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## STUDY ON PHYSICO-CHEMICAL PROPERTIES AND POST-HARVEST WEIGHT LOSS OF MANGO CV. FAZLI (*Mangifera indica* L.)

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### ABSTRACT

Islam MS, Islam MN, Uddin MS, Kader HA, Khan MSI (2016) Study on physico-chemical properties and post-harvest weight loss of mango cv. Fazli (*Mangifera indica* L.). *Int. J. Expt. Agric.* 6(2), 30-32.

The study was conducted at the laboratory of Regional Horticulture Research Station, Bangladesh Agricultural Research Institute, Chapainawabganj, during July to September, 2015. The experiment was carried out to know the pattern of post-harvest weight loss and physico-chemical properties of important commercial mango variety Fazli. Data were collected seven days after harvest to assess the pattern of physico-chemical characteristics. Moderate variations were noticed among the samples regarding physico-chemical composition. Some of the attribute such as total weight loss, moisture content, total soluble solid and pH were measured for the T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> mango samples. From the experimental results, it was observed that each mango lose its weight continuously. The average percent of weight loss was 11.58% 7days after harvest. Average moisture contained was 81.12%. Vitamin-C recorded at 7<sup>th</sup> day was T<sub>1</sub> (9.0mg/100g), T<sub>2</sub> (9.0mg/100g), T<sub>3</sub> (9mg/100g) and loss of Vitamin-C from T<sub>1</sub> the sample 33mg/100g from T<sub>2</sub> 32mg/100 and T<sub>3</sub> 33mg/100g initial day to 7<sup>th</sup> day and average % of Vitamin-C loss was 32.66%. At initial stage pH recorded at T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 3.0, 2.9, 3.1 respectively and gradually increase to 3.6, 3.5 and 3.7 at the 7<sup>th</sup> days after harvest. At initial stage TSS (%) were recorded from T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 10.60, 11.8, 12.33 percent respectively. The average increase of TSS was 7.25%. The overall result shows that the mango loss its weight and Vitamin-C day by day after harvesting while increase moisture content, TSS and pH.

**Key words:** storage life, physico-chemical properties, fazli, weight loss

### INTRODUCTION

Mango (*Mangifera indica* L.) is one of the most popular and commercially important fruit in tropics and subtropics particularly in Asia where it is considered as the “King of fruits” (Singh 1996). It belongs to the family Anacardiaceae. Mango grows well throughout the country but the commercial cultivation is concentrated in the North-Western region of the country such as Rajshahi and Chapainawabganj districts (Uddin *et al.* 2007). The annual mango production is 9.45 lac ton (BBS 2014). Based on taxonomic investigation and recent molecular evidence it is now apparent that the mango probably evolved within a large area including North-Western Myanmar, Bangladesh and North-Eastern part of India (Litz 1997). This fruit is well accepted to the consumers all over the world for its special organoleptic features such as excellent flavor, pleasant aroma, luscious taste, lovely size and attractive colour. In nutritional aspects, both ripe and unripe mango is superior and rich in several vitamins as well as minerals (Paramanik 1995). Perhaps, there is no fruit other than ripe mango that contains considerable amount of carotene (the precursor of Vitamin-A). It is second only to containing niacin, has more thiamin (Vitamin-B1) and riboflavin (Vitamin-B2) than most other fruits. Besides, mango contains appreciable quantity of iron, Vitamin-C and soluble sugar. Moreover, it provides a lot of energy (as much as 74 kcal/100g edible portion) which is nearly equals the energy values of boiled rice of similar quantity by weight (Hossain 1989). The fruit has really of immense value in respect of money and prosperity. Seems it is considered to be the choicest of all indigenous fruits and called as “The King of Fruits”. The mango tree has been declared as “The National Tree” of Bangladesh on 15<sup>th</sup> November, 2010. Nutritionally, mango is highly important because it has medium calorific and high nutritional values. The carbohydrate content in ripe mango pulp is 16.9% (Salunkhe and Desai, 1984). The present availability of fruits is only 78.0g as since the minimum dietary requirement of 200.0g per head per day (FAOSTAT 2010). Mango is renowned for combating nutritional disorders (Griesbach 2003). Each part of the tree has a number of functions. A bark infusion can be a remedy for mouth infections in children (Bally 2006). Amiruzzaman (1990) reported that the magnitude of post-harvest losses in fresh fruits including mango in Bangladesh is about 25-50% while it is only 5-25% in developed countries. Therefore, the present study has been undertaken to know the weight loss pattern and physico-chemical properties of Fazli variety.

