INTRODUCTION

Litchi (Litchi chinensis Sonn.) is the most popular fruit of the Sapindaceae family which is originated in southern China and northern Vietnam (Menzel 2001). It is reputed for its juiciness, fascinating color, quality, sweet flavor and for slight sour-sweet taste. The edible part of litchi fruit is a white to cream colored diaphanous pulp adjacent to a lustrous brown seed. The pulp is specified by sweet taste and acidic nature; grape like texture and ambrosial (Cavaletto, 1980). The dietary reference intakes (DRI) for Fe, K, Zn, P, Mn and Mg could be met 2-4% and be given DRI (22%) for Cu by eating of a litchi (Wall 2006). According to Wills et al., 2004; Litchi is a non-climacteric fruit and degrade very fast after harvest. Fruits kept in polyethylene at 5 °C asserted a small change in weight loss and the peel were shiny Chaiprasart (2005). Fontes et al. (1999) studied that long shelf life is provided by low temperature. Roy (2002) investigated that litchi (cv. Bombai) kept at low temperature (7-8 °C) in unperforated polyethylene bag barring litchi leaf provided the maximum shelf life period (21.50 days). Kamleshwar (2001) studied that litchi fruits enveloped with perforated plastic bags were fairly to hold down proper quality till the 7th days of storage. In advance hydro-cooling by using iced-water for 2-3 hours at 0-2 °C can attain favorable results of postharvest treatments for litchi (Lin and Chiang, 1988). Mitra et al. (1996) investigated that enveloping fruits in polyethylene bag provide better quality at 4 °C than at 0 °C (up to 18 & 16 days, in some respects). Hassan (2010) observed that the mostly practiced storage methods comprise of...
controlled atmosphere (CA) storage, low temperature storage and modified atmosphere (MA) storage. According to Jiang and Fu (1999); the wreath of water loss was complementary correlated with polyphenol oxidase activity, membrane permeability and pH of tissue negatively correlated with anthocyanin extent. Litchi fruit are extremely susceptible to postharvest moulds (Jiang et al. 2001). One of the major factors reducing the storage life and marketability of litchi are pathological decay. Besides, low temperature storage of litchi has been used to reduce pathological decay (Holcroft and Mitcham 1996). Micro-cracking (Li et al. 2001), postharvest decay (Swarts and Anderson 1980) and desiccation (Underhill and Simons 1993) were considered as egregious balks at postharvest period of litchi. The micro-cracks on the pericarp act as like as ports of gateway for the attack of postharvest pathogens during transportation and cold storage (Sivakumar et al. 2007). Micro-cracking can also be occurred due to packing or handling line operations (Sivakumar and Korsten 2004). In the present study, PP bag of different thickness & low temperature (4 °C) were used to study the pattern of physico-chemical changes of litchi fruit during storage.

MATERIALS AND METHODS

The experiment was carried out at the laboratories of the Departments of Horticulture and Biochemistry of Bangladesh Agricultural University, Mymensingh during May to September, 2016. The experimental litchi fruits were taken out from the local growers of Ishurdi, Pabna. The maturity of the litchi fruits was ascertained by the comparative smoothn ess of epicarp and flatness of tubercles.

Experimental materials: The commercially momentous litchi variety namely ‘Bombai’

‘Bombai’

This is vital commercial cultivar of Bangladesh. Litchi fruits are almost heart shaped. Ripening commences from the last week of May. The color at maturity is pointed out as yellow-green background with red tubercles. The average weight of fruit varies from 15-20g. Fruit pulp has satisfactory flavor and is soft, greyish white, juicy, sweet to sour in taste.

Regarding weight, the ratio of rind, pulp and seed is 12.11:70.08:16.8. Ghosh et al. (1987) found that the average weight of litchi fruit was 19 g which consisted of 19.9% seed, 62.2 % pulp, 17.9% skin, on the basis of weight. They also narrated that the fruit pulp contained 17.7% total soluble solids, 0.42% acidity and 11.0% sugars.

Experimental treatments

Total 8 treatments are implemented in this experiment. The experiment was consisted of 2 factors.

