Application of Aloe Vera Gel Edible Coating Combined with Rosehip Oil for Postharvest Quality of Sweet Pepper (Capsicum annum L. var. Emperor) under Ambient Condition

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Abstract: *Sweet pepper (Capsicum annum L. cv. Emperor) fruits were coated with Aloe vera gel at 4%, 5%, and 6% concentrations combined with 2% rosehip oil and stored at room temperature (25-28ºC) for 9 days. At room temperature, T1 (4% AV + 2% RO) has the least reduction of firmness from 14.88 ± 1.73 N to 10.60 ± 0.76 N throughout the storage days. In terms of color changes, T3 (6% AV + 2% RO) retained the color of sweet pepper compared to other treatments. Meanwhile, quality parameters including pH and TSS of sweet pepper coated with T2 (5% AV + 2% RO) showed a significant decrease until the last day of storage with corresponding values of 5.38 and 3.03 %Brix, respectively. Overall, a concentration of 5% AVG and 2% rosehip oil was found to be sufficient in maintaining the postharvest quality and storability of sweet pepper stored at room temperature.*

Keywords: Aloe vera gel; Cold storage; Edible coating; Quality parameters; Room temperature

1. INTRODUCTION

Sweet (bell) pepper (*Capsicum annuum L.*) is one of the vegetable crops grown worldwide in the most significant quantity. In 2020, Research and Markets reported that the global production of bell pepper in 2018 stood at 752,000 tons, while Vietnam was the top producer with a volume of 273, 000 tons, followed by Indonesia (88,000 tons) and Brazil (80,000 tons). Further, Asia produces more than 70 percent of the world's bell peppers [1]. In the Philippines, bell pepper is also known as "sweet pepper," "lara", "atsal", and "kampana" because its shape is like a bell. In tropical countries like the Philippines, bell pepper production is limited in quantities. Bell pepper fruit requires cool weather for the best quality; hence, the top producer of bell pepper in the Philippines are the Cordillera Administrative Region (CAR), Ilocos Region, and Northern Mindanao comprising 45%, 13%, and 17%, respectively to the overall production Bell Pepper production in the Philippines [2].

Bell pepper fruit is one of the global cuisine's most popular and readily available ingredients. Bell pepper is a flavoring ingredient to improve the taste of salads, vegetables, fish, and meat dishes. This fruit is a rich source of many different nutrients. It is an excellent source of various vitamins and minerals, particularly the antioxidant vitamins A and C and potassium. Due to its culinary purposes and high nutritional value, the demand for bell pepper is exponentially growing. However, bell pepper fruit has a corresponding short life. The longevity of the shelf-life of bell peppers after the harvest is affected by senescence, the presence of pathogenic microorganisms, and rapid water loss [3] [4]. Thus, this will lead to postharvest losses and affect the consumer's acceptance.

In recent years, edible coating has gained interest among people in the food industry due to its ability to maintain the quality and lengthen the shelf-life of various food products. Aloe vera, a well-known herbal plant used for medicinal purposes, has expanded its purpose in the food industry. The gel from the aloe vera plant is composed of different bioactive components, including water- and fat-soluble vitamins, minerals, enzymes, simple/complex polysaccharides, phenolic compounds, and organic acids [5]. Hence, making it an excellent source of raw materials for edible coating. Besides that, aloe vera gel (AVG) has antioxidant and microbial properties, improving the product's safety and shelf-life [6].

Numerous scientific papers have proved the effectiveness of aloe vera gel-based edible coating as a standalone or combination of essential oils (emulsion). For instance, Khatri [7] used pure AVG at a concentration of 2% to prolong the shelf life of tomatoes. Their study revealed increased phenolic, lycopene content, and soluble sugars while titratable acidity, antioxidant activity, and ascorbic acid gradually decreased. Another study was carried out by Benitez [8], where they investigated the effect of four various concentrations (0%,1%, 5%, and 15%) of AVG on the quality of sliced kiwifruit. Their findings revealed a decreased respiration rate and microbial spoilage in sliced kiwifruit. The uncoated samples deteriorated faster than the coated samples in terms of texture, and the optimum results were obtained at a 5% concentration. Furthermore, strawberries [9], apples [10], and papaya [11] were coated with AVG, and the result showed that AVG could delay weight loss, decrease firmness and moisture loss, and reduce respiration rate.

