



# Naskah Publikasi

## Diff erent Maturity Phases and Types of Wrapping Material on the Quality of Papaya Fruit ( Carica Papaya L. ) Var. Calina

 Henik Sukorini

 Publication Articles Okt - Des 2024 Dosen UMM

 University of Muhammadiyah Malang

---

### Document Details

**Submission ID**

trn:oid::1:3026856313

**Submission Date**

Oct 1, 2024, 4:10 PM GMT+7

**Download Date**

Oct 1, 2024, 4:26 PM GMT+7

**File Name**

d\_Types\_of\_Wrapping\_Material\_on\_the\_Quality\_of\_Papaya\_Fruit.docx

**File Size**

95.2 KB

11 Pages

3,193 Words

17,236 Characters





# 9% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.




## Filtered from the Report

- ▶ Bibliography
- ▶ Quoted Text

## Match Groups

-  **18 Not Cited or Quoted 7%**  
Matches with neither in-text citation nor quotation marks
-  **4 Missing Quotations 2%**  
Matches that are still very similar to source material
-  **0 Missing Citation 0%**  
Matches that have quotation marks, but no in-text citation
-  **0 Cited and Quoted 0%**  
Matches with in-text citation present, but no quotation marks

## Top Sources

- 7%  Internet sources
- 5%  Publications
- 1%  Submitted works (Student Papers)

## Integrity Flags

### 0 Integrity Flags for Review

No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

### Match Groups

- 18 Not Cited or Quoted 7%**  
Matches with neither in-text citation nor quotation marks
- 4 Missing Quotations 2%**  
Matches that are still very similar to source material
- 0 Missing Citation 0%**  
Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%**  
Matches with in-text citation present, but no quotation marks

### Top Sources

- 7% Internet sources
- 5% Publications
- 1% Submitted works (Student Papers)

### Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

<b>1</b>	Internet	adoc.pub	1%
<b>2</b>	Internet	www.devotion.greenvest.co.id	1%
<b>3</b>	Publication	R Sigalingging, H A Nasution, A Rindang, P C Ayu. " Effect of Packaging Fillers Mat...	1%
<b>4</b>	Internet	www.ajrsp.com	1%
<b>5</b>	Internet	jjbs.hu.edu.jo	1%
<b>6</b>	Internet	eprints.umm.ac.id	0%
<b>7</b>	Internet	worldwidescience.org	0%
<b>8</b>	Student papers	School of Business and Management ITB	0%
<b>9</b>	Publication	Waryat, N R Ahmadi, A Sulistyningrum. "Changes in Quality Characteristics at Pa...	0%
<b>10</b>	Internet	www.foodandnutritionjournal.org	0%

11	Publication	Saowapa Chaiwong, Rattapon Saengrayap, Jutarat Rattanakaran, Arraya Chaitha...	0%
12	Internet	internationaljournalcorner.com	0%
13	Internet	text-id.123dok.com	0%
14	Publication	B R Vinod, Ram Asrey, Nirmal Kumar Meena, Shruti Sethi, Jai Prakash, Gautam Ch...	0%
15	Publication	Sajid Ali, Shabir Ahmad Mir, B.N. Dar, Shaghef Ejaz. "Sustainable Postharvest Tech...	0%
16	Internet	accreditation.umm.ac.id	0%
17	Internet	erl.ucc.edu.gh:8080	0%
18	Internet	www.qascf.com	0%
19	Publication	Tri Luchi Proklamita, Aloysius Ng. Lende. "THE EFFECT OF POLYPROPYLENE THICK...	0%

1 **Different Maturity Phases and Types of Wrapping Material on the Quality of Papaya Fruit ( *Carica***  
2 ***Papaya L. ) Var. Calina***

3  
4 Sukorin, H.,<sup>1,2)</sup> <https://orcid.org/0000-0002-3738-8382>, Romadhon, S <sup>1)</sup> , Ishartaty, E <sup>1)</sup>  
5 <https://orcid.org/0000-0002-6211-6338>

- 6 1) Agrotechnology Department of Faculty of Agriculture and Animal Science, Street Raya Tlogomas  
7 Number 246 Malang - East Java Postal Code 65144  
8 2) Correspondence Author [henik@umm.ac.id](mailto:henik@umm.ac.id), +6281334877029  
9