Factor A: Temperature
T1: Ambient temperature
T2: Low temperature (4 °C)

Factor B: PP bags (Polypropylene bag), size: 36cm X 24 cm
P1: Control (unwrapped)
P2: 50µ PP bag
P3: 75µ PP bag
P4: 100µ PP bag

Experimental design

The two factors experiment was implemented in completely randomized design with three replications of 8 fruits at each. Randomly selected a total of 192 fruits of more or less similar shape and size and free of visual diseases symptoms were used.

Application of postharvest treatments

Among 8 fruits in each replication of each treatment 4 fruits were marked to investigate disease incidence, disease severity and the remaining 4 fruits were kept unmarked conditions for destructive sampling to examine dry matter content, TSS, Titratable acidity, pulp to peel ratio and pulp pH.

Methods of studying Parameter

(A) Pulp to peel ratio

The fruits were peeled at the 3rd, 6th and the 9th days of storage. After separating, the peel and pulp weights were taken individually by using an electric balance and the pulp to peel ratio was calculated. Then the pulp was used for other chemical analysis.

(B) Dry matter content

Ten grams of fruit pulp was taken in a Petridis from each treatment and replication. The Petridish was placed in an electric oven preset at 80°C for 72 hours until constant weight attained. It was then cooled in descicators and weighed again. Percent moisture content was calculated according to the following formula:

\[
\text{Moisture content (%) = } \left( \frac{\text{IW} - \text{FW}}{\text{IW}} \right) \times 100
\]

Where, IW = Initial weight of pulp (g), FW= Final weight of oven dried pulp (g).
Percent dry matter content of the pulp was calculated from the data obtained during moisture estimation using the following formula:

\[ \text{Dry matter content (\%) = (100\% - \% moisture content)} \]

(C) Total soluble solids

Total soluble solid (TSS) content of litchi pulp was estimated by using Abbe's Refractometer. A drop of litchi juice squeezed from the fruit pulp was placed on the prism of the refractometer. Then TSS was obtained from direct reading of the instrument. Temperature corrections were made by using temperature correction chart that accompanied the instrument.

(D) Pulp pH

Preparation of standard buffer solution pH -7 and pH-4 buffer tablet BDH (chemicals Ltd., Poole, England) was dissolved in water and made up to the mark of 100 ml with distilled water.

Extraction of fruit juice

For the determination of pulp pH, 5 g of fresh pulp was taken in a conical flask containing 10 ml of distilled water. Then the pulp was crushed thoroughly in a mortar and pestle and extract was filtered through two layers of cloths.

Procedure

The pH meter (Hanna) was standardized by using buffer solution of pH -7 and pH-4 when correction for temperature was also taken into consideration. On completion of calibration the electrode was washed twice with distilled water, rinsed with litchi juice and dipped into the juice. The pH was recorded.

(E) Titratable acidity

Titratable acidity of litchi pulp was determined according to the method mentioned by Rangana (1979). The following reagents were used for the determination of titratable acidity.

1. Standard NaOH solution (0.1N)
2. 1% phenolphthalein solution

Extraction of litchi juice

Ten grams of fresh litchi pulp was homogenized with distilled water in a blender. The blended materials were boiled for 1 hr under refluxing. The whole mass was than cooled, filtered and transferred to a 100 ml volumetric flask and the volume was made up to the mark with distilled water.

Procedure

Ten ml pulp solution was taken in a conical flask. Two to three drops of phenolphthalein indicator was added and the flask was shaken vigorously. It was then titrated immediately with 0.1 N NaOH solution from a burette till a permanent pink colour was appeared. The volume of NaOH solution required for titration was noted and percent titratable acidity was calculated by using the following formula:

\[ \text{Percent titratable acidity} = \frac{T \times N \times V_1 \times E}{V_2 \times W \times 1000} \times 100 \]

Where,

- \( T \) = Titre
- \( N \) = Normality of NaOH
- \( V_1 \) = Volume made up
- \( E \) = Equivalent weight of acid
- \( V_2 \) = Volume of extract
- \( W \) = Weight of sample

(F) Disease incidence

Disease incidence refers to the percentage of fruits infected by disease organisms. The fruits were critically examined for the appearance of disease symptoms. The first count was made at the 2nd day of storage. The diseased fruits were identified symptomatically. The disease incidence was calculated as follows:

\[ \text{Disease incidence (\%) = \frac{\text{Number of infected fruits}}{\text{Total number of fruits under study}} \times 100} \]

(G) Disease severity

Disease severity refers to the percentage diseased portion of infected fruit. The infected fruits of each replication of each treatment (varieties) were observed to determine percent fruit area infected and was measured based on eye estimation. The mean values regarding infected fruit area were calculated, presented, and discussed.