On the other hand, although the AVG is packed with nutrients, the lipid concentration of its gel is too low. Hence, it limits its performance in maintaining the quality of various perishable products. As a result, adding essential oils is necessary to enhance AVG's coating and hydrophobic properties. Rosehip oil is among the inexpensive essential oils used today in the food industry. In a recent paper, Paladines [12] investigated the effect of AVG (100%) and when combined with Rosehip oil (2% and 10%) on a wide range of Prunus species and cultivars (peach, plum, nectarine, and sweet cherry) on its quality parameters related to its ripening. They reported a delay in ripening, hindered ethylene production, and the AVG coating with 2% rosehip oil gave the best formulation and results. Further, Ullah [13] reported the effectiveness of 4%, 5%, and 6% of AVG concentrations on the quality of and storability of Bell pepper cv. "Yolo Wonder" in terms of color, weight loss, and increment of total soluble solids and firmness. Currently, there is still no study about the effect of AVG (4%, 5%, and 6% coating combined with Rosehip oil (2%) on the physicochemical properties influencing the quality and storability of bell pepper stored at ambient temperature. Hence, this study utilized AVG and rosehip oil as edible coating, evaluated the quality changes of untreated and treated sweet peppers stored at ambient conditions, and differentiated the effect of each treatment on the quality parameters of sweet peppers stored at ambient conditions.

2. MATERIALS AND METHODS

2.1 Framework

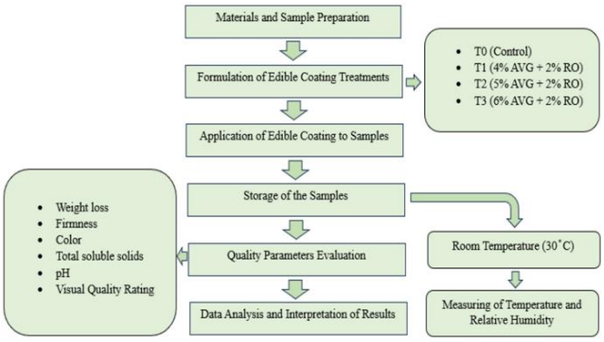


Fig. 1. General Framework of the Study

The general framework of the study is presented in Figure 1 to investigate the sufficiency of AVG coating combined with Rosehip oil for the postharvest quality of sweet pepper under ambient conditions. First, the materials and samples were prepared such as the Aloe vera, Tween 80, Sweet pepper (var. Emperor), a knife and strainer, and containers to contain the prepared edible coating. Then, the edible coating was formulated according to its AVG concentrations and rosehip oil. Afterwards, the collected samples were coated with different treatments and compositions. After coating, the coated and uncoated samples were stored at ambient temperature for 5 days while the temperature and relative humidity were measured every three (3) hours of interval. Hence, the quality parameters were measured every single day. Lastly, the collected data were analyzed and interpreted using Microsoft Excel 2016 and Statistical Tool for Agricultural Research (STAR).

2.1.1 Preparation of Emulsion-based Aloe vera gel coating

The AVG was prepared following the procedure described by Alkaabi et al. [14] but with some alterations. The freshly harvested aloe vera plant was washed with water to remove the leaf dirt and disinfected with 2% v/v of mild chlorine solution. The outer cortex layer of the aloe vera leaves was peeled off using a knife, and the gel matrix was separated using a plastic spoon. Next, the obtained gel matrix was homogenized using a kitchen blender (Dowell). After homogenization, the resulting mixture was filtered using a strainer to remove foreign objects present in the mixture, and citric acid (0.80g) was added to the gel mixture to adjust the pH level to 4. The gel mixture was pasteurized at 70℃ for 45 minutes at 250 rpm using a beaker placed on a hot plate with continuous stirring. Then the pasteurized gel was cooled to 25ºC.

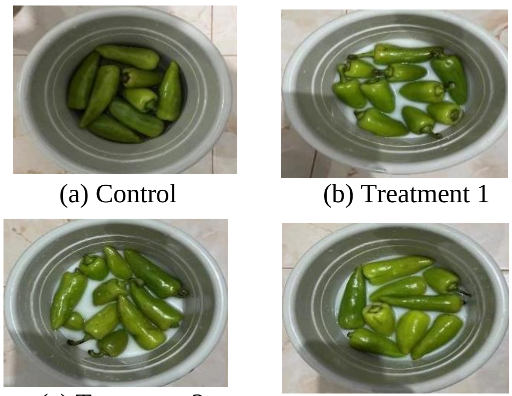
In preparing the concentrations of AVG, 40 ml, 50 ml, and 60 ml of AVG was diluted to 1000 ml of distilled water to create 4%, 5%, and 6% concentrations. On the other hand, since rosehip oil is not soluble in water, it was diluted to Tween 80 (polysorbate 80) with a ratio of 1:1 (v/v) and stirred continuously until the mixture was emulsified. Then, the emulsified mixture was added to the AVG by vigorous shaking.