10 Papaya has excellent potential to develop in tropical areas such as Indonesia. Papaya production in  
11 2021 will reach 1.17 million tons per year, with total export and import volumes of 468 and 299 tons  
12 per year, respectively. Mechanical damage to papaya fruit can occur due to impacts during harvest  
13 and transportation. Harvesting fruit that is too young or not yet physiologically ripe will result in it not  
14 being fully ripe and the taste not being sweet enough, while harvesting fruit that is too ripe (overripe)  
15 will affect the papaya's shelf life, making it short and easily damaged. Damage by various factors,  
16 including 20-26% due to rot, 2-4% due to overcooking, and 10% due to mechanical damage. This  
17 research aimed to determine the maturity phase and type of packaging material that effectively  
18 extends the shelf life of callina papaya fruit. This study used a completely randomized design with two  
19 factors, and all treatment combinations were repeated three times. The treatments used were the  
20 maturity phase and the type of packaging material. Observation parameters include Color Change,  
21 Weight Loss, Fruit Hardness Level, Vitamin C Content, TSS (Total Soluble Solid), Percentage of Disease  
22 Severity, and Intensity of Disease Attacks. The combination of the green maturity phase treatment  
23 and plastic wrap packaging material was the best maturity phase and wrapping material.  
24

25 **Keywords: *Carica papaya* , Maturity- Phase, Wrapping**

26  
27 **1. Introduction**

28 Papaya fruit is classified as a climacteric fruit. One of the factors that causes the selling value  
29 of papaya fruit to fall is errors and damage that occur during harvest and post-harvest. The thin surface  
30 of the skin and tissue of papaya fruit causes it to be easily damaged if it is scratched or hit. Mechanical  
31 impact can cause bruising on the surface of the skin and food tissue, triggering further damage due to  
32 the growth of microorganisms (Sigalingging *et al.*, 2019). Post-harvest disease in papaya fruit is  
33 anthracnose caused by *Colletotricum gloeosporides* Penz.Sacc. This disease is latent. The symptom is  
34 brown spots. This disease originates while still on the tree and develops after the fruit is fully ripe  
35 (Srikantharajah, Pakeerathan and Mikunthan, 2021)

36 Papaya has seven stages of fruit maturity, namely physiological ripe (mature Green), a tinge  
37 of yellow (color break), 25% yellow (quarter ripe), 50% yellow (half ripe), 75% yellow (ripe), 100%  
38 yellow (fully ripe), and too ripe (overripe). The appropriate harvest for local market demand is ripe  
39 papaya fruit with 95% green fruit, accompanied by a yellow tinge between the middle and tip of the  
40 papaya. The outer appearance of the fruit looks thick, but when cut open, the inside shows a yellowish-  
41 red color (Kher and Sahu, 2018).

42 Papaya fruit harvested at the MG (ripe Green) and QY (partially yellow) maturity levels  
43 experienced an average weight loss of 5.0% and 6.2% during storage. Weight loss is influenced by  
44 storage temperature; fruit that ripens at 25°C or is stored at 10, 12, or 15°C and then ripened,  
45 respectively, experiences a reduction in weight loss of 4.1%, 5.8%, 6.0%, and 6.7% (Ali *et al.*, 2011).

46 Packaging functions to make food products easy and safe to transport, prevent  
47 contamination, and prevent damage and changes in food ingredients (Morya and Sharma, 2020). The  
48 research results (Arundathi *et al.*, 2019) show that a combination of newsprint and cardboard  
49 packaging materials is recommended for packaging papaya fruit. This is because the condition of the  
50 fruit in this packaging combination is better than packaging using wooden crates and bamboo baskets  
51 filled with banana leaves. Research by Lokasari (2011) on transporting tomatoes packaged in wooden  
52 crates and added as filler with newsprint had mechanical damage of 25.20%. It was the lowest  
53 compared to dry banana leaf filler. These fillers also reduce the weight of tomatoes.

## 54 2. Material and Method

55 A completely Randomized Design with factorial was used in this research. The design used in this  
56 research was factorial and included two factors. The first factor was the fruit maturity phase (S), which  
57 consists of S1: Green, S2: Green-slightly yellow, S3: Yellowish Green. The second factor was the  
58 wrapping material (P), which consists of P0: no wrapping (control), P1: Newsprint, P2: Plastic Wrap,  
59 and P3: Net foam. There were 12 treatment combinations, and they were repeated three times.

### 60 2.1 Research Stages

61 2.1.1. Preparation of research materials. The calina variety of papaya fruit was obtained from farmers.  
62 The papaya fruit used was selected that had a uniform shape and size, was free from disease, had no  
63 defects, had a maturity phase according to research needs, and selected fruit that was physiologically  
64 ripe. Then, each one is wrapped according to the treatment and put into a fruit box with 5 papayas  
65 per box. Then, the fruit is transported by public transportation as far as 200km and stored in a room.  
66 Observations were made during 21 days of storage.