Observation

Fruits used in the experiment were observed every day. Data were collected on physical and chemical changes and rotting of the fruits during storage as influence by different postharvest treatments.

Statistical analysis

The collected data were statistically analyzed by Analysis of Variance (ANOVA) test. The means of different parameters were compared by least significant difference (LSD) as described by Gomez and Gomez (1984). For percentage data
arcsine transformations were carried out to satisfy the assumption of ANOVA.

RESULTS

(A) Pulp to peel ratio

Significant variation was observed due to the effect of different temperature during storage. The highest pulp to peel ratio (5.64) was observed in litchis kept in ambient temperature at the 6th day of storage and the lowest pulp to peel ratio (4.48) was observed in litchis kept at low temperature (4ºC) at the 3rd day of storage (Table 1).

Different thickness of PP bags had a great effect on pulp to peel ratio of litchi during different time span of storage period. Significant variations were observed in these practices. The highest pulp to peel ratio (6.76) was observed in control at 6th day of storage. The lowest pulp to peel ratio (4.46) was observed in litchis kept in 100µ thickness of PP bag at the 9th day of storage (Table 2).

Table 1. Main effect of temperature on pulp to peel ratio of litchi

| Temperature | Pulp to peel ratio at different days after storage |
|-------------|---------------------------------------------------|
| T1          | 5.25, 6.64, 5.08                                |
| T2          | 4.48, 4.83, 4.53                                |
| LSD0.05     | 0.095, 0.134, 0.091                             |
| LSD0.01     | 0.131, 0.185, 0.125                             |
| Level of significance | **3.511** 3.912**, 1.782** |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

Table 2. Main effect of thickness of PP bags on pulp to peel ratio of litchi

| Thickness of PP bags | Pulp to peel ratio at different days after storage |
|----------------------|---------------------------------------------------|
| P1                   | 5.88, 6.76, 5.73                                |
| P2                   | 4.52, 4.72, 4.49                                |
| P3                   | 4.53, 4.76, 4.55                                |
| P4                   | 4.52, 4.69, 4.46                                |
| LSD0.05              | 0.134, 0.190, 0.128                             |
| LSD0.01              | 0.185, 0.261, 0.177                             |
| Level of significance | **2.761**, **6.237**, **2.291**                  |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

(B) Dry matter content

Dry matter content varied significantly in litchis due to the effect of different postharvest treatments. It was observed that the percent dry matter content increased with the increase in storage duration. Temperature had a direct effect on dry matter content of litchi fruits. The highest dry matter content (21.69%) was observed in litchis kept in ambient temperature at 9th day of storage. The lowest dry matter content (16.71%) was observed in litchis kept in low temperature (4ºC) at 3rd day of storage (Table 3).

Table 3. Main effect of temperature on percent dry matter content of litchi

| Temperature | Dry matter content (%) at different days after storage |
|-------------|-------------------------------------------------------|
| T1          | 18.33, 20.42, 21.69                                   |
| T2          | 16.71, 18.17, 19.99                                   |
| LSD0.05     | 0.072, 0.109, 0.169                                   |
| LSD0.01     | 0.100, 0.151, 0.232                                   |
| Level of significance | 15.844**, 30.443**, 17.238** |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

The effect of thickness of PP bags on dry matter content of litchi was also statistically significant. The highest rate of dry matter content (22.29%) was found at control (untreated) fruits at 9th day of storage. In contrast, the lowest rate (16.87%) was found in litchis kept at 75 micron thickness of PP bag at 3rd day of storage (Table 4).