### MATERIALS AND METHOD

The present study was conducted at the laboratory of Regional Horticulture Research Station, Bangladesh Agricultural Research Institute, Chapainawabganj. The study was conducted during the period of July to September, 2015. The mango variety Fazli was collected from research farm of Regional Horticulture Research Station, Chapainawabganj. Three samples of Fazli variety was taken in this study. Just after harvest, fruits were taken into laboratory to observe the weight loss and different biochemical analysis. The Fazli is a popular commercial variety grown especially at Rajshahi and Chapainawabganj district. The mango fruits were

harvested in the morning. The temperature and relative humidity of the atmosphere during the study period ranged from 29 to 31°C and 80% to 82% respectively. During this period the mango stored at ambient temperature for the experiment purpose and developed were observed daily. Data were recorded on weight loss, chemical changes at an interval of 1 to 7 days during storage. Data were collected mainly under laboratory conditions during post-harvest study.

The weight loss was determined gravimetrically. Moisture content was determined adopting AOAC (1984) method. The pH of mango samples was measured by using perkinflmer Matron pH at an ambient temperature. Ascorbic Acid was determined following the method of Ranganna (1979). Two drops of mango pulp were taken in a refractometer (model No. 8987 Kuji Kuki Ltd. Tokyo, Japan) plate and the total soluble solids (TSS) of the sample was read directly from the refractometer.

## RESULTS AND DISCUSSION

Table 1. Post-harvest weight loss of Fazli variety observed at Horticulture laboratory of RHRS, Chapainawabganj

| Samples        | Initial wt. (g) | 3 <sup>rd</sup> Day after harvest | 5 <sup>th</sup> Day after harvest | 7 <sup>th</sup> Day after harvest | Wt. loss (g) | % Wt. loss | Mean Value |
|----------------|-----------------|-----------------------------------|-----------------------------------|-----------------------------------|--------------|------------|------------|
| T <sub>1</sub> | 616.1           | 589.9                             | 572.5                             | 558.6                             | 57.5         | 9.33       |            |
| T <sub>2</sub> | 519.2           | 486.8                             | 465.6                             | 449.9                             | 69.3         | 13.34      | 11.58      |
| T <sub>3</sub> | 523.4           | 495.4                             | 476.3                             | 460.2                             | 63.2         | 12.07      |            |

Table 2. Determination of moisture content, Vitamin-C, and pH of mango at different days after storage

| Days after storage (DAS) | Moisture content (%) |                |                | Vitamin-C Content mg/100g |                |                | pH             |                |                |
|--------------------------|----------------------|----------------|----------------|---------------------------|----------------|----------------|----------------|----------------|----------------|
|                          | T <sub>1</sub>       | T <sub>2</sub> | T <sub>3</sub> | T <sub>1</sub>            | T <sub>2</sub> | T <sub>3</sub> | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> |
| 0                        | 80.25                | 80.60          | 76.0           | 42.0                      | 41.0           | 42.0           | 3.0            | 2.9            | 3.1            |
| 3                        | 80.50                | 81.75          | 78.0           | 29.0                      | 28.0           | 30.0           | 3.1            | 3.1            | 3.2            |
| 5                        | 81.45                | 82.0           | 78.5           | 18.2                      | 17.4           | 19.0           | 3.3            | 3.2            | 3.5            |
| 7                        | 82.30                | 81.1           | 80.41          | 9.0                       | 9.0            | 9.00           | 3.6            | 3.5            | 3.7            |
| Mean                     | 81.12                | 81.36          | 78.22          | 24.55                     | 23.85          | 25.0           | 3.25           | 3.18           | 3.38           |
| Range                    | 80.25-82.30          | 80.6-81.1      | 76.0-80.41     | 9.0-42.0                  | 9.0-41.0       | 9.0-42.0       | 3.0-3.6        | 2.9-3.5        | 3.1-3.7        |

From Table 1: It was observed that the maximum percentage of total weight loss of was found in the sample T<sub>3</sub> (12.07%) and minimum (9.33%) was in T<sub>1</sub>. The average percent of weight loss was 11.58%. This change in percentage of weight loss may be due to the change in the respiration rate, environmental factor (temp., relative humidity, air etc.) stages of maturity of mangoes and storage condition etc. This may be due to the decrease slightly with the passage of time. Several other researchers also indicated due to rotting, dehydration, transpiration and respiration in storage, rather high percentage of weight loss occurred in differently treated mangoes other than fresh one (Roy *et al.* 2011).

From Table 2: For the sample T<sub>1</sub>: the percentage of moisture content was increase of storage period. The highest percentage of moisture content was found of 7<sup>th</sup> days of storage (82.3%) and lowest percentage of moisture content was observed on the initial day of storage (80.25%).

Similar changes of percentage of moisture content was observed for sample T<sub>2</sub>: The highest content of moisture was found on 7<sup>th</sup> days of storage (82.0%) and lowest percentage of moisture content was observed of the initial day of storage (80.6%).

For the sample T<sub>3</sub>, the percentage of moisture content was increase of storage period. The highest percentage of moisture content was found at initial days of storage (80.41%) and lowest percentage of moisture content was observed on the initial day of storage (76.0%).

In case of sample of T<sub>1</sub>, on the initial day of Vitamin-C content of the treated mangoes was 42mg/100gm of sample and subsequently decreased 9mg/100gm at 7<sup>th</sup> days.

