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INFLUENCE OF SOURSOP (*Annona muricata* L.) LEAF EXTRACT ON QUALITY INDICES OF STORED FRUITS OF FIELD GROWN EGG PLANT (*Solanum melongena* L.)

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ABSTRACT

The use of various plant leaf and spices extracts that are economically and environmentally friendly during pre-harvest and postharvest stages are becoming popular among researchers in recent year to enhance the shelf life and quality of fruits. The main objective of the study is to assess the effect of Soursop (Annona muricata) extracts on physical parameters and quality of stored egg plant (Solanum melongena L.). The experiment was carried out at the Department of Crop Science and Biotechnology Laboratory, Faculty of Agriculture and Veterinary Medicine, Imo State University, Owerri. The experimental design was Completely Randomized Design (CRD), with four treatments levels and four replications. The treatments are control (T_1), 25% ethanol extraction (T_2), 50% ethanol extract (T_3) and 75% ethanol (T_4) extract of plant extracts (Soursop). Fruits of egg plant were dipped for 5 minutes and 10minutes in ethanol extract (25%, 50% and 75%) of Soursop leaf and stored at laboratory temperature. Analysis of physical parameters was done at 24hours Interval while proximate analysis was done at the end of the storage period. After 3-6 Days the highest colour change (60%) and decrease in shrinking (73.33%) were recorded in control.T_3 for 5 minutes and 10 minutes soaking period gave the lowest percentage of physiological weight loss of 13.2% and 13.81% respectively which were significantly different($p<0.05$) from 18.19% and 17.63% respectively recorded from control. The result of proximate composition, revealed that T_4 recorded the highest Crude protein of 14.61% and 14.79% from 5 minutes and 10 minutes soaking period which was significantly different ($p<0.05$) from control. However, Application of Soursop plant extracts improved nutritional quality of egg plant and reduced physical degradation.

Key words: *Soursop, plant extracts, physical parameters, and egg plants.*

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INTRODUCTION

Eggplant belongs to the family *Solanaceae*. It is a very large and important genus of the family *Solanaceae*. The egg plant (*Solanum melongena L.*) is one among this genus which is representative of the non-tuberous group of *Solanum* species. It has potential wild types with resistance to different biotic and abiotic stress (Behera and Singh, 2002). *Solanum melongena* is an important vegetable in Central, Southern and Southeastern Asia and in a number of African countries especially Nigeria (Behera *et al*., 2006). Egg plants are cultivated in all the agro-ecological zones of Nigeria and there are many varieties of egg plant. Each variety is peculiar to the locality where it is cultivated (Ubani and Okonkwo, 2011). The egg plant is characterized by variation in morphology, physiology and biochemical features such as bitterness of fruit (Daunay *et al*., 2001).

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Eggplant (*Solanum melongena* L.) fruits are harvested at the physiologically non-mature stage. In fresh weight they contain about 7% of dry matter, 1% of proteins, and 4% of carbohydrates (Esteban *et al.*, 1992). Also vitamins B1, B2, B6 and C were found in the fruits. Consumption of eggplant fruits can decrease LDL level in human blood due to hypolipidemic effect of flavonoids and improve heart action (Sudheesh *et al.*, 1997; Kashyap *et al.*, 2003).

Eggplant fruits are rich in phenolic compounds (Hanson *et al.*, 2006). Phenolics show high biological activity (Lattanzio, 1987; Babic *et al.*, 1993; Leja *et al.*, 1997). They have antioxidant, antibacterial and immunostimulant properties. Phenolic acids are components of lignins and tannins, and also occur as esters or glycosides (Macheix *et al.*, 1990). Phenolic compound nasunin, an anthocyanin, was isolated from the skin of purple-skin eggplant fruit (Noda *et al.*, 2000), according to Stomemel and Whitaker(2003); Gajewski *et al.* (2007), fruits of various eggplant genotypes differed in respect of several sensory attributes. Maturity stage of the fruits also affected their sensory quality (Gajewski and Arasimowicz, 2004). Firmness of eggplant fruits and sugars content are important quality parameters, which influence sensory quality of the fruits (Jha and Matsuoka, 2002). Gajewski (2002a, 2002b) reported that during storage firmness of egg plant fruits and the total sugar content decreased. Esteban *et al.* (1992) found that during development of fruits, the titratable acidity, reduced and total sugars, ascorbic acid, proteins and the total phenolics content increase. Eggplant fruits are chilling sensitive at temperatures below 10°C. At 5°C, chilling injury will occur in 6-8 days (Concello *et al.*, 2007). Therefore, storage temperature above 10^{o}C is recommended (Cantwell and Suslow, 2009).