Table 4. Main effect of thickness of PP bags on percent dry matter content of litchi

| Thickness of PP bags | Dry matter content (%) at different days after storage |
|----------------------|-------------------------------------------------------|
| P1                   | 18.38, 20.21, 22.29                                   |
| P2                   | 17.30, 19.00, 20.54                                   |
| P3                   | 16.87, 18.82, 19.72                                   |
| P4                   | 17.53, 19.15, 20.81                                   |
| LSD0.05              | 0.102, 0.155, 0.239                                   |
| LSD0.01              | 0.141, 0.213, 0.329                                   |
| Level of significance | 2.439**, 2.351**, 6.873**                            |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

(C) Total soluble solids

Total soluble solids content (TSS) was found to be statistically significant due to storage temperature. The maximum percent total soluble solid contents (19.80°Brix) were observed in litchi kept in ambient temperature at the 6th day of storage and the minimum percent total soluble solid content (18.25°Brix) were observed in litchis kept in 75 micron thickness of PP bag at 3rd day of storage (Table 5).

The effect of thickness of PP bags was statistically significant in total soluble solid contents of litchi during storage. The highest rate of total soluble solid contents (20.15°Brix) was found at control (untreated) litchis at 6th day after storage followed by litchis kept in control (untreated) litchis (19.85°Brix) at 9th day after
storage and the lowest rate of total soluble solids (18.30 °Brix) was found in litchis wrapped in PP bag of 75 micron thickness followed by 50 micron PP bags (18.40 °Brix) > 100 micron PP bags (18.50 °Brix) at 3rd days of storage (Table 6).

Table 5. Main effect of temperature on total soluble solids of litchi

| Temperature | Total soluble solids (°Brix) at different days after storage |
|-------------|-------------------------------------------------------------|
| T1          | 18.85 19.80 18.83                                          |
| T2          | 18.25 18.93 19.53                                          |
| LSD0.05     | 0.128 0.188 0.125                                          |
| LSD0.01     | 0.177 0.259 0.173                                          |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

Table 6. Main effect of thickness of PP bags on total soluble solids of litchi

| Thickness of PP bags | Total soluble solids (TSS) at different days after storage |
|----------------------|-------------------------------------------------------------|
| P1                   | 19.00 20.15 19.85                                          |
| P2                   | 18.40 19.10 18.95                                          |
| P3                   | 18.30 19.00 18.90                                          |
| P4                   | 18.50 19.20 19.00                                          |
| LSD0.05              | 0.182 0.265 0.177                                          |
| LSD0.01              | 0.250 0.366 0.244                                          |
| Level of significance | 0.580** 1.694** 1.225**                                      |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

(D) pH of fruit pulp

Variations among the treatments in relation to pH of fruit pulp were significant as influenced by the postharvest treatments. The highest pulp pH (4.10) was observed in litchis kept in ambient temperature at 9th day after storage. The lowest pulp pH (3.70) was observed in litchis kept in low temperature (4ºC) at 3rd day of storage (Table 7).

Table 7. Main effect of temperature on pH of litchi

| Temperature | pH at different days after storage |
|-------------|-----------------------------------|
| T1          | 3.74 3.97 4.10                     |
| T2          | 3.70 3.93 4.05                     |
| LSD0.05     | 0.039 0.027 0.027                  |
| LSD0.01     | 0.053 0.038 0.038                  |
| Level of significance | 0.012** 0.008** 0.017** |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

Statistically significant variations were observed on pH content of litchi at different storage days due to different thickness of PP bags. The maximum pH of fruit pulp (4.13) was observed in litchis wrapped in PP bag of 100 micron thickness at 9th day of storage. The minimum pH of fruit pulp (3.65) was observed in litchis wrapped in PP bag of 75 micron (µ) thickness at 3rd day of storage (Table 8).

Table 8. Main effect of thickness of PP bags on pH of litchi

| Thickness of PP bags | pH at different days after storage |
|----------------------|-----------------------------------|
| P1                   | 3.78 4.02 4.06                     |
| P2                   | 3.69 3.93 4.07                     |
| P3                   | 3.65 3.90 4.03                     |
| P4                   | 3.76 3.97 4.13                     |
| LSD0.05              | 0.055 0.039 0.039                  |
| LSD0.01              | 0.075 0.053 0.053                  |
| Level of significance | 0.024** 0.016** 0.009**            |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

(E) Titratable acidity

Significant variation was found in titratable acidity content of litchi subjected to different postharvest treatments at different days of storage. The maximum titratable acidity (0.48%) was recorded in litchis kept in low temperature (4ºC) at 3rd day after storage, while the minimum titratable acidity (0.26%) was observed in litchis kept in ambient temperature at 9th day of storage (Table 9).