In case of sample T<sub>2</sub>, on the initial day of Vitamin-C content of the treated mangoes was 41mg/100gm of sample and at the 7<sup>th</sup> day it decreased to 9mg/100gm. Likely, at treatment T<sub>3</sub>, on the initial day of Vitamin-C recorded 42mg/100gm of sample and at 7<sup>th</sup> day it decreased to 9mg/100g.

From the treatment T<sub>1</sub>, pH gradually increases with the day of storage. On 7<sup>th</sup> day of storage fruits had the highest pH 3.6 and the lowest 3.0 was recorded at first day. From the treatment T<sub>2</sub>, the highest pH 3.5 was observed on 7<sup>th</sup> days of storage and the lowest pH was 2.9 at 1<sup>st</sup> day. The sample of T<sub>3</sub> the highest pH 3.7 was observed on 7<sup>th</sup> days of storage and the lowest pH was 3.1 on 1<sup>st</sup> day. The increase pH is due to the lowering of acidity with increase the period of storage.

Table 3. Total soluble solid content (%) of mango during storage at laboratory

| Samples        | TSS Content (%) at different Days |                 |                 |                 |            | Average (%) |
|----------------|-----------------------------------|-----------------|-----------------|-----------------|------------|-------------|
|                | Initial stage                     | 3 <sup>rd</sup> | 5 <sup>th</sup> | 7 <sup>th</sup> | increase % |             |
| T <sub>1</sub> | 10.60                             | 14.12           | 16.50           | 19.0            | 8.4        | 7.25        |
| T <sub>2</sub> | 11.80                             | 13.70           | 15.30           | 18.5            | 6.7        |             |
| T <sub>3</sub> | 12.33                             | 14.23           | 17.33           | 19.0            | 6.67       |             |

In the treatment T<sub>1</sub>, TSS is lowest recorded at 10.60% just after harvest and then gradually increase upto ripening and at the 7<sup>th</sup> days it was recorded 19%. In the treatment T<sub>2</sub>, TSS recorded lowest 11.8% at initial stage and gradually increases upto ripening and the 7<sup>th</sup> TSS 18.5%. In case of T<sub>3</sub>, TSS is lower 12.33% at initial stage and gradually increases upto ripening and at the 7<sup>th</sup> days TSS was recorded 19%. From all the treatment, it was observed that TSS was increased gradually and recorded at T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> is 8.4%, 6.7%, 6.7 percent respectively and average of TSS is 7.25%.

### CONCLUSION

Wide variations were noticed at the commercial Fazli variety considering weight loss, moisture content, and total soluble solids content. The pH increased while Vitamin-C content during storage decreased highly at the Fazli variety. It may be concluded that during storage in the laboratory the physico-chemical properties and weight loss continued day by day. Therefore, to get proper taste from the mango it should be consumed within 3 to 4 days after harvest.

### REFERENCES

- Amiruzzaman M (1990) Post-harvest handling and processing of fruits and vegetables in kitchen gardening and homestead productive activities. CIRDAP Action Research, Series No. 11. p. 22.
- AOAC (1984) Official methods of analysis. Association of Official Analytical Chemists. Washington, DC. U.S.A.
- Bally ISE (2006) Species profiles for Pacific Island agroforestry. Permanent Agriculture Resources (PAR), <http://www.traditionaltree.org>. (accessed 30.04.08.).
- BBS (2014) Statistical Pocket Book of Bangladesh-2013. Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning, Government of the People's Republic of Bangladesh.
- FAOSTAT (2010) FAO Statistics, Food and Agriculture Organization of the United Nations, Rome, Italy.
- Griesbach J (2003) Mango book Kenya. Nairobi, Kenya: World Agroforestry Centre. pp. 4-6.
- Hossain AKMA (1989) Manual on Mango Cultivation in Bangladesh. Division of Horticulture, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur. 39 & 58.
- Litz RE (1997) The Mango Botany, Production and Uses 4th ed. CAB international. Wallingford. UK. p. 7.
- Paramanik MAJ (1995) Effect of different post-harvest treatments on physico-chemical changes during storage and shelf life of mangos. M.S.Thesis, Dept. of Hort. BAU, Mymensingh.
- Ranganna S (1979) Manual of Analysis of Fruit and vegetable products. Tata Mc Graw Hill publishing company Ltd., New Delhi, pp. 634.
- Roy R, Rahim MA, Alam MS (2011) Effect of Wrapping Papers on Physiological Changes and Shelf-life of mango variety Langra. *J. Environ. Sci. & Natural Resources*. 4(2), 99-103.
- Salunkhe DK, Desai BB (1984) Post harvest biotechnology of Fruit. Vol.1. CRC Press, Inc., Boca Raton, Florida 77-94.
- Singh RN (1996) Mango. New Delhi: ICAR. p. 134.
- Uddin MS, Uddin MZ, Barman JC, Hoque MA, Alam SMM (2007) Studies on the performance of some local and exotic mango varieties grown at Barisal region. *International Journal of Sustainable Agriculture & Technology*. 3:79-82.