## 67 2.2 . Observations

### 68 2.2.1. Fruit Color Change

69 Fruit skin color was measured by visual observation using the fruit skin yellowness index. The degree  
70 of yellowness of the fruit skin is assessed with a score of 1 to 7, referring to the Cavendish banana  
71 score but adjusted to the condition of the papaya. These values were: 1 = Green, 2 = Green with a  
72 little yellow, 3 = Yellowish green, 4 = More yellow than green, 5 = Yellow with green tips, 6 = Full  
73 yellow, 7 = Yellow with a few brown spots (overripe ). (Taris et al., 2014)

### 74 2.2.2 . Fruit weight loss

75 Weight loss measurements are carried out gravimetrically. With the formula:  $((a - b)/a) \times 100\%$ ,  
76 Whereas a: initial weight, b: final weight

### 77 2.2.3. Fruit Hardness

78 The level of firmness or hardness of the fruit was tested using a Hardness Tester, and observations  
79 were made every 4 days for 21 days using a Penetrometer.

### 80 2.2.4. Vitamin C content

81 Vitamin C content was measured by titration using iodine and 3-4 drops of starch solution indicator  
82 with a concentration of 1g/100 ml. Vitamin C content was measured by crushing 25 g of fruit flesh,  
83 then filtered by adding distilled water and put into a 100 ml measuring flask; take 25 ml of the solution  
84 and give 3-4 drops of starch solution indicator, then titrated with iodine. Titration is carried out until  
85 a stable dark blue color was formed. Referring to Sudarmadji et al. (1984), Vitamin C content is  
86 calculated using the equation:  $\text{Vitamin C (mg/100 mg of material)} = \text{ml Iodine } 0.01 \text{ N} \times 0.88 \times \text{fp} \times 100$

87 Sample weight (g). Information: N = Normality of iodine solution (0.01 N), Fp = Dilution factor (100  
88 ml/25 ml), 1 mg iodine 0.01 N = 0.88 mg ascorbic acid

### 89 2.2.5 . Total Soluble Solids (TSS)

90 TSS was observed using a Refractometer. Take samples of papaya fruit from 3 parts: the tip, middle,  
91 and bottom of the papaya fruit, which were mashed, then place the mashed sample on the surface of  
92 the refractometer glass and see the sugar content value. Observations were made from the beginning  
93 of storage until the end of the research.

### 94 2.2.6. Intensity of Disease Attacks

95 The intensity of disease attacks on the fruit was observed 3 days after storage until the research was  
96 completed. Measurements are expressed in  $I = n/N \times 100$ , whereas: I: Intensity of disease attack, n:  
97 Number of fruits attacked by disease, N: Number of fruits observed.

## 98 RESULTS AND DISCUSSION

### 99 3.1.Weight lost

100 In this study, there was no interaction between the maturity phase treatment and the type of  
101 papaya packaging material on all research variables at all ages of observation. The green maturity  
102 phase treatments, plastic wrap packaging material, and newspaper showed the slowest color change  
103 compared to the other treatments (Figure 1). The same results also occurred in fruit weight loss (Figure  
104 2). The most minor fruit weight loss was in the green maturity phase, fruit wrapping in newspaper and  
105 plastic wrap.

### 106 3.2. Vitamin C Content

107 Up to 12 days after treatment, vitamin C increased in all treatments except in the control treatment.  
108 However, after that, the vitamin C content in all treatments decreased (Figure 3).

### 109 3.3. Total Soluble solid

110 Total soluble solids continued to decrease from observation 4 days to 20 days after treatment except  
111 for the green maturity phase treatment and the type of net foam wrapping. Only fruit wrapped in  
112 plastic wrap had total soluble solids that still increased at the end of observation/20 days after  
113 treatment (Figure 4).

#### 114 **3.4. Fruit Hardness Level and Intensity of Disease Attacks**

115 The green maturity phase shows the hardest fruit hardness, indicated by the significant hardness value  
116 of the fruit. All treated fruits were able to survive well only up to 16 days after treatment, except for  
117 the newspaper wrapping treatment, which lasted up to 16 days after treatment. Likewise, plastic wrap  
118 also showed the hardest fruit hardness and was even able to survive up to 20 days after treatment  
119 (Figure 5). When related to disease incidence, only the green maturity phase treatment was able to  
120 survive up to 9 days of storage, while the others had more than 50% disease attack rates (Figure 6).