Table 9. Main effect of temperature on titratable acidity of litchi

| Temperature | Titratable acidity(%) at different days after storage |
|-------------|-------------------------------------------------------|
| T1          | 0.45 0.31 0.26                                       |
| T2          | 0.48 0.35 0.27                                       |
| LSD0.05     | 0.027 0.040 0.034                                    |
| LSD0.01     | 0.038 0.055 0.046                                    |
| Level of significance | 0.0540** 0.0735** 0.0184** |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

The effect of thickness of PP bag had a significant variation on titratable acid content of litchi. The highest titratable acid content (0.48%) was observed in litchis wrapped in PP bag of 75 micron thickness at 3rd day of storage (Table 27). The lowest titratable acid content (0.22%) was observed in control (litchis left unwrapped) at 9th day of storage (Table 10).

(F) Disease incidence

Disease incidence was significantly varied due to different postharvest treatments. Generally the levels of disease incidence were found to gradually increase as the duration of storage progressed at...
litchis kept in ambient temperature. No disease incidence was shown in all the litchis kept in low temperature (4ºC). Disease incidence was highest (86.67%) in litchis kept in ambient temperature at 8th day after storage and the lowest disease incidence (0.00%) was observed at all the litchis kept in low temperature at 2nd, 4th, 6th & 8th days of storage (Figure 1).

Table 10. Main effect of thickness of PP bags on titratable acidity of litchi

| Thickness of PP bags | Titratable acidity at different days after storage |
|---------------------|--------------------------------------------------|
|                     | 3       | 6       | 9       |
| P1                  | 0.45    | 0.28    | 0.22    |
| P2                  | 0.47    | 0.36    | 0.29    |
| P3                  | 0.48    | 0.35    | 0.27    |
| P4                  | 0.47    | 0.34    | 0.28    |
| LSD0.05             | 0.039   | 0.056   | 0.047   |
| LSD0.01             | 0.053   | 0.077   | 0.065   |
| Level of significance | 0.0110** | 0.0710** | 0.0554** |

** = Significant at 1% level of probability, * = Significant at 5% level of probability, NS = Not significant

Figure 1. Main effect of temperature on percent disease incidence of litchi

The effects of thickness of PP bags were statistically highly significant in disease incidence of litchi during storage. The highest rate of disease incidence (50.00%) was found in control (litchi left untreated) and litchis that were wrapped in PP bag of 100µ thickness and the lowest rate of disease incidence (0.00%) was found at litchis that were wrapped in PP bag of 75µ thickness at the 2nd day of storage (Figure 2).

(G) Disease severity

Postharvest treatments at the different storage time influenced the levels disease severity significantly. Disease severity level trended to increase with duration of storage at litchis kept in ambient temperature. Disease severity was highest (28.84%) at litchis kept in ambient temperature at 8th day of storage and the lowest (0.00%) in all the litchis kept in 4 ºC at 2nd, 4th, 6th & 8th days of storage (Figure 3).

Figure 2. Main effect of thickness of PP bags on percent disease incidence of litchi. The vertical bar represents LSD at 5% level of probability.

The effects of thickness of PP bags were statistically significant in disease severity of litchi during storage. The highest rate of disease severity (25.84%) was found in control (litchi left untreated) followed by disease severity in 100 micron (µ) PP bags (15.34%) and at 8th day of storage the lowest rate (6.67%) was found at litchis wrapped in 75 micron PP bag (Figure 4).

Figure 3. Main effect of temperature on percent disease severity of litchi
DISCUSSION