Anjum malik *et al*.(2016) also repoted that Various extracts such as neem leaf extract, castor oil and neem oil on citrus fruits and reported that, among these extracts neem was best in retaining most of biochemical characteristics such as TSS (16.01°B), acidity (0.38%), pectin (0.98%) and ascorbic acid content (20.56 mg/100 ml juice). Singh *et al.*, (2003) also reported the effect of various extracts such as neem leaf extract, castor oil and neem oil on citrus fruits and reported that, among these extracts neem was best in retaining most of biochemical characteristics such as TSS (16.01° B), acidity (0.38%), pectin (0.98%) and ascorbic acid content

Chaudhary (2003) reported that aqueous extracts from different plants can be a viable alternative to chemicals in controlling post-harvest pathogens as they are environmentally safe strategies for controlling the post- harvest storage pathogens in different crops. Ogbuehi *etal*.,(2016) reported , that application of ginger extract at 100mg concentration was best for the extension of the shelf life of egg plant as well as exhibited fungicidal potential action as against fungi as there was no incidence of rot or decay. A considerable amount of work has been carried out all over the world on the effect of plant extracts on the quality and shelf life in various fruit and vegetable crops (Anjum Malik *et al*., 2016)

The major disadvantages of food produce storage and distribution are the limits it imposes on shelf-life. The difficulty is predicting storage life of different perishable crop varieties. There is lack of control over distribution conditions which occur in the Nigerian situation especially in the local markets (Ubani and Okonkwo, 2011).

Egg plant deterioration starts within two to three days after harvest, especially when the stalk and calyx are removed and fruits are exposed to warm temperatures (Ubani and Okonkwo, 2011). The main objective is to assess the effect of plant extracts on physical parameters and quality of stored egg plant *(Solanum melongena L.).*

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MATERIALS AND METHODS

Location

This study was conducted in the Teaching and Research Farm of the Faculty of Agriculture and Veterinary Medicine, Imo State University, Owerri. Owerri lies between the latitudes $5^{o}10'$N and $6^{o}0'$N and longitudes $6^{o}35'$E and $7^{o}0'$E with an altitude of 91.0m within the Southeast rain forest agricultural zone of Nigeria. The area maintains an average annual rainfall of 2,500 mm, mean minimum and maximum temperature of 23.5^{o}C and 32.1^{o}C respectively, with relative humidity ranging from 70-85% and the annual evapotranspiration is 1450 mm (NIMET, 2010).

Source of Materials

Plant materials (Soursop leaf) used in this study were collected from Imo State University Teaching and Research Farm, while reagents that was used for extraction was purchased from the local market. Egg plant seeds were sourced from Imo ADP. Other materials include; a piece of land measuring 15m x 18m, Blender and weighing scale. Also 12 air tight plastic containers were used for storage.

Agronomic Practices

The experimental plot was cleared with cutlass and low beds were made for nursery and also for planting. Seedlings were sown after 4weeks in the nursery. Eggplant seedlings were planted at a depth of 4-6cm with a spacing of 1mx1m. The field was kept weed free throughout the study period.

Laboratory Experiment

Preparation of *Annona muricata* Extract

Soursop (*Annona muricata)* leaves were grinded using a wooden mortar and a pistle in the laboratory. 100gs of the grinded *Annona muricata* leaf was poured in beaker and 100mls of Ethanol was added to it and stirred vigorously. It was kept in the laboratory at room temperature and left for 24hours.

After 24hours mixture of *Annona muricata* leaf and ethanol were sieved differently using a sieve and their extracts were poured into different beakers.

The treatments (75%, 50% and 25% concentrations) were achieved by:

75% (T_4) = 75ml of extract and 25ml of distilled water added together.