121

122 Based on the overall research results, the green maturity phase treatment and the plastic  
123 wrap packaging material were the best treatments. Several observation parameter results support  
124 this. These parameters include the level of color change, weight loss, fruit hardness, vitamin C, and  
125 the intensity of disease attacks on the fruit. Papaya fruit is climacteric. The quality of climacteric fruit  
126 really depends on the timeliness of harvest and how it is stored (Arundathi *et al.*, 2019). Fruit has the  
127 potential to be stored for a long time when it is still green but physiologically ripe. The treatment of  
128 plastic wrap packaging material was shown to be able to inhibit the color change of papaya fruit for  
129 up to 20 days (the day after treatment) to become 100% full yellow color. This is because this  
130 treatment is able to inhibit the respiration and transpiration processes, and the plastic wrap packaging  
131 material can maintain the color of the papaya fruit during storage. According to (Fabi and do Prado,  
132 2019), the use of a modified atmosphere with polyethylene plastic wrapping *can* extend the shelf life  
133 of tomatoes for 6 weeks. According to (Nur Sakinah *et al.*, 2020), polyethylene (PE) packaging is  
134 suitable for use in controlled air storage systems because the permeability of PE film to CO<sub>2</sub> gas is  
135 more significant than O<sub>2</sub>. Hence, the rate of accumulation of CO<sub>2</sub> gas around the material is lower  
136 than the absorption of O<sub>2</sub>.

137 A common change during fruit storage is the loss of green color. This is caused by chlorophyll  
138 degradation. During storage, the fruit's chlorophyllase carries out activities that cause the loss of  
139 chlorophyll. (Kuai, Chen and Hörtensteiner, 2018) The factors responsible for chlorophyll degradation

140 are changes in pH, the oxidative system and the *chlorophyllase enzyme*. During the storage period,  
141 papaya fruit experiences an increasing decrease in fruit weight. The treatment of plastic wrap  
142 packaging material is thought to be able to withstand the processes of respiration and transpiration  
143 (water loss ) during storage. (Ibrahim *et al.*, 2022) The purpose of packaging is to prevent weight loss,  
144 improve product image, avoid or reduce damage during transportation, and act as a promotional tool.  
145 Agricultural products that have been harvested are living structures therefore they still carry out  
146 metabolic activities. These metabolic activities include the respiration process, namely the oxidative  
147 breakdown process of complex fruits such as starch, sugar and organic acids in cells into small  
148 molecules of CO<sub>2</sub>, H<sub>2</sub>O, and energy used by the cells themselves and the process of transpiration (  
149 water evaporation ), the magnitude of the respiration rate is a guide or indication of the speed of  
150 compositional changes in the fruit.

151 Vitamin C levels increased initially and then decreased during storage. This is caused by the  
152 fruit undergoing a ripening process at the beginning of storage. (Yamdeu Galani *et al.*, 2017), The  
153 results of their research also show that the vitamin C content increases during cooking. Total carotene  
154 increased with increasing maturity and reached a maximum value 2-4 days after the fruit was fully  
155 ripe. Decreased levels of vitamin C are caused by fruit that is overripe (rotten) being attacked by  
156 disease. The research results stated that the vitamin C content in the early stages of maturity increases  
157 and then decreases in stored fruit until it approaches rotten. Based on this, scale 6 is very susceptible  
158 to rotten conditions that have excess water content, so vitamin C content is very easily lost (Yungyuen  
159 *et al.*, 2021).

160 The total soluble solids content of papaya fruit after the day of observation showed an  
161 increase, and after that, the total solids value decreased. This is because, during the fruit ripening  
162 process, the hydrolysis process of starch into sugar occurs, a result of which the TSS content of the  
163 fruit increases gradually after harvest during the ripening process (Rooban *et al.*, 2016). The total  
164 soluble solids content of fruit flesh increases with the expansion of the yellow color on the surface to

165 a level of 80%, after which it decreases with the expansion of the skin color due to the hydrolysis of  
166 sugar into organic acids which is used for the respiration process (Suketi *et al.*, 2016).

167 **The results of** observations **showed that the level of** hardness of papaya fruit decreased during  
168 storage at room temperature. **The decrease in** hardness **in calina papaya fruit is due to** the ripening  
169 process. **This decrease in hardness value occurs due to the degradation of water-insoluble pectin**  
170 **(protopectin) and its turning into water-soluble pectin. This results in a decrease in** the cohesive power  
171 of the cell walls, which **binds one cell wall to another** (Sigalingging *et al.*, 2019).

172 The intensity of disease attacks also accompanies the decrease in the level of fruit hardness.  
173 In the treatment of the green maturity phase and plastic wrap, the lowest level of disease attack  
174 intensity was up to 12 days. This is because in the green maturity phase, it was still not fully ripe, and  
175 the flesh of the fruit was still hard. Hence, the anthracnose disease spreads more slowly than on ripe  
176 fruit. At the same time, the treatment of the wrapping material Plastic wrap can inhibit respiration  
177 and ethylene so that the fruit remains fresh and can suppress disease infections. The smallest  
178 percentage of disease attacks was shown in the green maturity phase treatment up to 18 days after  
179 planting, with a value of 60%.

180 **Conclusion:** the green maturity phase treatment and the plastic wrap packaging material were **the**  
181 **best treatments.**

182 **Conflict of interest:** The authors declare no conflict of interest.