Table 1. Treatments and Compositions

Treatments	Composition
T0	Distilled water
T1	4% AVG + 2% RO
T2	5% AVG + 2% RO
T3	6% AVG + 2% RO

2.4.3 Application of coatings to the samples

The experiment utilized a Completely Randomized Design (CRD) with four (4) different treatments and three replications for each treatment. Hence, each replication consists of 10 sweet peppers for non-destructive and 45 sweet peppers for destructive parameters. As shown in Figure 6, sweet pepper fruits were dipped in different treatments, T0 (distilled water), T1 (4% AVG + 2% RO), T2 (5% AVG + 2% RO), and T3 (6% AVG + 2% RO) for 5 minutes. Then the coated samples were dried for 30 minutes at room temperature (30℃). When the coated samples dried, they were put on a plastic tray and stored at ambient temperature for five (5) days. Hence, the quality parameters of sweet pepper were measured every single day.



(a) Control (b) Treatment 1

(c) Treatment 2 (d)Treatment 3

Fig. 2. Sample preparation.

2.5 Quality Parameters

2.5.1 Weight Loss

Sweet peppers in each treatment were initially weighed (Day 0) using a precision electronic balance (Sartorius Precision Electronic Balance, BSA2202S-CW) after dipping it into the coatings. The amount of weight loss that took place during storage was determined using Equation 1 and expressed in percentage:

$$Weight\ loss, \% = \frac{W_1 - W_2}{W_1} x\ 100 \qquad \text{Equation 1}$$

2.5.2 Firmness

The firmness of the uncoated and coated samples was measured using a digital fruit penetrometer (Lutron Precision Fruit Sclerometer, Model: FR-5120) as shown in Figure 3. The samples for each treatment were tested every day in three different spots of the sweet pepper fruit.

Fig. 3. Measuring firmness using a Penetrometer

2.5.3 Fruit Color

The color of the sweet pepper was measured using the CIELAB color system every single day with a handheld colorimeter as shown in Figure 4. The average value of L*, a*, and b* was measured by taking three (3) random readings at various locations.

Fig. 4. Measuring color using a Colorimeter

2.5.4 Total Soluble Solids

Total soluble solids of bell pepper were measured where 100 g of sweet pepper from each treatment was homogenized in a blender by adding 50 g of distilled water to obtain soluble solids readings from the freshly prepared juice in Digital Brix and Sucrose Refractometer (Biobase Digital Refractometer, China) as shown.

Fig. 5. Measuring TSS using sweet pepper's extracted juice

2.5.5 pH (Potential Hydrogen)

A digital pH meter (Apera Instruments, PH800 Laboratory Benchtop PH Meter Kit) was used to measure the pH level of sweet pepper fruit juice (figure 6). The measurement was taken using juice extracted from the flesh of the entire fruit and filtered through a strainer.

Fig. 6. Measuring pH value using sweet pepper's extracted juice

2.5.6 Visual Quality Rating

The visual quality of the uncoated and coated sweet peppers was evaluated using the visual quality rating (VQR). The number of days to reach VQR 5 was taken as the potential postharvest life of sweet pepper fruit stored in ambient temperature.

Fig 7. Visual Quality Rating [15]

2.5.7 Statistical Analysis

The computer software Statistical Tool for Agricultural Research (STAR) was utilized to measure the quality parameters of sweet pepper through analysis of variance (ANOVA). Hence, the sources of variation were storage days and treatments. The least significant difference (LSD) was used to separate the treatment means at $p \leq 0.05$ and the coefficient of variation (CV) was obtained from the ratio between standard deviation and mean.

3. Results and Discussions

3.1 Changes in the Quality Parameters of Sweet Pepper (*var. Emperor*) during Storage Days and Interaction between Treatments and Room Storage Conditions

The changes in the quality parameters of sweet pepper during storage were evaluated. In this chapter, the results were divided into each physicochemical property including weight loss, firmness, fruit color, total soluble solids, and pH. Further, the interaction between storage conditions, storage days, and treatments were discussed.