50%(T_3) =50ml of extract and 50ml of distilled water added together

25%(T_2) =25ml of extract and 75ml of distilled water added together.

0% (T_1) = No extract

Soaking of *Solanummelongena*

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Some *Solanum melongena* were harvested from the field and taken to the laboratory. They were poured into transparent plates (5 each) and were weighed using a sensitive weighing balance (they were weighed separately i.e. each plate containing 5 fruits *Solanum melongena).* The prepared treatments were shared into 2 beakers each, one for 5 minutes and the other for 10 minutes. *Solanum melongena* were soaked into *Annona muricata* extract for 5 minutes and some for 10 minutes. After soaking they were put back into the transparent plastics labelled accordingly and kept at room temperature for six (6) days for observation. Daily day temperature reading was also recorded.

Experimental Design

The 17 pieces of the small plastic baskets with lid containing egg plant were arranged in a Completely Randomized Design with four replications.

Experimental Design. 32transparent plastic containers with lids containing egg plants for 5 and 10 minutes soaking periods respectively were arranged in Randomized Completely Design with four replications

Data Collection

The experiment was allowed to stand while it was monitored and data was collected on the following parameters:

Ambient Temperature (^{0}C): the temperature of the laboratory was taken daily and recorded.

Colour Change: the fruits were observed daily to detect and record the date from storage date till when change in the original colour occurred.

Fruit firmness: the fruits were observed by feeling to detect shrivelling in their texture.

Weight loss (%): the fruits were weighed at the first day (initial weight) and at the last day (final weight lost) of storage. Weight loss was calculated from the difference between initial and final weight and expressed as zero percentage of the initial fresh weight.

Fruit Decay (%): this was determined by counting the number of decayed fruits (with either pathological or physiological disorders) and expressed as a percentage of the initial number of fruits per each sample (replicate) for each treatment.

Palatability Test: This was conducted at the end of the experiment for fruit flavor and acceptability. Twenty students from the Department of Food Science and Technology,Imo State University Owerri,were sampled and were given the fruits to confirm for aroma and acceptability on a 9 point Hedonic scale (1-9) where;

1. Extremely dislike, 2. dislike very much, 3.dislike moderately, 4.dislike slightly, 5.Neither like nor dislike, 6.like slightly,7. like moderately, 8.like very much 9. extremely like

Proximate composition was done using Analytical method as described by AOAC (2000)

Data Analysis

The data collected were subjected to statistical analysis using the analysis of variance method suitable for the CRD as described by Onuh and Igwemma, (2001).

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RESULTS

Effect of Soursop *(Annona muricata)* Leaf Extract on Physical Parameters of Egg plant during Storage

At Day 1 and Day 2, daily temperature remained constant at 24^0C there was no observed change in colour, shrinking and decaying of fruit as shown Table 1. At Day 3, 13.33% of the fruit were observed to have change colour from the fruit in T_2, while 6.66% of fruit change colour from fruit in T_3. There was no shrinking and decaying observed in 5 minutes soaking treated fruits. However, for 10 minutes only 6.66% of the fruit were observed to have change colour from the fruit in treatment 4. Temperature was 25^0C as shown in Table 1.

At Day 4, only 20% of the fruit were observed to have change colour from the fruit in T_2 for 5 minutes soaking time, while in T_3 and T_4. 13.33% of the fruit were observed to have changed colour in 5 minutes compared to the least 6.66% colour change observed from the control. However, in 10 minutes soaking time, 13.33% of the fruit changed colour from fruit in control while 6.66% was observed in T_3 and T_4.

At Day 4, 13.33% of fruit were observed to have shrink from fruit in T_3, while control has 6.66% for 5 minutes treated fruit. Whereas, in 10 minutes soaking time, 6.66% shrinking were recorded from the fruit in control and T_3. There was no sign of decay temperature stood at 26^0C.

At Day 5,40% of the fruit in control were observed to change colour for 5 minutes, while 33.33% of fruit were observed to change colour in T_2 and T_3 for 5 minutes whereas 26.66% of fruit from T_4 changed colour. For 10 minutes duration time 33.33% of fruit were observed to change colour in T_3, while the least, 20% of fruit were observed to change colour in T_4. T_2 and T_1 were at per because 26.66% colour change was recorded against them respectively.