### 183 References

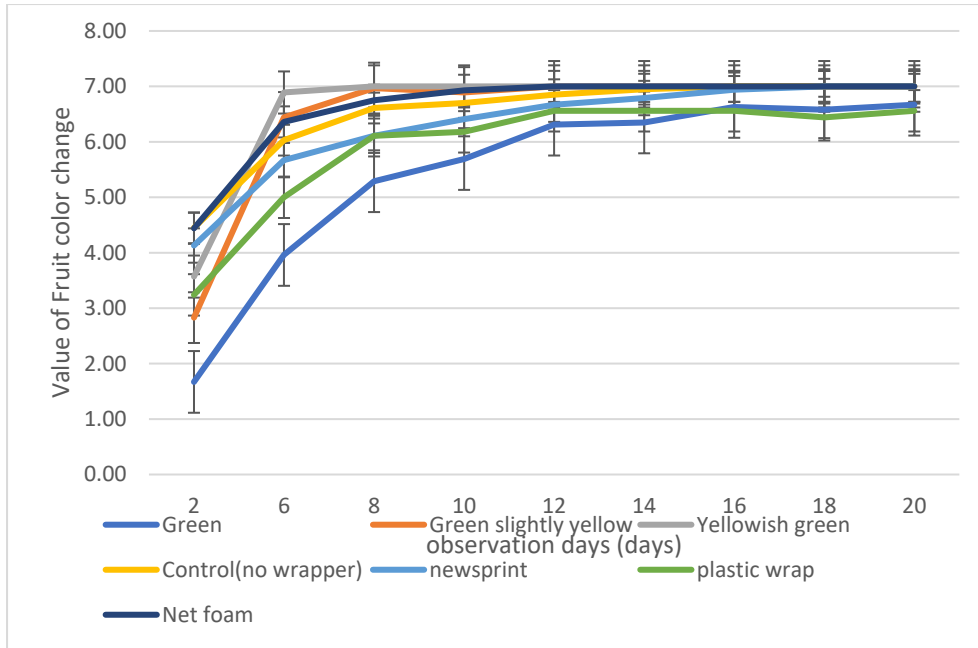
184 Ali, A. *et al.* (2011) 'Effect of chitosan coatings on the physicochemical characteristics of Eksotika II  
185 papaya (*Carica papaya* L.) fruit during cold storage', *Food Chemistry*, 124(2), pp. 620–626. Available  
186 at: <https://doi.org/10.1016/j.foodchem.2010.06.085>.

187  
188 Arundathi, K. *et al.* (2019) 'Effect of Different Wrapping Materials on Shelf Life and Quality of Papaya  
189 (*Carica papaya* L) cv. Taiwan Stored at Ambient Temperature', *International Journal of Current*  
190 *Microbiology and Applied Sciences*, 8(01), pp. 2543–2552. Available at:  
191 <https://doi.org/10.20546/ijcmas.2019.801.267>.

192  
193 Fabi, J.P. and do Prado, S.B.R. (2019) 'Fast and furious: Ethylene-triggered changes in the metabolism  
194 of papaya fruit during ripening', *Frontiers in Plant Science*. Frontiers Media S.A. Available at:  
195 <https://doi.org/10.3389/fpls.2019.00535>.

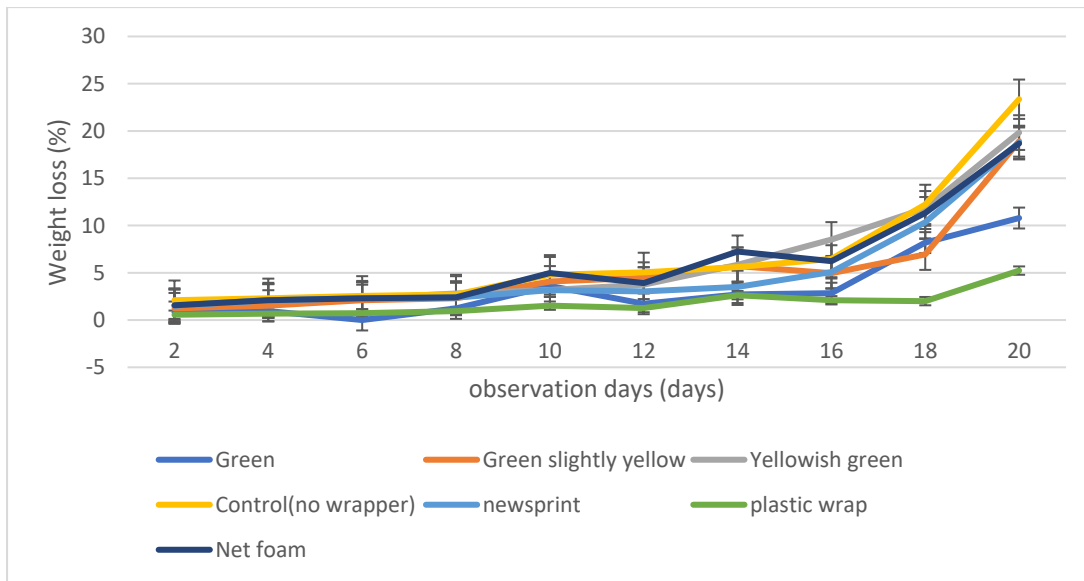
196  
197 Ibrahim, I.D. *et al.* (2022) 'Need for Sustainable Packaging: An Overview', *Polymers*. MDPI. Available

