, G and B

Maturity Stage	Fold 1	Fold 2	Fold 3	Fold 4	Average
Stage 1	100%	100%	100%	100%	100%
Stage 2	100%	94%	100%	100%	98%
Stage 3	81%	75%	94%	100%	88%
Stage 4	100%	94%	88%	88%	92%
Stage 5	81%	81%	81%	69%	78%
Stage 6	88%	100%	100%	94%	95%

Validation technique resulted in very high detection accuracy at **100%, 98% and 95%** for mangosteen stage 1, 2 and 6 respectively. High accuracy also detected for stage 3, 4 and 5 at **88%, 92% and 78%** .



Result

Result of training and testing of SVM to detect mangosteen maturity based on anthocyanin content

Stage	Sum of image testing	Sum of images classified correctly	Accuracy of classification (%)	Notes
1	8	8	100.0	-
2	8	8	100.0	-
3	8	7	87.5	1 image classified as stage 4
4	8	4	50.0	1 image classified as stage 3 meanwhile 3 images classified as stage 5
5	8	5	62.5	3 images detected as stage 4 whereas 2 images detected as stage 6
6	8	8	87.5	-
Mean of accuraccy in stage detection			83.3	

Observation on chemical compound and image processing showed the accuracy in detecting mangosteen maturity at the level of **83.3%**.



Research: Edible Film

Purpose:

1. Develop Edible film to reduce the use of longtime-degredable Plastic
2. Develop edible coating to prolong the shelf-life of fruit