The result on shrinking as shown in Table 2, showed that 40% of fruit from control and T_2 shrinked in size for 5 minutes soaking time, whereas in T_4 33.33% was recorded against T_3. There was fruit decay at Day 5, temperature remained 26^0C. In 10 minutes soaking time, 73.33% of fruit from control were observed to have shrinked while there was zero (0%) percentage observed in T_4. Whereas 20% and 26.66% of fruit were observed to have shrinked in T_2 and T_3 respectively. However, it was observed that 6.66% of fruit decay from fruit in T_3 for 10 minutes.

At Day 6, 60% of fruit were observed in control to have changed colour, also T_2 recorded 53.33% change in colour while T_3 and T_4 recorded 40% and 46.66% respectively changed in colour for 5 minutes soaking time. However, for 10 minutes soaking time, 60% of fruit were observed to change colour in control, while T_2 recorded 53.33% and 60% respectively colour change in fruits.

The result on percentage shrinking showed that 46.66% of fruit were observed to have shrinked in control while T_2 and T_4 recorded 53.33% each of fruit shrinkage for 5 minutes. Also T_3 showed that 60% of fruit shrinked. In 10 minutes, soaking time, 73.33% of fruit were observed to have shrinked in control while the least 6.66% of shrinking was recorded from T_4. Whereas, 33.33% of fruit were observed from T_3. There was no decay recorded in all the treatment both in 5 minutes and 10 minutes and 10 minutes at 27^0C.

Effect of Soursop leaf extract on the physiological weight loss

Physiological loss in weight was found to be significantly very slow in fruits treated with 50% soursop leaf extract as compare to control and other treatments. In 5 minutes soaking duration

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(Table 4). 50% treated fruits recorded 13.27% physiological loss in weight which was significantly different (P<0.05). The trend of reduced lost in weight is as follow 50% <75% <25% <control. However, in 10 minutes, 50% recorded the slower loss in weight of about 13.81% which was significantly different (P<0.05) from the highest loss in weight of 17.63% obtained from fruit in control plots also 25% soursop leaf extract as showed significantly slower loss in weight of 14.80% than 16.226% recorded from fruit treated with 75% soursop leaf extract as shown in Table 2.

Effects of soursop Leaf Extract on Proximate Composition of stored egg plant *(Solanum melongena L.)*

Proximate analysis of eggplant as influenced by soursop leaf extract is presented in Table.3.

Moisture content

It was observed that fruits treated with 75% soursop leaf extract recorded 81.11% moisture content for 5 minutes duration time which was significantly (P<0.05) lower than 84.52% and moisture content recorded from control. 82.71% and 82.572% of moisture content respectively obtained from fruits treated with 25% and 50% leaf extracts were statistically not different as shown in Table 3.Similarly, for 10 minutes duration, the same treatment was obtained were higher moisture (84.66%) content was obtained from control which was significantly different (P<0.05) from lower 81.495% recorded from 75% soursop leaf extract. Also 25% soursop extract recorded higher (82.835%) than 50% (82.75%) statistically they are different.

Crude protein

Analysis for crude protein for 5 minutes duration, showed that crude protein was significantly influenced as shown in table 6 fruits treated with 75% extract recorded significantly higher (14.61%) of crude protein than the lower 7.035% obtained from control. 50% (T_3) was observed to give higher (10.47%) crude protein than 10.26% of crude protein recorded from fruits treated with 25% (T_2) soursop leaf extract.However, in 10 minutes duration time, 75% treated fruits significantly (P<0.05) obtained higher (14.79%) crude protein than lower (7.11%) recorded from controls. This was followed by 50% treated fruits with 12.90% crude protein which was higher than 10.46% recorded from 25% treated fruits.

