

Influences of Different Storage Conditions on Postharvest Quality of Mango (*Mangifera indica* L.cv.Sein Ta Lone)

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Introduction

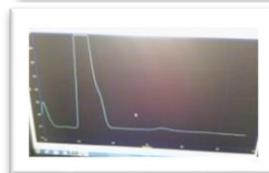
Mango is the most important commercial fruit in Myanmar with cultivated areas of over 51 thousands hectares. Sein Ta Lone is a popular variety for both domestic consumption and export market. Postharvest losses of perishable fruit have been estimated in the range of 25-40% from harvesting to consumption stage (FAO, 2001). The selection of proper storage conditions such as packaging materials and suitable storage temperature are essential prerequisite for prolonging the postharvest life. In Myanmar, there is no academic information on the measurement of ethylene production and respiration rate of Sein Ta Lone mango as affected by the use of packaging materials and low temperature storage. So, this study was carried out with the following objectives.

Objectives

- 1 To investigate respiration and ethylene production rate of Sein Ta Lone mango as affected by different packaging materials and storage temperatures
- 2 To assess the postharvest quality and storage life of Sein Ta Lone mango as affected by different storage conditions

Materials and Methods

Tested cultivar	Sein Ta Lone (115 -120 DAF)
Material source	Myanadi mango orchard, Mandalay Region
Experimental site	Laboratory of Horticulture Department, YAU
Duration	May- June of 2017
Experimental design	Randomized Complete Block design with 3 treatments for four replications
Storage Conditions	Packaging materials- paper, net sac and without packaging Temperature – at room temperature & at 13 °C



Research Findings

No.	Collected Data	Room temperature			13°C		
		Control	Paper	Net Sac	Control	Paper	Net Sac
1	Weight Loss (%)	4 -28	4 -13	5 -20	5 -9	6 -9	6 -10
2	Brix (%)	13	12	12	14	15	14
3	Ethylene production rate ($\mu\text{g kg}^{-1} \text{hr}^{-1}$)	0.05-0.39	0.15-0.69	0.06-0.41	0.011-1.344	0.013 - 5.508	0.015- 1.946
4	Respiration rate ($\text{mg CO}_2 \text{kg}^{-1} \text{hr}^{-1}$)	10.37 - 54	10.37 - 55.31	10.37 - 58.2	10.37- 50.54	10.37 - 58.93	10.37- 55.8
5	Shelf Life (days)	7	7	8	16	16	16



Control (without packaging)

Paper

net sack

Visual appearance of Sein Ta Lone mango stored at 13 °C (16 days after storage)

Results and Discussion

With the regardless of wrapping materials, the weight loss and the peel color development were highly significant between the storage temperatures. However, the highest physiological weight loss was observed in the fruits of unwrapped fruits stored at room temperature and these fruits reached full ripening stages of yellow color at 4 days after storage. The color index value was increased in all treatments stored at ambient condition at 4 days after storage. Generally, the color index of fruits stored at 13°C was lower value than that of the ambient condition. With the regardless of temperature, wrapping treatments showed considerable higher value in color index than unwrapped fruit.

There was no significant difference in skin firmness of fruits among the wrapping treatments at the respective temperatures. However, it can be assumed that the skin firmness of paper wrapping was a little higher value than others at the end of storage life at both temperatures. There was no significant difference in Brix% and TTA % of the fruits among the wrapping materials at both temperatures. However, the Brix% of without wrapping treatment showed higher value than other treatments.

There was significant difference in shelf life of fruits between two temperatures. However, there was no significant difference in the shelf life of mango (7 days) among the wrapping treatments at room temperature. The fruits wrapped with paper showed the longest shelf life of 16 days stored at 13°C. Therefore, the lower the storage temperature, the longer the storage life was observed. The minimum rate of respiration and ethylene production of untreated fruits were $10.37 \text{ ml CO}_2 \text{ kg}^{-1}\text{hr}^{-1}$ and $0.24 \mu\text{l C}_2\text{H}_4 \text{ kg}^{-1}\text{hr}^{-1}$ respectively. It was found that ethylene production rate of mango increased from 0.1-0.2 to 1-3 $\mu\text{l C}_2\text{H}_4 \text{ kg}^{-1}\text{hr}^{-1}$ at 20°C. The reason may be the rise in respiration and ethylene production during the climacteric is related to fruit ripening process.

The respiratory peak in “Sein Ta Lone” mangoes was observed at 6 days after storage in all treatments and the fruit ripens within 6 or 7 days. The highest respiration rate of $110 \text{ ml CO}_2 \text{ kg}^{-1} \text{ hr}^{-1}$ was observed on the fruits of paper wrapping and followed by the fruits of the foam net sack stored at room temperature. There were significant differences in respiration and ethylene production rates of fruits at both temperatures. The respiration and ethylene production rates of “Sein Ta Lone” mangoes were decreased at low temperature storage of 13 °C which can prolong the shelf life. It was observed that mango fruits stored at low temperature showed lower ethylene production and respiration rate than high temperature storage.



