



UNIVERSITAS TRILOGI

Teknopreneur, Kolaborasi dan Kemandirian

Surat Tugas
No. 53/AET/S-Tug/XII/2018

Ketua Program Studi Agroekoteknologi dengan ini menugaskan kepada :

Dr. Inanpi Hidayati Sumiasih, S.P., M.Si.


Untuk mempresentasikan poster penelitian dalam The Internasional Seminar Series : Horticulture for The Quality of Life dengan judul "The study of several stages of maturity and storage temperature on color changes and shelf life of mangosteen (*Garciana mangosteen L.*)" yang akan dilaksanakan pada:

Hari/Tanggal : Senin, 10 Desember 2018
Waktu : 08.00 – 17.30
Tempat : IPB International Convention Center, Bogor
Agenda : Seminar Internasional Hortikulura

Kami berharap Ibu dapat melaksanakan tugas tersebut dengan sebaik-baiknya sesuai dengan ketentuan yang berlaku di Universitas Trilogi. Atas perhatian dan kerjasamanya diucapkan terima kasih

Jakarta, 7 Desember 2018
Ketua Program Studi Agroekoteknologi

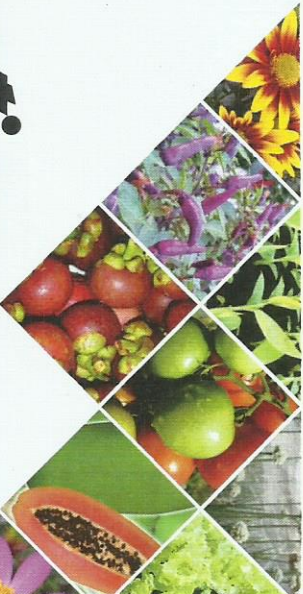



Warid, S.P., M.Si

Tembusan:

- I. Wakil Rektor Bidang Akademik
- II. Kabag SDM
- III. Yang bersangkutan

Certificate of Participation



This certificate is awarded to

Inanpi Hidayati Sumiasih

has participated as

Poster Presenter

at The International Seminar Series:
Horticulture for The Quality of Life

December 10th, 2018

IPB International Convention Center, Bogor, Indonesia



Dr. Awang Maharjaya

Director of Center for Tropical Horticulture Studies
Bogor Agricultural University

Nomor : 054/Panitia_ISSHort/PKHT/XI/2018
Hal : Abstract Announcement
Lamp : 2 (dua) berkas

November 22nd 2018

To the honor,
Mr/Mr.

With respect,

The committee of *The International Seminar Series: Horticulture for The Quality of Life* would like to send our gratitude for your interest on submitting your research abstract. Based on the selection process within our academic commission, we are glad to announce that the following abstract:

Name : Dr. Inanpi Hidayati Sumiasih
Abstract title : The Study of several stages of maturity and storage temperature on color changes and shelf life of mangosteen (Garcinia mangostana L.)

ACCEPTED FOR POSTER PRESENTATION

According to this announcement, we would like to invite you to attend *The International Seminar Series: Horticulture for The Quality of Life* which will be held on **Monday, December 10th 2018** at IPB International Convention Center (IICC), Bogor.

Please kindly find and fill in the enclosed document of confirmation letter and proceed to fee payment no later than **December 3rd 2018** to **bank account 146892517 BNI under the name Rektor IPB CQ Pusat Kajian Buah-Buahan Tropika**. The confirmation letter should be submitted to official e-mail of seminar committee (seminar.pkht@gmail.com) along with the payment receipt. The full paper should be send by e-mail no latter than **December 7th 2018**, written based on the proceeding guidelines attached on the e-mail.

We are highly looking forward to your attendance and active participation on *The International Seminar Series: Horticulture for The Quality of Life* in Bogor. For further information, please contact the committee through e-mail seminar.pkht@gmail.com or Andi Azhari (HP: 08128232523).

Thank you for your attention and cooperation.

Head of Committee,
The International Seminar Series:
Horticulture for The Quality of Life



Dr. Awang Maharijaya

STUDY OF SEVERAL STAGES OF MATURITY AND STORAGE TEMPERATURE ON COLOR CHANGES AND SHELF LIFE OF MANGOSTEEN (*GARCINIA MANGOSTANA* L.)

Inanpi Hidayati Sumiasih^{1,3}, Roedhy Poerwanto^{1,2}, Darda Efendi^{1,2}

1. Agronomy and Horticulture Department, Faculty of Agriculture, Bogor Agricultural University, Bogor, Indonesia
2. Center for Tropical Horticulture Studies
3. Agrotechnology Program, Faculty of Bioindustry, and Trilogi University, Jakarta

BACKGROUND

Color and freshness of mangosteen are important characters as benchmarks for consumers in the selection and purchase of mangosteen in the market. Color, freshness and shelf life of mangosteen are affected by the stage of maturity at harvest and the correct storage temperature. Information about the correct maturity stage for harvesting and storage temperature of mangosteen are needed by the mangosteen farmers, local merchant, and exporters as an effort to maintain the quality of fresh product. The objective of this research was to study the effect of several maturity stage at harvest and storage temperature to mangosteen color changes and shelf life during storage.