Crude Fibre

Crude fibre analysis from 5 minutes duration time, showed that the control recorded minimum (3.88%) and crude fibre which was significantly different (P<0.05) from the maximum (4.22%) recorded from fruits treated with 75% soursop leaf extract. Also 25% treated fruits gave higher (4.01%) than 3.925% recorded from 50% treated fruits.In the other hand, for 10 minutes duration time, 4.2% of crude fibre was recorded from fruits treated with 75% soursop leaf extract which was significantly different (P<0.05) from the lowest (3.91%) obtained from control. This was followed by 4.13% and fibre recorded from fruits treated with 50% which was significantly higher than 3.93% of fibre obtained from 25% treated fruits.

Ash Content

Higher Ash Content (3.62%) was recorded from fruits treated with 75% soursop extract which was significantly different (P<0.05) from the control (1.08%) for 5 minutes duration time. Also 25% was observed to have higher (3.13%) of Ash than 3.04% recorded from fruits treated with 50% extract. Similarly, for 10 minutes duration time, the Ash content follows the same trend were 75%

treated fruits recorded 4.56% which was significantly higher than 3.28% recorded from fruits in control. Whereas 50% treated fruits recorded 4.31% of Ash content which has higher than 4.15% recorded from fruits treated with 25% soursop leaf extracts.

Crude Fat Content

Analysis of result presented in Table 3, showed that for 5 minutes coating time, fruits treated with 75% soursop leaf extracts recorded higher (4.62%) fat content which was significantly different ($P<0.05$) than 3.31% recorded from control. T_2 that is 25% soursop leaf extract gave significantly higher (4.21%) than 4.15% of fat recorded from 50% treated fruits.However, for 10 minutes duration time, the lowest fat content was recorded from untreated fruits which was significantly different ($P<0.05$) from the highest (3.53%) recorded from 75% treated fruits. Whereas 50% obtained higher (3.24%) fat content than 3.03% recorded from fruits treated with 25% soursop leaf extract.

Effect of soursop leaf extract on palatability test of stored egg plant

Results obtained for 5 minutes duration time on palatability test score on fruits treated with soursop leaf extract is presented in Table 4. The same treatment observed in ginger extract on palatability score was the same trend in soursop treated fruits both in 5 and 10 minutes duration time as shown table 4. However, fruits treated with 50% soursop leaf extract recorded highest 4.060 palatability test score which was significantly different ($P<0.05$) from lowest (3.62) score recorded from control. This was followed by 25% treated fruits which was significantly higher (3.93) than score (3.90) from 75% treated fruits.

In other hand, for 10minutes duration time palatability test score show. The same trend 4.10 was recorded from 50% treated fruits which was significantly higher than the score (3.70) obtained from control. Also 25% with score of 3.97 performed better than 75% which recorded 3.87. Statistically they are different.

DISCUSSION

The effect of plant extracts on physical and quality of stored egg plant *(Solanum melongena L.)* revealed that the plant extracts (Soursop leaf) enhanced the retention of nutrient content after storage. However, it was observed that the quality of nutrient content, shrinking, spoilage and physiological loss in weight were dependent on period of soaking, concentration of extracts, and methodology of analysis. The result obtained in ethanol soursop leaf showed that treated fruits irrespective of concentration improved the physical parameters and nutrient content of stored eggplant fruits. This finding corresponds to the works of Ogbuehi *et al. (*2016) on stored egg plant. The variation could be as a result of solvent and methodology used for preparation of extract. This agreed with Pinelo *et al.* (2004), and Savad Somayeh, (2016) who suggested that the chemical properties of solvent and method of extraction show distinct behaviour.

The obtained result showed that higher spoilage was recorded from control while fruits in treated sets maintained relative firmness and reduced change in colour. This loss of firmness and increased change recorded in control could be due to increase in temperature of the laboratory as was shown in Table 1. This, means that the increase in temperature could increase change in rate of metabolic process going on in the stored egg plant there by leading to breakdown of pectic substances in the cell wall of the fruit. However, the firmness in the soursop leaf treated fruits could be that there are

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traces of Calcium in the extract which according to Akhtar *et al.* (2010), facilitated the cross lining of the pectic polymers increasing wall strength and cell cohesion. This also agrees with the reports of Shuiliang *et al.* (2002) who stated that fruits treated with Calcium extract maintained firmness and eating quality for longer time.