3.1.1 Weight Loss

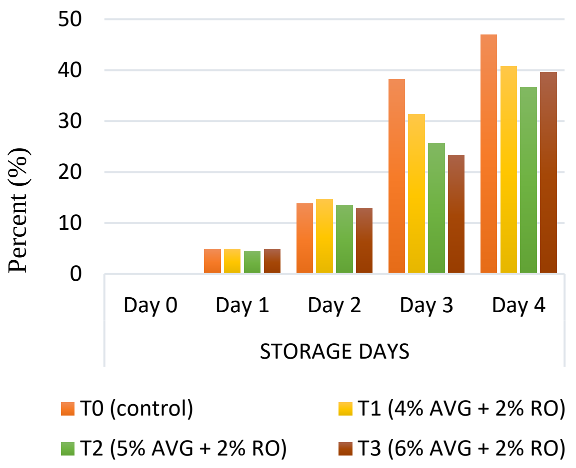


Fig. 8. Effect of edible coating in the weight loss of sweet pepper after 4 days of storage at ambient temperature. The significance value is indicated by the difference letter on top of each bar, $p < 0.05$. This means that the same letter has no significant difference.

The water content of fruits and vegetables is a major factor in maintaining the quality of horticultural produce. Low weight loss is important in maintaining the sweet pepper quality over a longer duration. The data provided presents the weight loss percentages for four different treatments (T0, T1, T2, T3) over a period of four (4) days. All treatments demonstrated weight loss throughout storage days, with varying degrees of effectiveness. Figure 9 showed that T0 had a steady increase in weight loss percentage over the four-day period. It started at 4.85% on Day 1 and gradually increased to 46.93% on Day 4, indicating a substantial amount of weight loss. T1 followed a similar pattern, with a gradual increase in weight loss percentage. It started at 4.94% on Day 1 and reached 40.73% on Day 4.

Although the weight loss percentages were slightly lower compared to T0, T1 still showed significant weight loss results. Similarly, T3 exhibited lower weight loss percentages compared to T0 and T1. While the rate of weight loss was slower compared to T0 and T1, T3 still showed a progressive reduction in weight throughout storage days. A similar result was obtained by Pimsorn [16] where the weight loss of lime fruit increased with storage. Further, Sharifimehr [17] describing the effects of Aloe vera gel enriched with rosehip oil in the quality and extended shelf life of pomegranate arils shows or indicates an increase in weight loss in all the samples and observed that the weight loss further increases in all the treatments.

On the other hand, T2 had weight loss percentages similar to other treatments and followed an increasing trend. It demonstrated substantial weight loss but at a slower rate compared to T0, T1, and T3 at the end of the storage period. Nevertheless, all treatments (T0, T1, T2, T3) led to weight loss, however, the highest increment in weight loss was observed in the control samples as compared to the coated samples. A similar result obtained by Velez [18] describing a lower weight loss was observed for coated fruits compared to uncoated fruits of Andean Blackberry coated by Aloe vera gel.

3.1.2 Firmness

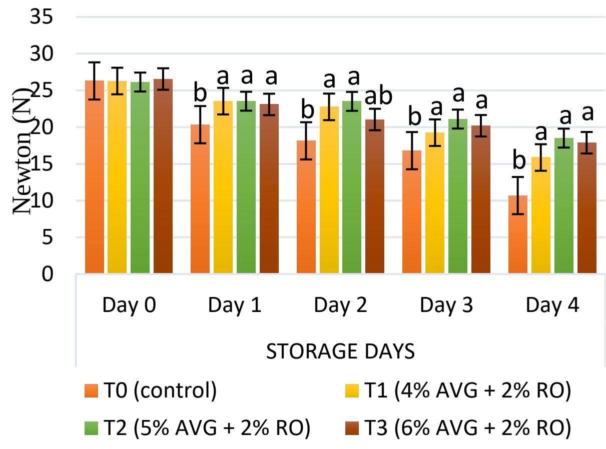


Fig. 9. Effect of edible coating on the firmness of sweet pepper after 4 days of storage at ambient temperature.

Firmness is one of the vital attributes of customer acceptability. Sweet pepper declined with increasing room storage duration. The given data represents the firmness measurements (in Newtons) for four different treatments (T0, T1, T2, T3) over a period of four (4) days (Day 0, Day 1, Day 2, Day 3, Day 4). T0 (control) exhibits a consistent decrease in firmness throughout the experiment, starting at 26.28 N on Day 0 and dropping to 10.68 N on Day 4. This indicates that T0 leads to a significant reduction in firmness over time. T1 initially shows a slight decrease in firmness on Day 1 compared to Day 0 but subsequently experienced a gradual decline. The firmness measurements for T1 on Day 4 (15.86 N) are lower than those on Day 0 (26.27 N), suggesting a decrease in firmness overall.