MATERIALS AND METHOD

Magosteen fruit was from mangosteen plantation in Tanggamus Regency, Lampung. The research was conducted in Postharvest Laboratory, Agronomy and Horticulture Department, Bogor Agricultural University. The research used Completely Randomized Design of two factors. The first factor was the fruit maturity stage at harvest consisting of: Maturity Stage 1, 2, 3 and 4. The second factor was storage temperature of 15 °C and room temperature. The observations were total titratable acid (TTA) (%), fruit skin water content, fruit skin color appearance, optimum consumption point, organoleptic test, color scoring, and mangosteen fruit sepal freshness.

RESULTS AND DISCUSSION

Total Titratable Acid (TTA)

At the early storage time, TTA of mangosteen was around 0.60-0.74%. Generally, TTA value of every treatment was declined especially after 10 DAH.

Table 1. TTA content of mangosteen at several maturity stages and storage temperature during storage

Treatment	DAH (%)						
	0	5	10	15	20	25	30
Stage 1	0.74 a	0.69	0.68	0.54	0.40	0.24	0.20
Stage 2	0.68 ab	0.64	0.66	0.55	0.38	0.24	0.19
Stage 3	0.67 ab	0.65	0.65	0.54	0.40	0.24	0.19
Stage 4	0.60 b	0.61	0.63	0.54	0.37	0.23	0.14
Temperature of 15 °C	0,66	0,66	0,67 a	0,55	0,47	0,48	0,36
Room temperature	0,69	0,65	0,64 b	0,54	-	-	-

Notes: Numbers followed by the same letter in the same column showed insignificant difference based on DMRT 1%. – was the fruit that skin hardened with dried aril (rotten).

Mangosteen Aril Appearance

At harvest (0 DAH) at 15 °C, mangosteen that was harvested at Maturity Stage 1 and 2 had aril that could not be separated with endocarp and had a lot of yellow sap, while at 5 DAH mangosteen could already be consumed. At the end of storage, mangosteen that was harvested at Maturity Stage 3 and 4 had hollow space between aril and endocarp. Endocarp color was brownish and aril color was unappealing. While fruit that was harvested at Maturity Stage 1 and 2 could still able to be consumed in the end of storage (30 DAH).