The result obtained in colour change showed that fruits from control sets recorded higher colour changed than treated fruits both in 5 and 10 minutes coating periods. The lower change in fruit colour of fruits treated with Soursop extract could be also be due to the fact that chemical content in the extract could have increased the resistance of ripening by maintaining the strength of cell wall. It might also be due to reduced moisture loss. This findings is in agreement with the results of Abassi *et al.* (2013); Ogbuehi *et al.* (2016); and Ogbuehi *et al.* 2017.

During the present investigations, the result obtained in both 10 and 5minutes soaking period showed that treated fruits recorded lower physiological loss in weight compare to control fruits. This could be as a result of its ability to retard moisture loss and senescence. This is in conformity with work of Eakhukar, (1996) and Nisha, (2014) who reported the same findings using neem leaf extract. It could be that soursop leaf used irrespective of concentration could contain phenolic compounds that can reduce hydrolysis of intercellular pectin thereby increasing firmness. The reduction in physiological loss in weight observed in fruits treated with soursop leaf extract could be its ability to check growth of organism responsible for softening and high metabolic rate, which might be another probable reason behind their efficacy in reducing physiological loss in weight. This corresponds with work of some researchers Singh *et al.* (2000) and Nisha (2014) who reported similar findings using fresh leaves of *Annona squamosa* and *neem Azadinracta indica* on mango fruits.

Although, not much have been done using soursop leaf extract in postharvest physiology. However, soursop have been known to contain organic compound (acetogenins) that have repellent effect on flea beetles and as such could confer some resistant effect to biodegradation to egg plant fruit when used during storage. We suggest that impact of soursop leaf extract in improving quality and physical appearance beyond 4 days of storage was due to presence of *acetogenins* and other elements. Bermego *et al.* (2005) have reported that *Acetogenins* is the major active ingredient found in *Annonaceae* family.

The loss of green colour was obvious changes in eggplant which probably was due to the physiochemical changes associated with degradation of the chlorophyll structure during storage. These results are in conformity with findings of Rathore *et al.* (2007), on mango fruits. The result obtained in fruits treated with soursop leaf extract showed remarkable increase nutritional content (crude protein, crude ash and crude fat) of eggplant thereby enhancing its quality and palatability, and its usage beyond 3 days although dependent on the soaking period. This result is in conformity with Anjum malik *et al.*,(2016), who also reported that various extracts such as neem leaf extract, castor oil and neem oil on citrus fruits and reported that, among these extracts neem was best in retaining most of biochemical characteristics such as TSS (16.01°B), acidity (0.38%), pectin (0.98%) and ascorbic acid content (20.56 mg/100 ml juice).

Verghese (2000) studied the efficacy of botanical extracts of neem, Mahua *(Madhuca spp.)* and mint *(Mentha spp.)* leaves on Pomegranate *(Punica granatum)* fruits and reported that these extracts were effective in retaining Marketable quality even after 22 days of storage. Similar result was obtain by Bhardwaj and Sen (2003) studied the effect of different concentrations of neem leaf

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extracts on the storage quality of mandarin (Citrus reticulata) cv. Nagpur Santra and reported that among various treatments used neem leaf extract (20%) was significantly better in retaining higher ascorbic acid content (27.17 mg/100 ml. of juice) as compared to control fruits where it was only after storage

CONCLUSION

The results obtained from the study indicated that the use of soursop leaf extracts showed a greater degree of spoilage inhibition and slowed down the associated changes in the eggplant fruits during storage. Consequently, it improved the nutritional status of stored eggplant (*Solanum melongena L.).* To the best of our knowledge this is the first report in the use of soursop leaf extracts for post harvest treatment of eggplant.