- 198 at: <https://doi.org/10.3390/polym14204430>.  
199
- 200 Kher, R.M. and Sahu, F.M. (2018) 'Engineering physical properties of papaya ( *Carica papaya* L ) at  
201 different ripening stages', *International Journal of Chemical Studies*, 6(6), pp. 1945–1952.  
202
- 203 Kuai, B., Chen, J. and Hörtensteiner, S. (2018) 'The biochemistry and molecular biology of chlorophyll  
204 breakdown', *Journal of Experimental Botany*. Oxford University Press, pp. 751–767. Available at:  
205 <https://doi.org/10.1093/jxb/erx322>.  
206
- 207 Morya, S. and Sharma, A. (2020) 'Advances in Horticultural Crop Management and Value Addition  
208 Editors', *Professional University of Punjab*, (December 2019), p. 10.  
209
- 210 Nur Sakinah, M.J. *et al.* (2020) 'Evaluation of storage temperature, packaging system and storage  
211 duration on postharvest quality of straw mushroom (*Volvariella volvacea*)', *Food Research*, 4(3), pp.  
212 679–689. Available at: [https://doi.org/10.26656/fr.2017.4\(3\).349](https://doi.org/10.26656/fr.2017.4(3).349).  
213
- 214 Rooban, R. *et al.* (2016) 'Physiochemical changes during different stages of fruit ripening of climacteric  
215 fruit of mango (*Mangifera indica* L.) and non-climacteric of fruit cashew apple (*Anacardium*  
216 *occidentale* L.)', *Journal of Applied and Advanced Research*, 1(2), pp. 53–58. Available at:  
217 <https://doi.org/10.21839/jaar.2016.v1i2.27>.  
218
- 219 Sigalingging, R. *et al.* (2019) 'Effect of Packaging Fillers Materials on the Quality of Papaya Fruit (*Carica*  
220 *papaya* L.)', in *IOP Conference Series: Earth and Environmental Science*. Institute of Physics Publishing.  
221 Available at: <https://doi.org/10.1088/1755-1315/260/1/012036>.  
222
- 223 Srikantharajah, N., Pakeerathan, K. and Mikunthan, G. (2021) 'Fungicide-Free Management of Papaya  
224 Anthracnose (*Colletotrichum gloeosporioides* Penz.) Disease Using Combined Bio-Rationales and Bee  
225 Wax in Organic Agriculture', p. 16. Available at: <https://doi.org/10.3390/iecps2020-08906>.  
226
- 227 Suketi, K. *et al.* (2016) 'Studi Karakter Mutu Buah Pepaya IPB', *Jurnal Hortikultura Indonesia*, 1(1), p.  
228 17. Available at: <https://doi.org/10.29244/jhi.1.1.17-26>.  
229
- 229 Yamdeu Galani, J.H. *et al.* (2017) 'Effect of Storage Temperature on Vitamin C, Total Phenolics, UPLC  
230 Phenolic Acid Profile and Antioxidant Capacity of Eleven Potato ( *Solanum tuberosum* ) Varieties',  
231 *Horticultural Plant Journal*, 3(2), pp. 73–89. Available at: <https://doi.org/10.1016/j.hpj.2017.07.004>.  
232
- 233 Yungyuen, W. *et al.* (2021) 'Carotenoid accumulation and the expression of carotenoid metabolic  
234 genes in mango during fruit development and ripening', *Applied Sciences (Switzerland)*, 11(9).  
235 Available at: <https://doi.org/10.3390/app11094249>.  
236  
237