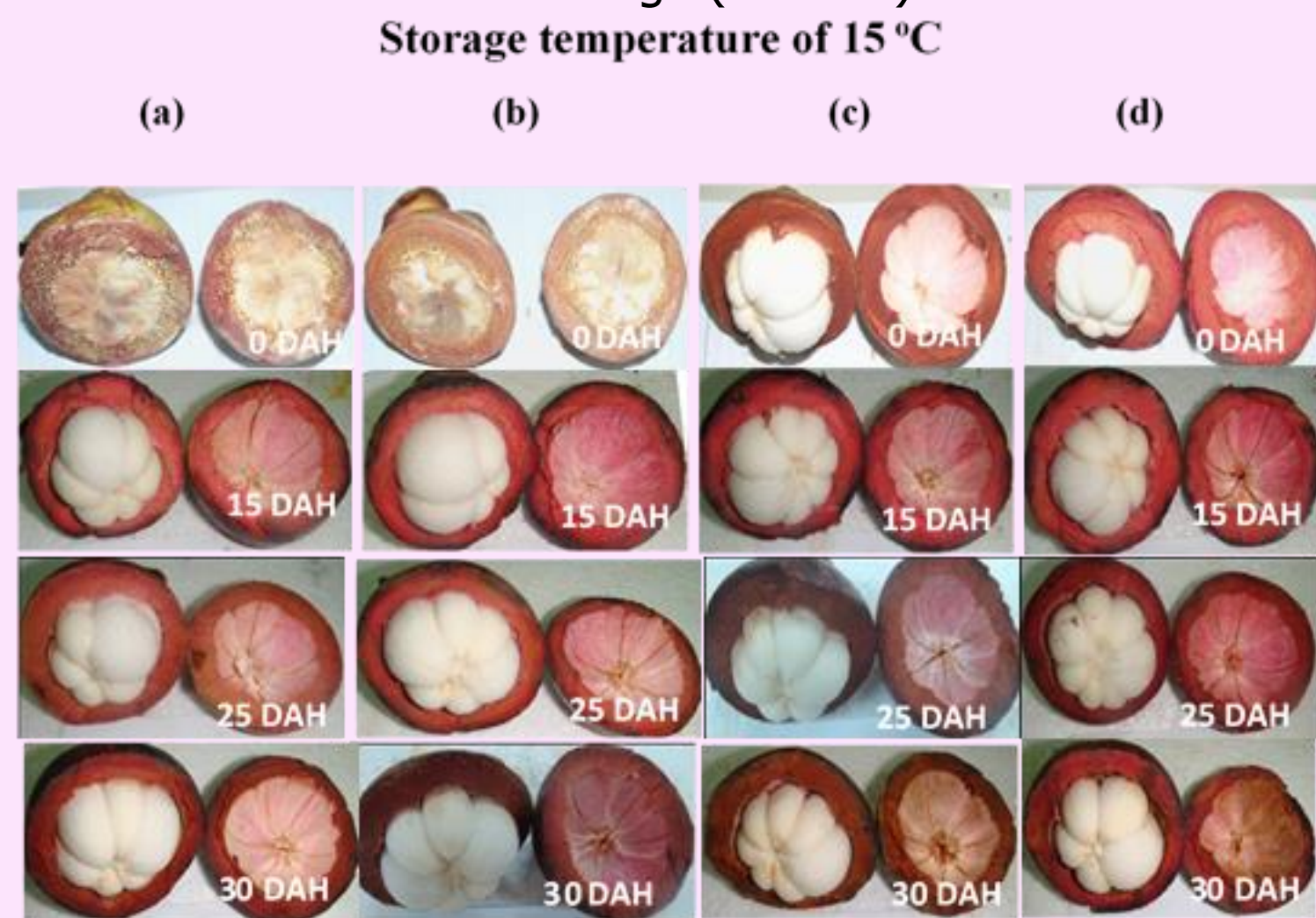


Figure 1. The appearance of mangosteen aril from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in storage temperature of 15 °C

In room temperature storage, the limit of consumers acceptability at all harvest Maturity Stages was 15 DAH. At 20 DAH all mangosteen from all Maturity Stages had already rotten and could not be consumed (aril was brown and endocarp was dried and brown).



Figure 2. The appearance of mangosteen aril from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in room temperature storage

Water Content Percentage (%)

Mangosteen fruit water content generally declined along with longer storage time. Mangosteen in storage temperature of 15 °C showed higher water content than in room temperature. This showed that lower storage temperature can suppress water loss in fruit.

Table 2. Magosteen fruit skin water content at several maturity stages and storage temperature

Combination of treatments	Fruit skin water content (%)						
	0	5	10	15	20	25	30
Stage 1, 15 °C	78.02	76.89	70.57	68.19	69.46 a	68.38 a	68.96
Stage 2, 15 °C	78.49	75.96	69.82	66.95	66.19 a	67.43 a	68.67
Stage 3, 15 °C	77.88	75.44	67.18	65.53	62.57 ab	62.51 a	64.63
Stage 4, 15 °C	78.85	77.76	66.58	64.94	62.43 bc	61.82 ab	60.29
Stage 1, room	78.23	75.16	62.02	59.59	58.76 cd	43.36 c	32.00
Stage 2, room	77.68	74.48	63.00	60.91	57.20 e	41.39 cd	31.36
Stage 3, room	78.10	76.73	61.52	59.35	48.06 f	22.88 e	26.17
Stage 4, room	78.55	76.41	62.70	56.79	39.25 g	21.72 e	22.56

Note: The numbers followed by the same letter in the same column showed no significant difference based on DMRT at 1%.

Mangosteen Fruit Sepal Color and Freshness Scoring

The effect of maturity stage and storage temperature to sepal color was shown at Figure 3.