The data were recorded at 2 and 3 days interval after storage (DAS) on different characteristics of physical and chemical properties of litchi. Litchi is a highly perishable commodity. Pulp to peel ratio is also an important feature in respect of quality of litchi during storage. The pulp to peel ratio showed an increasing rate up to the 6th day of storage and decreased thereafter. The lower pulp to peel ratio was observed in litchis kept in low temperature (4°C) at the time of storage. The value of pulp to peel ratio of 3rd day is higher than 9th day and it is observed in all litchis kept in ambient temperature and also in litchis kept in 4°C without wrapping. This result is supported by Aklimuzzaman et al. (2011). Mostly the moisture content decreased with the goes ahead in storage time under different postharvest treatments. This decreasing trend were also supported by Gaur and Singh (1987) and by Joshi and Roy (1988). Immediate and fast pre-cooling are important in the cold chain for litchi fruit and can remove field heat and provide effective temperature management during subsequent storage or shipment. These results of this experiment were supported by the results of Tongdee et al. (1999) and Bagshaw et al. (1994). In contrary, the percent dry matter content increased with the goes ahead in storage duration (Aklimuzzaman et al. 2011). Glahan (2000) noticed that respiration occurs incessantly after harvest and reaches a top depending on the variety and species. In the present study, weight loss had no influence on shriveling of the litchi fruit which is similar to that declared for other fruits (Glahan 2004a,b). Pesis et al. (2002) observed that the accumulation of acetaldehyde and ethanol of litchi fruit inside modified atmosphere packaging can bias the storage life, caused by the anaerobic respiration. Due to respiration after harvest, weight loss occurs fast. This result is similar with van Meeteren U, Aliniaefard S. (2016) and Aliniaefard S, van Meeteren U. (2016).

The increasing trend of percent total soluble solids contents of fruit during storage could be signed mostly to the breakdown of starch into simple sugars during ripening along with a proportional increase in TSS and further hydrolysis reduced the TSS at storage period. Similar result found by Elia Nora Aquino Bolaños et.al.2010 and (Aklimuzzaman et al. 2011).

Generally the titratable acidity content decreased with the goes ahead in storage time. In the present study, reduce in percent titratable acidity observed during storage agrees with the results of Mahajan (1997) and Mitra et al (1996). The decrease in titratable acidity during storage may be attributed to the utilization of organic acids in respiratory process and other biodegradable reactions (Ulrich, 1974); Total soluble solids (TSS) and titratable acidity (TA) content of lychee fruit changed throughout the storage period. This may be a result of storage conditions which may reduce metabolic processes in the lychee fruit. The storage methods used in this study could be implemented in the postharvest handling of lychee and extends the shelf-life of products as found in Gros Michale (Glahan and Kerdseri, 2001) banana ‘Kluai Khai’ (Glahan and Chockpachuen, 2003) and longkong (Glahan and Adireklap, 2005).

Decreases in TSS and TA of litchi are predominantly due to respiration which devours the nutrient substances of fresh litchi (Feng et al., 2011). This result is similar with Elia Nora Aquino Bolaños et al.2010 and Sai Xu, et al. 2019. pH is also an important property in respect of quality of litchi during storage. The pH showed an increasing rate up to the entire storage period. Further, it was noticed that the pH of fruit pulp was gradually increased during the total storage period (Aklimuzzaman et al. 2011). The increase in pulp pH may be due to continuous falling of acidity during storage. Increased of pulp pH observed in the present study was an agreement with the findings of Tongdee et al. (1982), who found that pulp pH of litchi, increased with storage duration. According to Zhuang et al (1998) and Coates et al (1994), litchi fruits are very prehensile to postrharvest decay. Low temperature played the significant role in controlling the disease incidence. Disease incidence trended to increase in all the varieties during the whole storage period (Aklimuzzaman et al. 2011). Jiang and Fu (1999) suggested that 85–95% relative humidity (RH) appears to be optimum for storage. Disease severity level trended to increase with duration of storage (Aklimuzzaman et al. 2011). Mainly low
The present investigation indicated that dry matter content, pulp pH, disease incidence and disease severity increased throughout the storage period. The increasing rate was slower in fruits kept in 75µ PP bag at 4°C temperature. Titratable acidity declined day by day throughout the storage period. The decreasing rate was slower in litchis kept in PP bag of 75 micron thickness at 4°C temperature. On the other hand, pulp to peel ratio and total soluble solid content increased initially but declined afterward. Considering the above parameters, among all postharvest treatments, 75µ PP bag at 4°C temperature were the best. From the above discussion it may be concluded that keeping litchi in 75µ PP bag and stored in low temperature (4°C) is the best to extend its shelf life without affecting the quality. For short-term storage of litchi fruits 75µ PP bag at ambient temperature would be recommended.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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