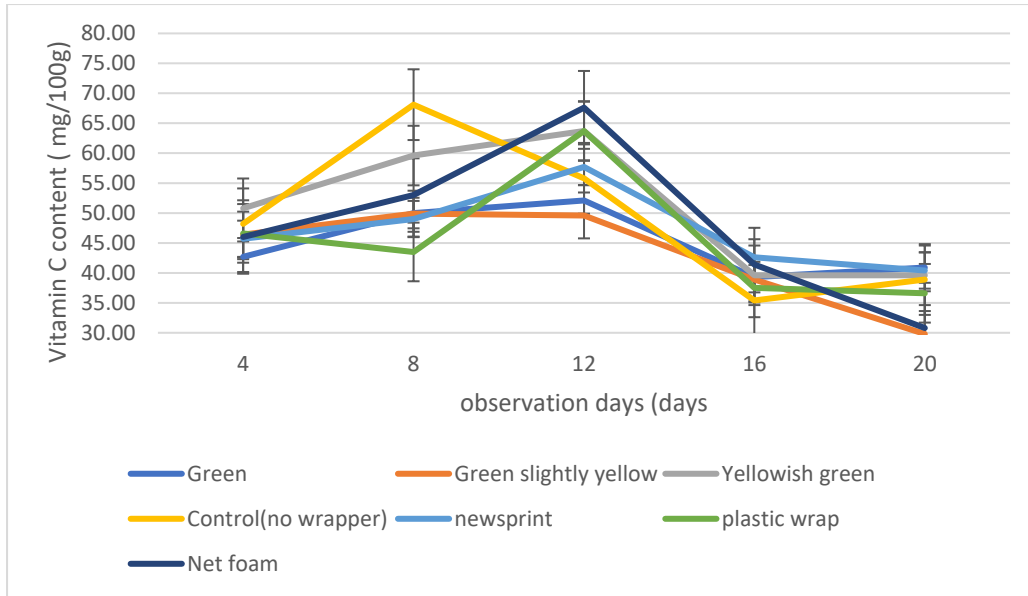
238  
239  
240  
241  
242  
243  
244

Figure 1. Average value of papaya fruit color change due to ripeness phase treatment (Green, green slightly yellow, Yellowish Green, Control (No wrapping)), and type of fruit wrapping material (Newsprint, plastic wrap, Net foam) in observations 2 to with 20 days after treatment. Storage at 26 ° C.



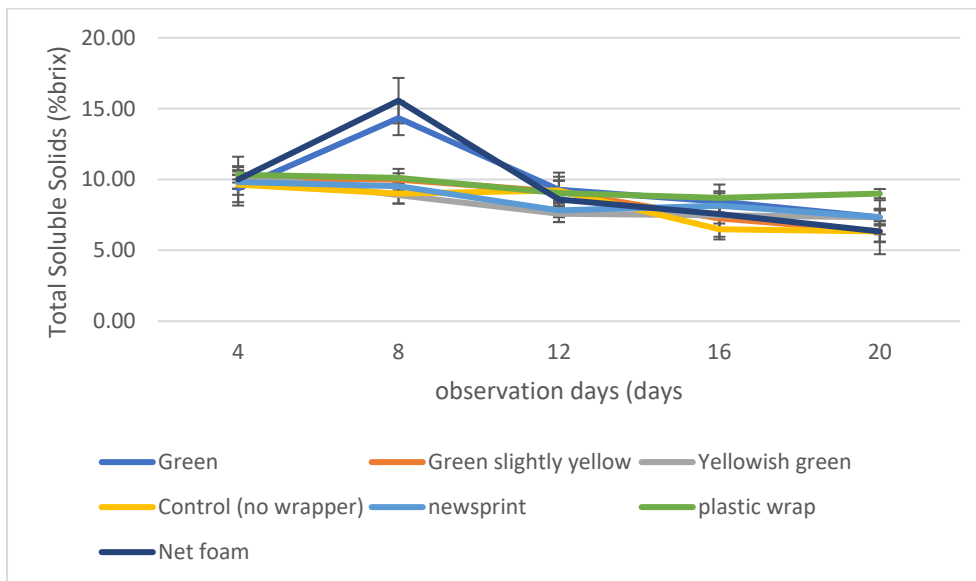
245  
246  
247  
248  
249  
250

Figure 2. Average percentage of weight loss of papaya fruit due to ripeness phase treatment (Green, green slightly yellow, Yellowish Green, Control (No wrapping)), and type of fruit wrapping material (Newsprint, plastic wrap, Net foam) in observations 2 to with 20 days after treatment, Storage at 26 ° C.