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Edible Film

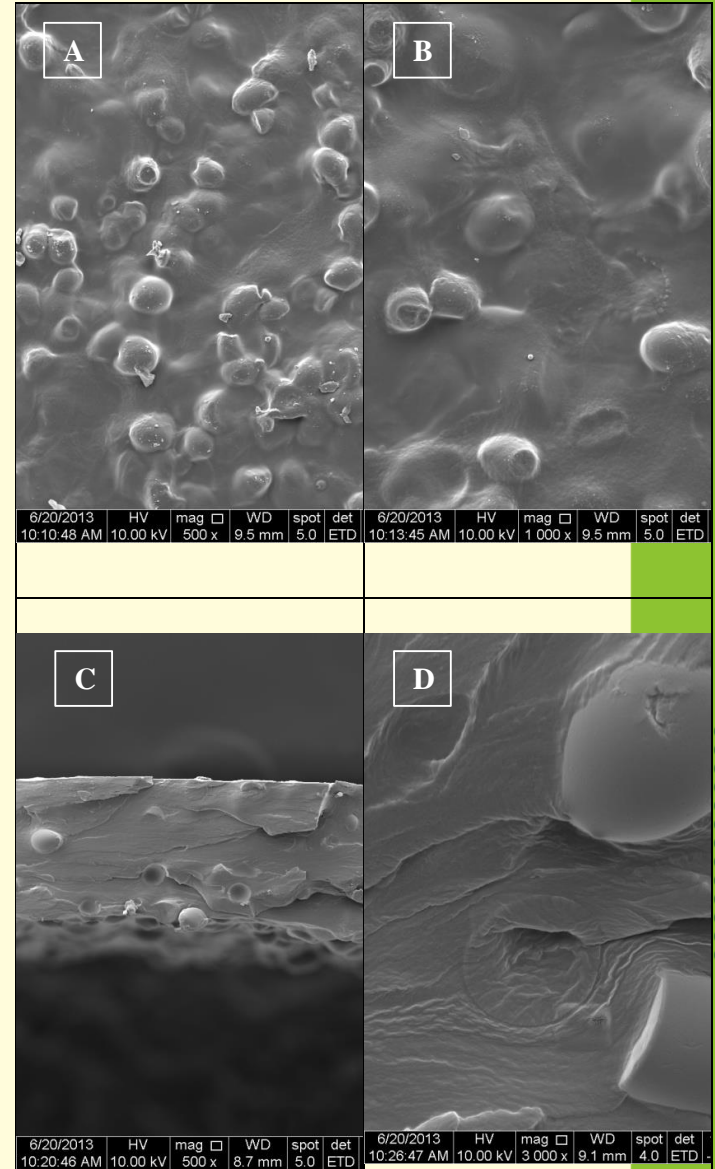
Sago starch + Chitosan

Table 1. Mechanical Properties of Sago Starch-Chitosan Biodegradable Film

Sago Starch-Chitosan Concentration	Tensile Strength (MPa)	Elongation (%)
BKS I	2,9277 ^b	49,3239 ^a
BKS II	2,4502 ^b	44,7872 ^a
BS	6,9004 ^a	31,8846 ^a

Table 2. Biodegradation of sago starch-chitosan film.

Sago starch-chitosan concentration	Soil Burial Test (cm ² /week)
BKS I	62
BKS II	24
BS	104



Edible Coating



Tomatoes



Chitosan



Averroa Bilimbi
L Extract

Treatment	Total Microbe (x 10 ⁴ CFU)				
	5	10	15	20	25
C	1.6b	15.7ab	74.6ab	100.0a	184.9b
A	0.0b	4.2b	4.6b	21.7a	104.6b
C + A	0.0b	3.1b	3.8b	18.6a	146.6b
Control	196.7a	37.7a	119.0a	319.5a	1398.0

a

Treatment	Weight Loss (%)				Firmness(N/m ²)			
	16d	20d	24d	28d	10d	15d	20d	25d
C	13.3b	15.6b	19.9b	27.8c	0.31b	0.36a	0.34b	0.28b
A	12.9b	16.7b	21.9b	35.8b	0.32b	0.29b	0.26b	0.21c
C + A	13.3b	16.4b	20.2b	26.6c	0.42a	0.37a	0.36a	0.33a
Control	17a	23.5a	30.7a	42.6a	0.25c	0.22c	0.18c	0.14d



Current Research



Fresh-cut Apple

Carboxymethyl
Cellulose



Essential Oil :
Cinnamon
Piper Betle
Lemon
Lemongrass



Rose Apple

Alginate

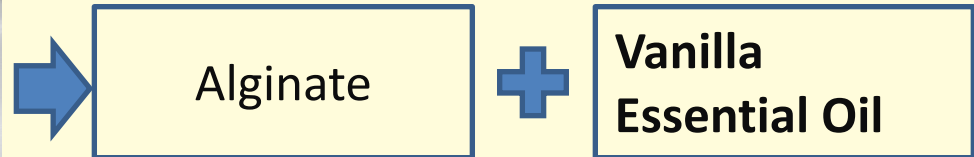


**Piper Betle
Essential Oil**

Current Research



Fresh-cut Dragon Fruit



Selected Publications

- International
 - **Non destructive method for maturity index determination of *Garcinia Mangostana* L using image processing technology.** (Acta Horticulturae, 2017)
 - **Optimized estimation of mangosteen maturity stage using SVM and color features combination approach.** (Acta Horticulturae, 2017)
 - **Synergism between sago starch and chitosan in enhancing biodegradable film properties.** (Springer nature, 2017)
 - **Maturity stages classification of mangosteen based on image processing using SVM.** (Joint publication Technische Universiteit Eindhoven, the Netherlands)



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Selected Publications

- International

- **Pectic polysaccharide distribution of Valencia Orange.** (Joint Publication with The University of Melbourne, Australia)
- **Effect of Light Emitting Diode (LED) on Biosynthesis and Metabolism of Ascorbate Acid on Postharvest Broccoli Florets (2016)**

- Books

- **Postharvest Technology of Tropical Fruits (Draft to be Published)**
- **Cultivation and Postharvest Technology of Ornamental Plants (2017)**



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Joint Research

- Post harvest technology of Indigenous Fruit
 - Packaging
 - Biotechnology
 - Image processing
 - Metabolomic



Postharvest Team



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