Meanwhile, T3 starts with a firmness measurement of 26.54 N on Day 0, and then exhibits a relatively stable trend over the following days, with slight variations. The firmness measurements on Day 4 (17.87 N) are lower than those on Day 0 but not as progressive as observed in T0 and T1. Similar results obtained by Passafiume [19] indicate a progressive loss of firmness of the pear slices was observed in all treatments during storage.

On the other hand, T2 shows a relatively consistent firmness level throughout the experiment. The measurements range from 26.13 N on Day 0 to 18.5 N on Day 4, indicating a slight decrease in firmness but not as pronounced as in T0, T1, and T3. In summary, the data suggest that sweet pepper regardless of the coating treatments applied decreased their firmness values at the end of the storage. However, the firmness values of the coated samples were significantly higher compared to the uncoated samples. The results confirmed that the coating materials (Aloe vera gel with Rosehip oil) delayed the post-harvest softening of the sweet pepper. Several studies found higher firmness with AV coatings for various fruits and vegetables, including papaya [20].

3.1.3 Color (L*, a*, and b*)

Sweet pepper, both uncoated and coated, manifested some changes in the L*, a*, and b* values throughout the storage period. Figures 10, 11, and 12 showed the effect of AVG + RO coatings on the L8, a*, and b* values of sweet pepper. Color is the most important visual attribute that directly influences the customers' perception of fruit and vegetable quality [47]. The color changes were measured using three color coordinates (L*, a*, b*) where the color coordinates describe the lightness (L*), redness/greenness (a*), and yellowness/blueness (b*) of the sample. The result showed that L* values were significantly increasing with the advancement of storage duration irrespective of the coating treatments applied.

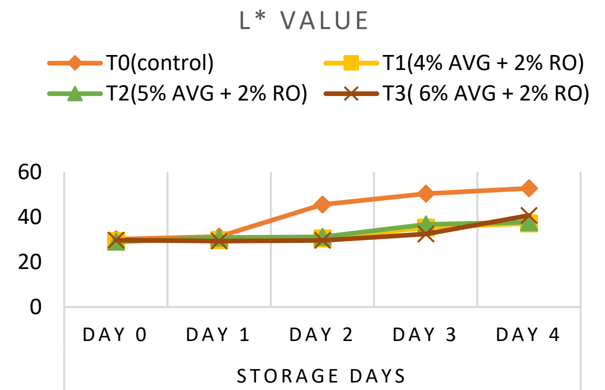


Fig.10. L* (higher positive value indicates more lightness while negative reading indicates darkness) color values under ambient conditions.

The results shown in Figure 11 agree with the previous report of Athmaselvi [21] where the a* values of the coated tomatoes were increasing at a slower rate compared to uncoated tomatoes. Furthermore, there is no significance in the initial b* value of T0, T1, and T2 which have 13.25, 13.22, and 12.85, respectively, while T3 had the highest initial b* value of 13.93. On subsequent days, the values gradually increased irrespective of the treatments applied.

On the other hand, based on Figure 12, the increase in b* values were slower in coated sweet pepper than in uncoated sweet pepper. The maximum value was obtained by T0 with 29.87 while the minimum value was observed on T3 with 21.39 b* value.

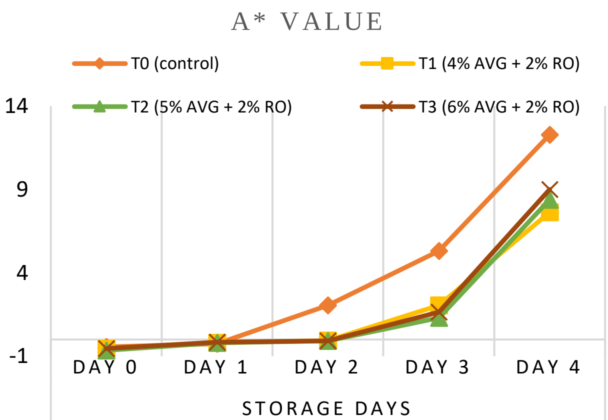


Fig. 11. a* (negative reading indicates greenness while positive reading indicates redness) color values under ambient conditions.