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Table1: Effect of Soursop Leaf Extract on Physical Parameters of Eggplant

		5 minute			10 minutes			
DAYS	**Treatment**	**Colour Change %**	**Shrinking %**	**Decay %**	**Colour Change %**	**Shrinking %**	**Decay %**	**Temp.**
DAY 1	T_1	0	0	Nil	0	0	Nil	24^0C
	T_2	0	0	Nil	0	0	Nil	
	T_3	0	0	Nil	0	0	Nil	
	T_4	0	0	Nil	0	0	Nil	
DAY 2	T_1	0	0	Nil	0	0	Nil	24^0C
	T_2	0	0	Nil	0	0	Nil	
	T_3	0	0	Nil	0	0	Nil	
	T_4	0	0	Nil	0	0	Nil	
DAY 3	T_1	0	0	Nil	0	0	Nil	25^0C
	T_2	(2) 13.33	0	Nil	0	0	Nil	
	T_3	(1)6.66	0	Nil	0	0	Nil	
	T_4	0	0	Nil	(1)6.66	0	Nil	
DAY 4	T_1	(1)6.66	(1)6.66	Nil	(2)13.33	(1)6.66	Nil	26^0C
	T_2	(3)20	0	Nil	0	0	Nil	
	T_3	(2)13.33	(2)13.33	Nil	(1)6.66	(1)6.66	Nil	
	T_4	(2)13.33		Nil	(1)6.66	0	Nil	
DAY 5	T_1	(6)40	(6)40	Nil	(4)26.66	(11)73.33	Nil	26^0C
	T_2	(5)33.33	(6)40	Nil	(4)26.66	(3)20	Nil	
	T_3	(5)33.33	(5) 33.33	Nil	(5)33.33	(4)26.66	06.66	
	T_4	(4)26.66	(2)13.33	Nil	(3)20	0	Nil	
DAY 6	T_1	(9)60	0	Nil	(9)60	(11)73.33	Nil	27^0C
	T_2	(8)53.33	0	Nil	(7)46.66	(3)20	Nil	
	T_3	(6)40	0	Nil	(8)53.33	(5)33.33	Nil	
	T_4	(7)46.66	0	Nil	(9) 60	(1)6.66	Nil	

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Table 2: Effect of soursop leaf Extract on the Physiological Weight Loss Stored Eggplant

Treatments	5 minutes			10 minutes		
	Initial weight(g)	Final weight(g)	Weight loss (%)	Initial weight (g)	Final weight (g)	Weight Loss (%)
T_1	240.7^{d}	196.92^{d}	18.19^{a}	312.9^{a}	257.71^{a}	17.63^{a}
T_2	250.5^{c}	210.94^{c}	15.79^{b}	310.4^{b}	264.49^{b}	14.80^{c}
T_3	257.6^{a}	224.95^{a}	13.27^{d}	271.1^{c}	237.93^{c}	13.81^{d}
T_4	254.4^{b}	215.27^{b}	15.37^{c}	234.0^{d}	195.9^{d}	16.26^{b}

Means in the same column having the same letter(s) are not significantly different (P<0.05)

Table 3: Soursop leaf extract on proximate composition of stored egg plant

	Treatments	Mean proximate composition				
		Moisture content (%)	Crude protein (%)	Crude fibre (%)	Ash (%)	Crude fat (%)
5 minutes	T_1	84.52^{a}	7.035^{d}	3.88^{d}	1.08^{d}	3.31^{d}
	T_2	82.71^{b}	10.26^{c}	4.01^{b}	3.13^{b}	4.21^{b}
	T_3	82.575^{b}	10.47^{b}	3.925^{c}	3.04^{c}	4.15^{c}
	T_4	81.11^{c}	14.61^{a}	4.22^{a}	3.62^{a}	4.62^{a}
10 minutes	T_1	84.66^{a}	7.11^{d}	3.91^{c}	3.28^{d}	1.02^{d}
	T_2	82.835^{b}	10.46^{c}	3.93^{c}	4.15^{c}	3.03^{c}
	T_3	82.75^{c}	12.90^{b}	4.13^{b}	4.31^{b}	3.24^{b}
	T_4	81.495^{d}	14.79^{a}	4.2^{a}	4.56^{a}	3.53^{a}

Mean in the same column with the same letter(s) are not significantly different (P<0.05)

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Table 4: Effect of soursop extract on the palatability test of stored egg plant

Mean Palatability Scores

Treatments	5 minutes soaking	10 minutes soaking
T_1	3.62^{c}	3.70^{c}
T_2	3.93^{b}	3.97^{ab}
T_3	4.060^{a}	4.10^{a}
T_4	3.90^{c}	3.87^{b}

Mean in the same column with the same letter(s) are not significantly different ($P<0.05$)