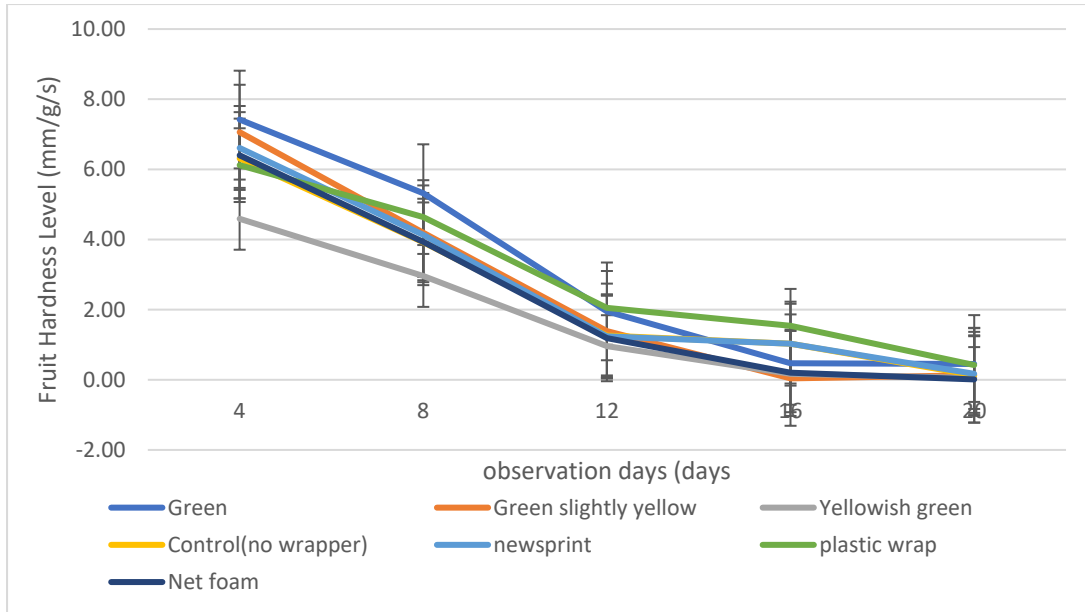
251  
252  
253  
254  
255  
256

Figure 3. Average Vitamin C content of papaya fruit due to ripeness phase treatment (Green, green slightly yellow, Yellowish Green, Control (No wrapping)), and type of fruit wrapping material (Newsprint, plastic wrap, Net foam) at observations 4 to with 20 days after treatment. Storage at 26 ° C.



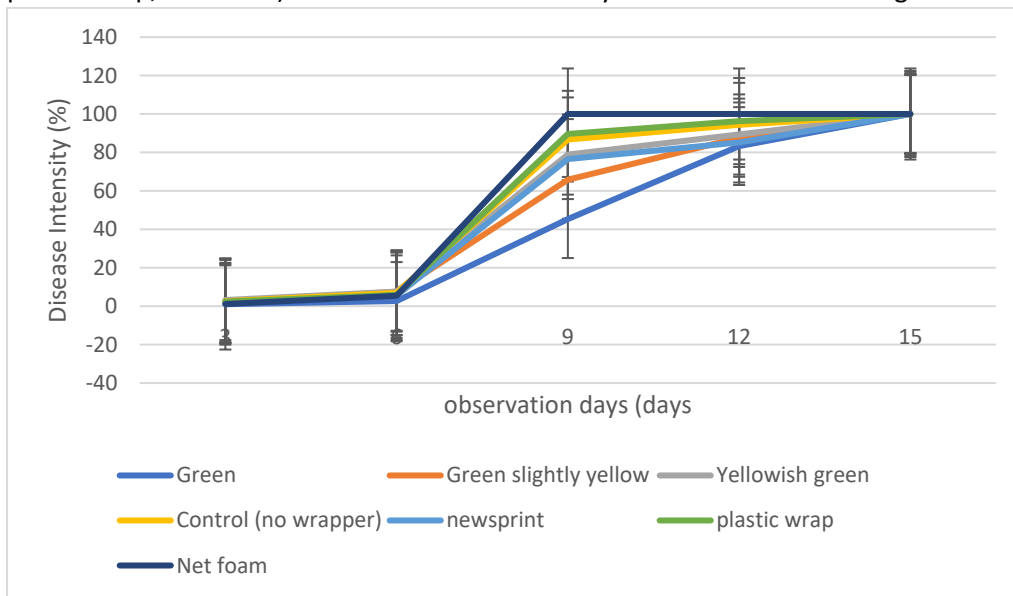
257  
258  
259  
260  
261

Figure 4. Average Total Soluble Solid of papaya fruit due to ripeness phase treatment (Green, green slightly yellow, Yellowish Green, Control (No wrapping)), and type of fruit wrapping material (Newsprint, plastic wrap, Net foam) at observations 4 to with 20 days after treatment. Storage at 26 ° C.



262  
263  
264  
265  
266

Figure 5. Average fruit hardness of papaya fruit due to ripeness phase treatment (Green, green-slightly yellow, Yellowish Green, Control (No wrapping)) and type of fruit wrapping material (Newsprint, plastic wrap, Net foam) in observations 4 to 20 days after treatment. Storage at 26 °C.



267  
268  
269  
270  
271

Figure 6. Average Intensity of Papaya Disease Attacks due to the maturity phase treatment (Green, green-slightly yellow, Yellowish Green, Control (No wrapping)) and the type of fruit wrapping material (Newsprint, plastic wrap, Net foam) in observations 4 to 15 days after treatment. Storage at 26 °C.