3.1.4 Total Soluble Solids

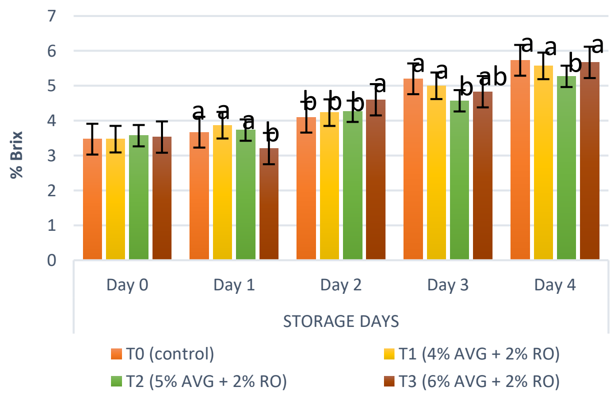


Fig. 12. b* (negative reading indicates blueness while positive reading indicates yellowness) color values under ambient conditions.

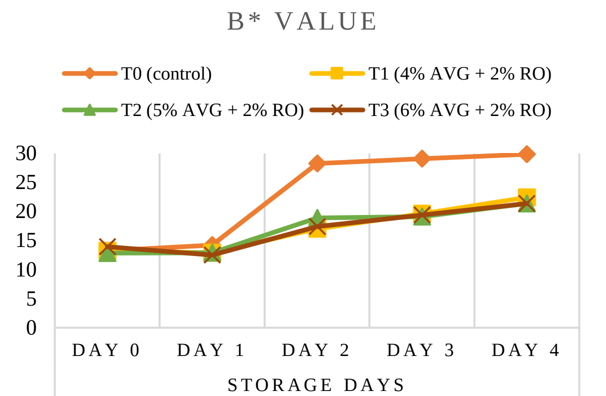


Fig. 13. Effect of edible coating in the TSS of sweet pepper after 4 days of storage at ambient temperature.

3.1.5 Total Soluble Solids

Total soluble solids are a measure of the number of dissolved solids in a solution and are often used as an indicator of the sweetness of fruits and vegetables. Based on Figure 13, it showed that the TSS of sweet pepper is significantly increasing throughout the storage days regardless of the coating treatments applied. Initial values of TSS ranged from 3.47 to 3.57 % Brix where T0 and T1 were the lowest and T2 was the highest. On Day 1, all TSS values increased except for T3 which had a sudden decrease in TSS which is 3.2 % Brix this sudden decrease is caused by the maturity index of the samples may be a tinge of green color samples being tested on that day of testing specifically on Day 1 of T3 having 6% Aloe Vera Gel (AVG) and 2% of Rosehip Oil (RO). However, on subsequent days, the TSS values of uncoated and coated samples were gradually increasing until the last day of storage. The TSS value of uncoated samples on Day 2 was 4.10 % Brix while T1, T2, and T3 were 4.23, 4.27, and 4.60 % Brix, respectively. Whereas on Day 3, a huge increment in TSS value was observed on T0 and T1 with 5.2 and 5 % Brix, respectively, meanwhile T2 and T3 have a slight increase in total soluble solids values of 4.57 and 4.83 % Brix, respectively.

Further, the values of TSS were relatively close to 6 % Brix on the last day of room storage where the highest TSS value was obtained by the control samples with 5.73 % Brix followed by T3 (5.67 % Brix) and T1 (5.57 % Brix) while the lowest value was obtained by T2 with a corresponding value of 5.27 % Brix which was significantly different among the other treatment values. A similar result was obtained by Velez [44] where there was a significant increase in the TSS value of fresh-cut "Hayward" kiwifruit coated with three different aloe vera gel-based edible coatings. Hence, the increase in total soluble solids was due to the initiation of the degradation process and the natural ripening process of fruits [22].

3.1.6 Potential Hydrogen (pH)

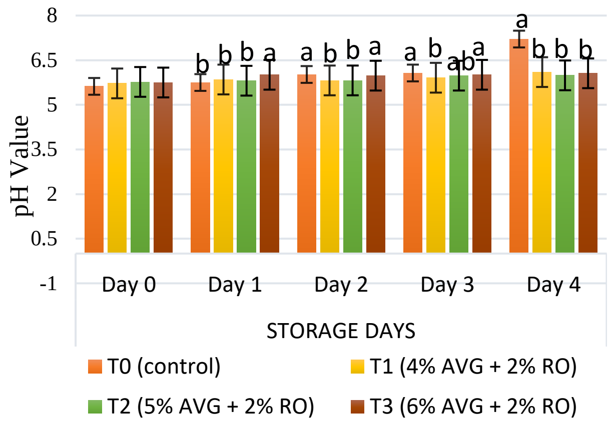


Fig. 14. Effect of edible coating on the pH value of sweet pepper after 4 days of storage at ambient temperature.