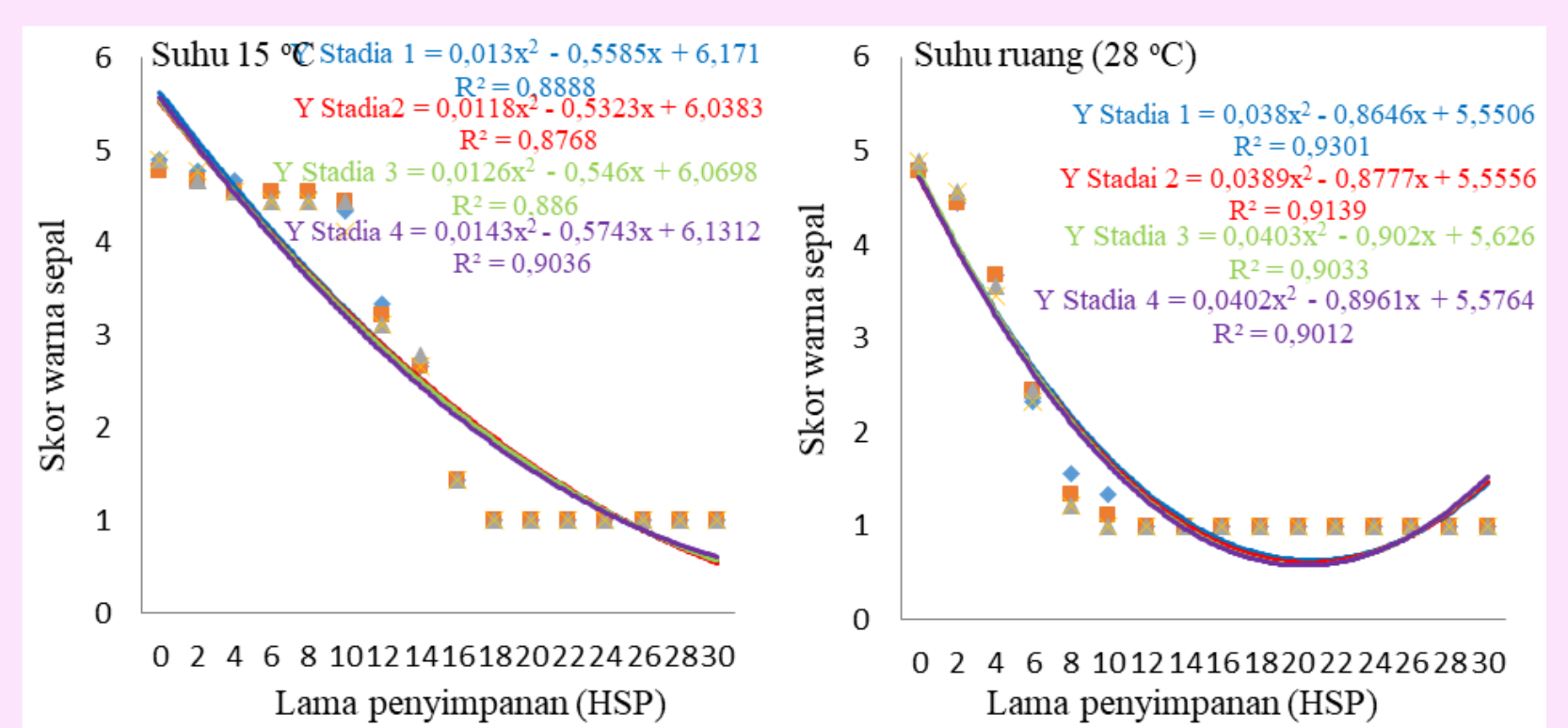


Figure 3. Mangosteen sepal color score at several maturity stages and room temperature

The effect of maturity stage and storage temperature to mangosteen sepal freshness score was shown at Figure 4.

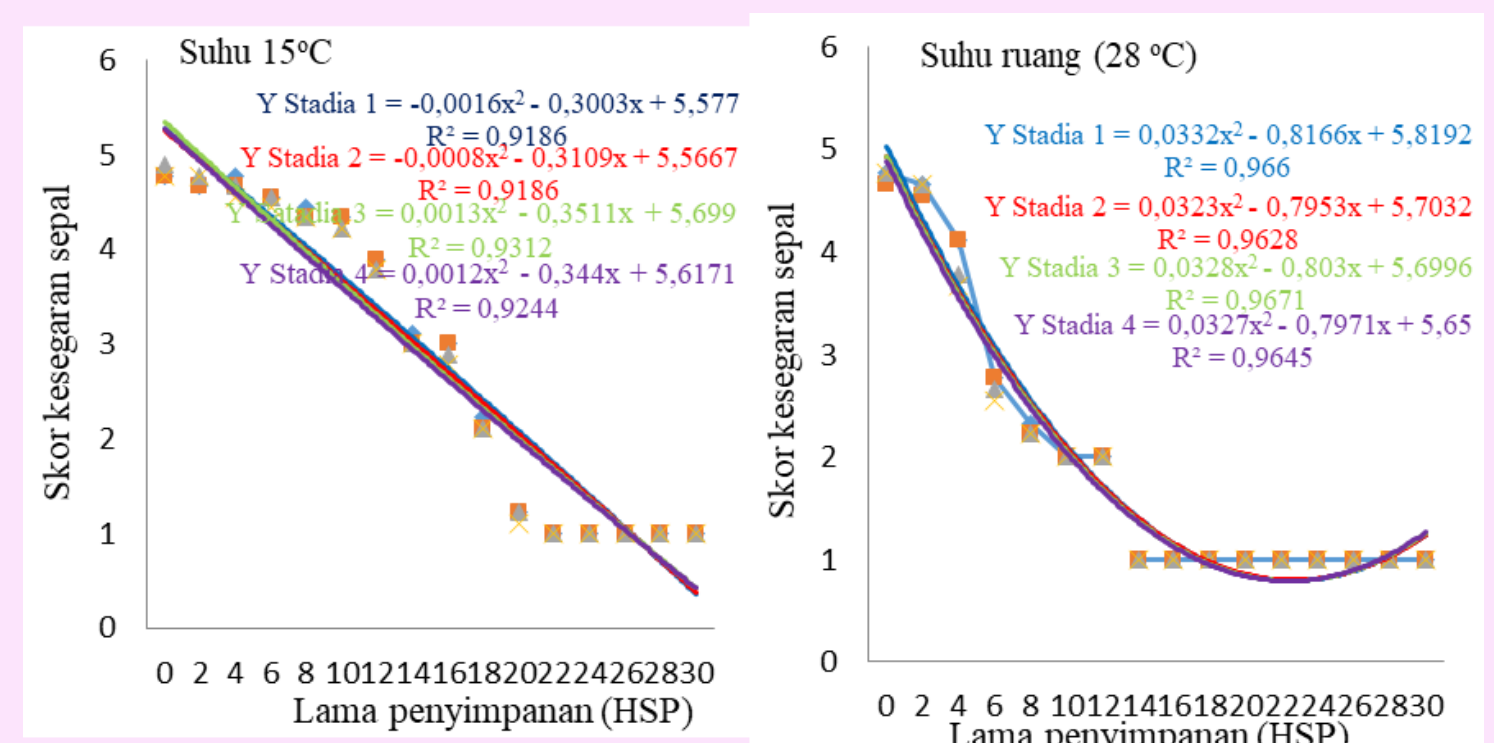


Figure 4. Mangosteen fruit sepal freshness from several maturity stages and storage temperature

Color and Freshness of mangosteen fruit sepal had effect on mangosteen quality during storage. Fresh mangosteen fruit had green sepal and then turned into brown, indicating the fruit had lost its freshness.

Mangosteen Fruit Skin Appearance

Figure 5 showed that mangosteen at all maturity stages in storage temperature of 15 °C was able to keep its skin color than mangosteen kept in room temperature.



Figure 5. Mangosteen fruit skin appearance from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in storage temperature of 15 °C

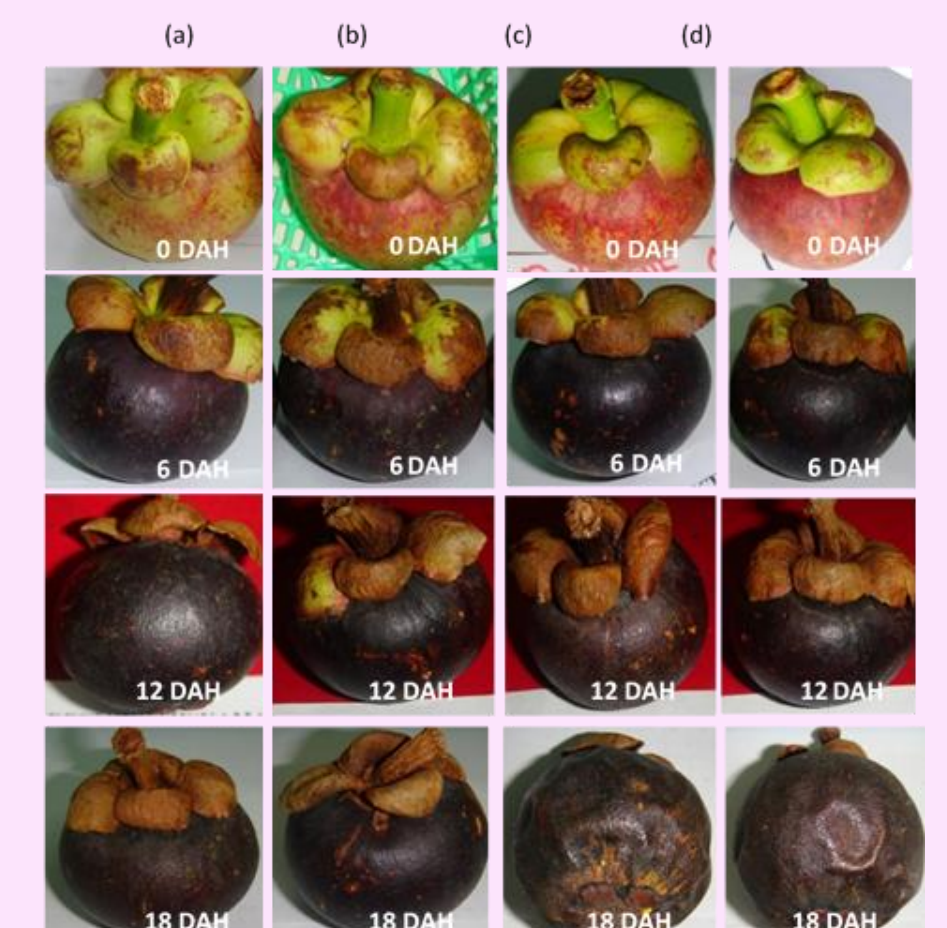


Figure 6. Mangosteen fruit skin appearance from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in room temperature storage

The taste optimum consumption point of mangosteen that was kept at 15 °C was 20 DAH (stage 1 and 2) and 10 DAH (stage 3 and 4). AS for mangosteen that was stored in room temperature at stage 1 was 15 DAH and at stage 2, 3, and 4 was 10 DAH.

CONCLUSION

The result of harvesting mangosteen at Maturity Stage 1 could maintain skin color, sepal color and freshness longer than at Maturity Stage 2, 3, and 4. Mangosteens that were harvested at Maturity Stage 1 and 2, combined with storage temperature of 15 °C could maintain fruit quality up to 30 days after harvest and could be used for export market. While harvesting at Maturity Stage 3 could maintain fruit quality up to 25 days after harvest and Maturity Stage 4 up to 20 days after harvest. Harvesting at Maturity Stage 4 followed by 15 °C storage temperature and all Maturity stages combined with room temperature storage could be used for local market.



International Seminar Series: Horticulture for The Quality of Life
December 10th 2018

IPB International Convention Center, Bogor - Indonesia

Study of Several Stages of Maturity and Storage Temperature on Color Changes and Shelf Life of Mangosteen (*Garcinia mangostana* L.)