The given data represents the potential hydrogen (pH) measurements for four different treatments over a span of four (4) days. The treatments, labeled T0, T1, T2, and T3, were monitored for their pH levels. O Day 0, the initial pH levels for all treatments were relatively low, ranging from 5.62 to 5.77. As the days progressed, variations in pH levels were observed for each treatment. For T0, the pH increased slightly on Day 1 but then started to increase gradually from Day 2 onwards, reaching a significantly higher level of 7.21 on Day 4. There is a sudden higher increase in pH level on Day 4 in the control treatment in this high increase in pH was correlated to the total soluble solids in the samples of the control treatment on Day 4, if the TSS of the samples increases then the pH also increases the sample testing on that Day was tinge red this indicates a steady increase in alkalinity over time. Treatments T1 and T2 showed minor fluctuations in pH levels over the course of the four days, remaining relatively close to their initial values. T1 showed a slight increase in pH over the first three days before stabilizing, while T2 (5% AVG + 2% RO) remained relatively consistent throughout the observation period. On the other hand, T3 (6% AVG + 2% RO) demonstrated a significant increase in pH from Day 1 to Day 2. It then maintained a relatively stable pH level, with small fluctuations between 5.98 and 6.06.

Based on these observations, it can be concluded that T0 (control) treatment exhibited a clear trend of increasing alkalinity over time. T1 (4% AV + 2% RO) and T2 (5% AV + 2% RO) remained relatively stable, while T3 (6% AV + 2% RO) showed an initial increase in pH followed by a stable range. Similar results were obtained by Qamar [48] where the pH level of strawberries coated with Aloe vera gel had the least change in pH value after 12 days of cold storage. Further, Farina [23] found that the pH value of red chilies during 15-day storage was significantly smaller compared to uncoated red chilies.

3.1.7 Visual Quality Rating (VQR)

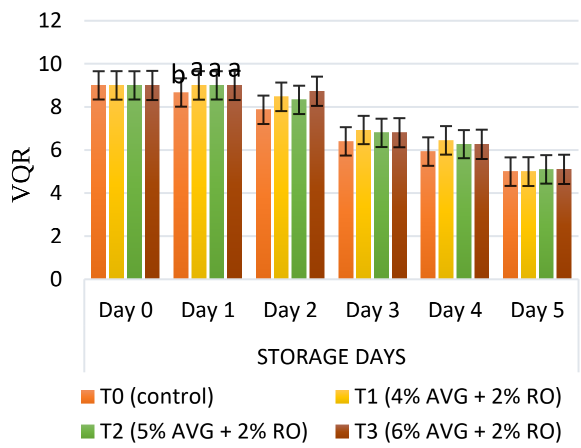


Fig. 15. Effect of edible coating on the visual quality of sweet pepper after 4 days of storage at ambient temperature.

As shown in Figure 15, there was no significant interaction between the effect of edible coatings on the VQR of both uncoated and coated sweet pepper throughout the storage. However, the VQR of the samples regardless of the coating treatment applied were comparable to each other until the last day of storage. On Day 1, it was observed that the VQR of coated samples was significantly higher compared to the control samples. T1, T2, and T3 showed good visual quality even on Day 2, Day 3, and Day 4. Although the coated sweet peppers were higher in terms of VQR mean, it was still comparable to the VQR mean of the uncoated sweet peppers on the

same days. On Day 5, all the samples irrespective of the coatings applied have a VQR score of 5, which means that the samples have a minor defect, thus limiting the marketability of the samples.

In this sense, the experiment was discontinued on the 5th day since this study aimed to investigate the storage of sweet pepper for its marketability. According to Jayamali [24], excessive moisture loss in fruits leads to shrinkage which could negatively affect the visual quality of the samples. Hence, moisture loss is directly correlated to the visual quality rating. The reduction in VQR of both uncoated and coated sweet peppers was mainly due to the excessive moisture loss which was manifested in the continuous increment in the weight loss of the samples throughout the storage period.

3.1.8 Correlation Analysis of the Quality Parameters of Sweet Peppers

Table 2. Relationship between the Quality Parameters of Sweet Pepper at T0

	Weight	*Firmness*	*L**	*a**	*b**	*TSS*	*pH*	*VQR*
Weight loss	1							
Firmness	-0.112	1						
L*	0.773	0.488	1					
a*	0.944	-0.224	0.66	1				
b*	0.807	0.357	0.98	0.69	1			
TSS	0.772	0.525	0.98	0.68	0.93	1		
pH	0.576	0.698	0.94	0.51	0.86	0.96	1	
VQR	-0.415	0.924	0.22	-0.5	0.09	0.26	0.50	1

Table 3. Relationship between the Quality Parameters of Sweet Pepper at T1

	Weight	*Firmness*	*L**	*a**	*b**	*TSS*	*pH*	*VQR*
Weight loss	1							
Firmness	0.066	1						
L*	0.630	0.813	1					
a*	0.876	-0.129	0.43	1				
b*	0.798	0.650	0.96	0.60	1			
TSS	0.749	0.705	0.99	0.55	0.99	1		
pH	0.478	0.904	0.98	0.28	0.90	0.94	1	
VQR	-0.263	0.933	0.57	-0.4	0.36	0.44	0.72	1

Table 4. Relationship between the Quality Parameters of Sweet Pepper at T2

	Weight	*Firmness*	*L**	*a**	*b**	*TSS*	*pH*	*VQR*
Weight loss	1							
Firmness	0.186	1						
L*	0.639	0.869	1					
a*	0.853	-0.033	0.39	1				
b*	0.765	0.758	0.96	0.50	1			
TSS	0.706	0.824	0.99	0.48	0.98	1		
pH	0.469	0.953	0.98	0.24	0.91	0.96	1	
VQR	-0.318	0.858	0.51	-0.4	0.35	0.44	0.68	1

Table 5. Relationship between the Quality Parameters of Sweet Pepper at T3

	Weight	*Firmness*	*L**	*a**	*b**	*TSS*		*pH*	*VQR*
Weight loss	1								
Firmness	0.137	1							
L*	0.660	0.831	1						
a*	0.906	-0.025	0.51	1					
b*	0.748	0.740	0.97	0.53	1				
TSS	0.761	0.725	0.97	0.55	0.99		1		
pH	0.450	0.936	0.97	0.24	0.91		0.90	1	
VQR	-0.315	0.850	0.48	0.43	0.35		0.35	0.68	1

Tables 2, 3, 4, and 5 showed the relationship between the quality parameters of sweet pepper coated with different concentrations of AVG (4%, 5%, and 6%) combined with 2% Rosehip oil. All the treatments applied to sweet peppers showed a positive correlation and a negative correlation between these quality parameters which means that if one parameter increases, the other parameter increases as well; if one parameter increases, the other parameter decreases. In T0, as observed there was a positive relationship between pH and TSS with a Pearson correlation coefficient of 0.961. This value indicates that there was a very high positive correlation between these two parameters, which means that if the pH value increases, the TSS of the sweet pepper increases as well. Similarly, there was also a strong relationship between pH and TSS for samples coated with AVG and Rosehip oil edible coating. On the other hand, there was a negative correlation between quality parameters. It was observed in the tables that VQR had a consistent negative relationship with weight. The result implied that if the VQR mean score increases, the weight of the samples decreases.

4. CONCLUSION

The present work focuses on the application of different concentrations of Aloe vera gel (4, 5, and 6%) edible coating combined with 2% rosehip oil on the postharvest quality of sweet pepper cv. Emperor stored at ambient condition. The results of the experiment showed that Aloe vera gel combined with rosehip oil edible coating was found to be a worthwhile postharvest treatment in maintaining the quality parameters influencing the quality of sweet pepper stored at ambient conditions. In terms of weight loss, all samples coated with AVG + RO demonstrated a lower weight loss compared to the control. T2 (5% AVG + 2% RO) was found to have the lowest weight loss percentage of 36.62% throughout the room storage period. Meanwhile, the same treatment (T2) had the least reduction in firmness of sweet pepper with a corresponding value of 18. 50 N which was higher than the other treatments. On the other hand, a huge increment in color changes was observed on T0 where L*, a*, and b* values were significantly increasing with the advancement of storage time. Whereas the L*, a*, and b* values of the coated samples are relatively lower compared to the uncoated samples.

Further, the total soluble solids and pH values of the samples coated with AVG + RO were significantly lower than the uncoated samples. T2 maintained the TSS and pH value of the sweet peppers until the last day of storage with a corresponding value of 5. 27 % Brix and 5.99, respectively. For the visual quality of sweet pepper, there is no interaction between the effect of edible coating to the samples. However, coated sweet peppers have a higher VQR mean compared to the uncoated ones on some days until all the samples deteriorated on the 5th day.

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