Inanpi Hidayati Sumiasih^{1,3}, Roedhy Poerwanto^{1,2} and Darda Efendi^{1,2}

1. Agronomy and Horticulture Department, Faculty of Agriculture, Bogor Agricultural University, Bogor, Indonesia
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BACKGROUND

Color and freshness of mangosteen are important characters as benchmarks for consumers in the selection and purchase of mangosteen in the market. Color, freshness and shelf life of mangosteen are affected by the stage of maturity at harvest and the correct storage temperature. Information about the correct maturity stage for harvesting and storage temperature of mangosteen are needed by the mangosteen farmers, local merchant, and exporters as an effort to maintain the quality of fresh product. Incorrect harvest stage and storage of mangosteen fruit can make the fruit skin harden faster and deplete its quality. The objective of this research was to study the effect of several maturity stage at harvest and storage temperature to mangosteen color changes and shelf life during storage.

MATERIALS AND METHOD

Magosteen fruit was from magosteen plantation in Tanggamus Regency, Lampung. The research was conducted in Postharvest Laboratory, Agronomy and Horticulture Department, Bogor Agricultural University. The research used Completely Randomized Design of two factors. The first factor was the fruit maturity stage at harvest consisting of: Maturity Stage 1, 2, 3 and 4. The second factor was storage temperature of 15 °C and room temperature. The observations were total tritatable acid (TTA) (%), fruit skin water content, fruit skin color appearance, optimum consumption point, organoleptic test, color scoring, and mangosteen fruit sepal freshness.

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Storage temperature of 15 °C

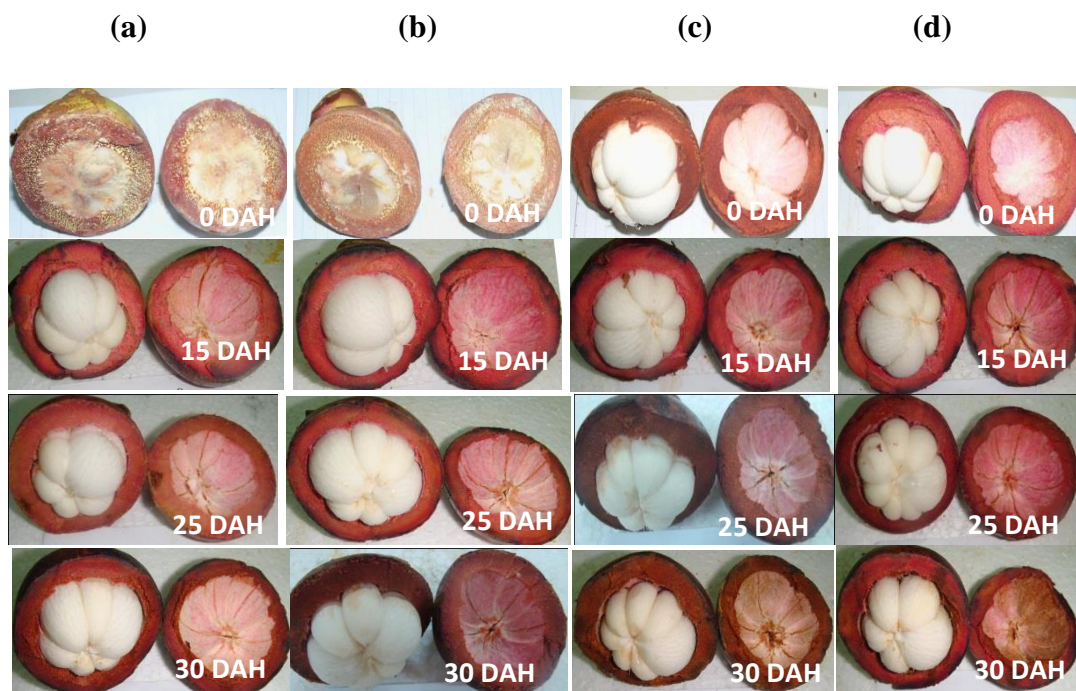


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In room temperature storage, the limit of consumers acceptability at all harvest Maturity Stages was 15 DAH. At 20 DAH all mangosteen from all Maturity Stages had already rotten and could not be consumed (aril was brown and endocarp was dried and brown).

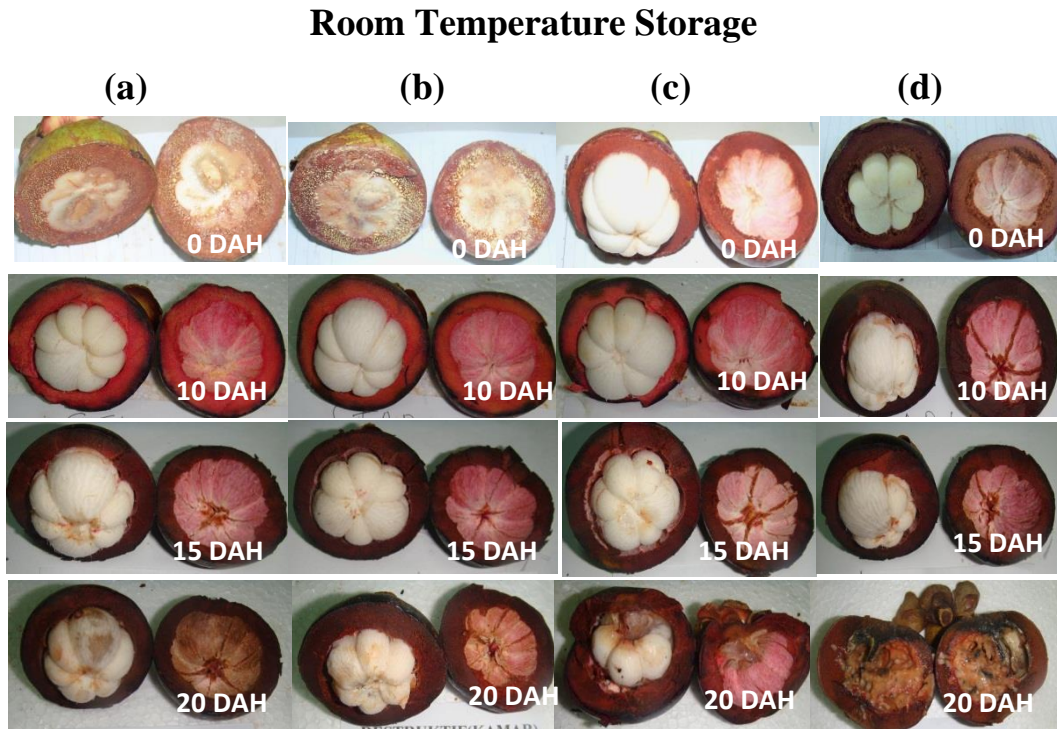


Figure 2. The appearance of mangosteen aril from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in room temperature storage

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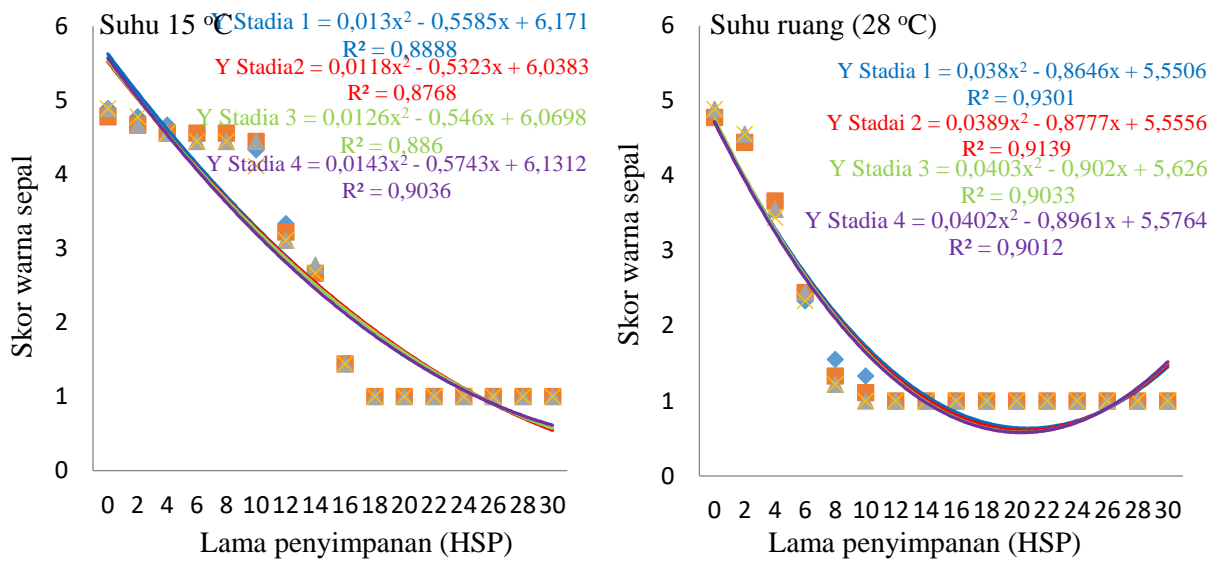


Figure 3. Mangosteen sepal color score at several maturity stages and room temperature

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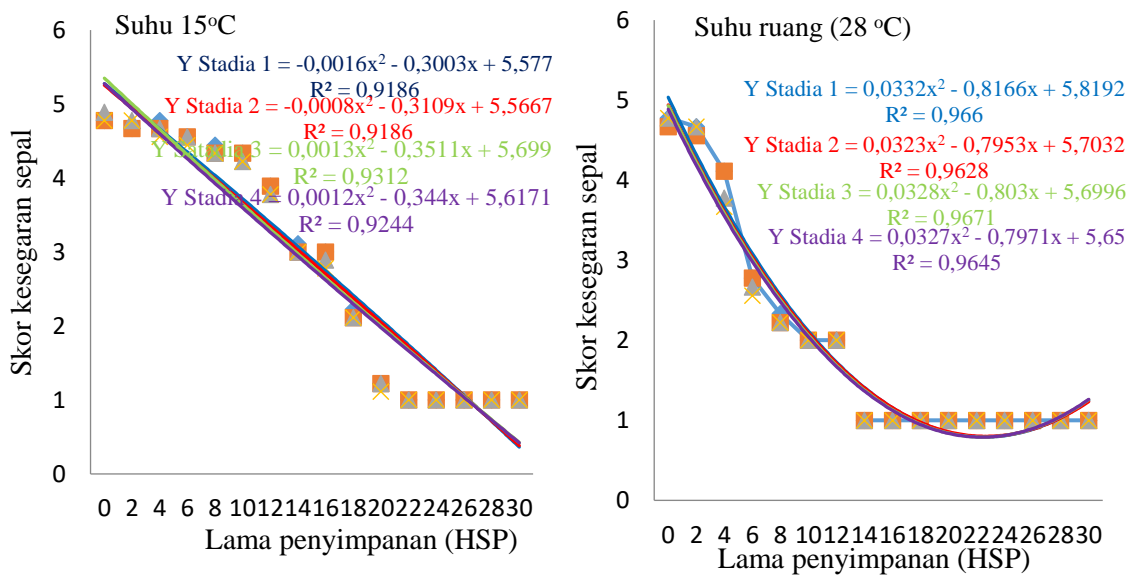


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Mangosteen Fruit Skin Appearance

Figure 5 showed that mangosteen at all maturity stages in storage temperature of 15 °C was able to keep its skin color than mangosteen kept in room temperature.

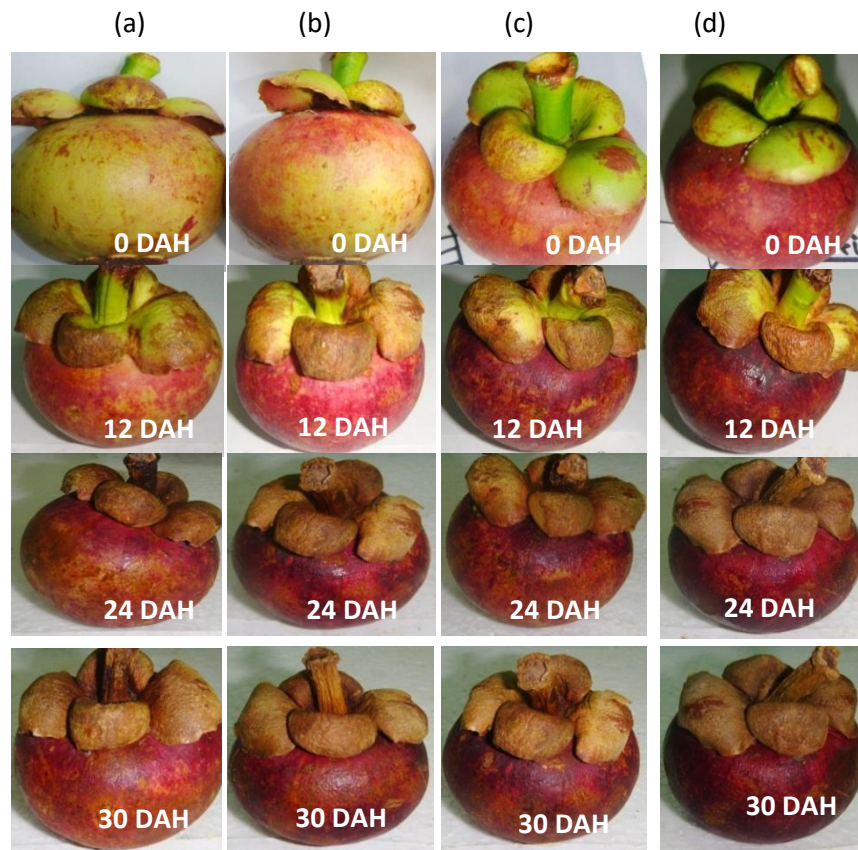


Figure 5. Mangosteen fruit skin appearance from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in storage temperature of 15 °C



Figure 6. Mangosteen fruit skin appearance from 0 DAH to 30 DAH: (a) Maturity Stage 1, (b) Maturity Stage 2, (c) Maturity Stage 3, and (d) Maturity Stage 4 in room temperature storage

Consumers acceptance limit of mangosteen at Maturity Stage 1, 2, 3, and 4 in storage temperature of 15 °C were at 30 DAH, 30 DAH, 25 DAH, and 20 DAH, respectively, while in room temperature at all maturity stages was 20 DAH. The optimum consumption point of mangosteen that was kept at 15 °C was 20 DAH (stage 1 and 2) and 10 DAH (stage 3 and 4). AS for mangosteen that was stored in room temperature at stage 1 was 15 DAH and at stage 2, 3, and 4 was 10 DAH.

CONCLUSION

The result of harvesting mangosteen at Maturity Stage 1 could maintain skin color, sepal color and freshness longer than at Maturity Stage 2, 3, and 4. Mangosteens that were harvested at Maturity Stage 1 and 2, combined with storage temperature of 15 °C could maintain fruit quality (appropriate for consumption) up to 30 days after harvest and could be used for export market. While harvesting at Maturity Stage 3 could maintain fruit quality up to 25 days after harvest and Maturity Stage 4 up to 20 days after harvest. Harvesting at Maturity Stage 4 followed by 15 °C storage temperature and all Maturity stages combined with room temperature storage could be used for local market.