J Krishi Vigyan 2023, 11 (Supple) : 261-263 DOI : 10.5958/2349-4433.2023.00124.1

Short Communication

Low Cost Ripening Chamber - A Boon to Mango Growers in Kerala

Elizabeth Joseph*, Mannambeth Renisha Jayarajan[1], Parvathy A[2] and Jayaraj P[3]
Krishi Vigyan Kendra, Kannur, Kerala Agricultural University

ABSTRACT

GI Kuttiatoor mango is a popular and tasty traditional mango cultivar of Kuttiyattoor and the nearby Grama panchayaths of Kannur district. Mango farmers were practicing traditional method of ripening for years which resulted in non uniform ripening, reduced shelf life and increased post harvest losses and leads to lower price in the markets. The study was conducted at selected farmers field by constructing a low cost ripening chamber of 1.6m X1.4 mX1.8 m height size with one side opening. In this technology Etherel (8 ml) and sodium hydroxide (2 g) was used for release of ethylene gas in the chamber. The chamber capacity is about 1ton. The unripe mature mangoes in plastic crates were kept inside the air tight ripening chamber for 24 h for enhancing ripening process. The results of study revealed that with low cost ripening chamber the ripening time was 3d where as the time required for traditional method was almost 7d the recovery percentage of mangoes in low cost ripening chamber and traditional method were 90 per cent and 70 per cent respectively. The benefits observed were reduction of post harvest losses in mangoes, labour and time saving.

Keywords: Mango, Low cost ripening chamber, Post harvest losses.

INTRODUCTION

Mango growers face problems as decreased production due to post harvest losses. According to FAO (2016), a loss of 5-10 percent during harvesting, 10 percent during cleaning, grading and sorting, 10-15 percent was recorded in ripening through traditional practice & 3-6 percent in ripening through ripening chambers. These losses are due to improper maturity, sap burn, spongy tissue, lenticels discolouration, fruit softening, decay, chilling injury, and disease and pest damage etc (Sivakumar *et al*, 2011). Proper harvesting and post-harvest management techniques will reduce the damage of fruits and ultimately contribute to improve farmer incomes. However, farmers largely continue to depend on conventional harvesting techniques coupled with improper harvesting methods results in huge loss of harvested produce.

Mango farmers in Kuttiattoor panchayat were practicing traditional method of ripening for years. Traditional method resulted in non uniform ripening, reduced shelf life and increased post harvest loss which leads to lower price in the markets. Being a climacteric fruit, artificial ripening of mangoes is important for early ripening of mangoes. Though there are technologies for artificial ripening the cost of adopting the technology is not affordable for farmers. Therefore, low cost ripening chamber, a technology from Indian Institute of Horticultural Research (IIHR), Bengaluru was introduced in Kuttiattoor panchayath by KVK Kannur.

MATERIALS AND METHODS

The study was conducted at Kuttiattoor panchayath of Kannur district, as the panchayath holds more area under the GI brand Kuttiatoor mango.

Corresponding Author's Email: elizebeth.joseph@kau.in

Selection of sample

The technology was demonstrated through Kuttiattor FPO - A FPO incorporated for harvesting, procurement, grading, ripening and marketing of raw mangoes as well as value added products .Five farmers were selected to demonstrate the effectiveness of this low cost ripening chamber. The trial was conducted during the year 2021-22 at five locations with a capacity of ripening one tonne of raw mango per treatment at Kuttiatoor panchayath, Kannur district.

Treatment

T1: Farmers practice of ripening mango in traditional method

Treatment 1. Traditional method of ripening mangoes by spreading the mango on the newspaper and then covering them with a layer of hay or poison nut leaves *(Strychnos nux-vomica Linn)* on mangoes**.**

T2: IIHR low cost ripening chamber.

Treatment 2 . Low cost ripening chamber developed by IIHR Bangalore having size of 4 cubic meter(1.6m X1.4 m X1.8 m height) with a capacity to hold one tonne of mangoes in crates (0.5 m x0.3 m x 0.3m) reducing the damages to individual fruits.

Materials required

- Air tight plastic chamber of size 1.6 m x1.4 m x 1.8 m
- Ventilated plastic crates of size 0.5 m x0.3 m x 0.3m- 20 nos
- Ethrel-8ml
- Caustic soda- 2 g
- Glass -1
- Battery operated fan-1 no.

Method of storage

The study was conducted in selected farmers field by constructing a low cost ripening chamber of 1.6m X1.4 mX1.8 m height size with one side opening . Matured mangoes after cleaning were placed in the 20 ventilated plastic crates each carry 50 kg and put them into low cost chamber. Natural ripening of mangoes is triggered by production of ethylene gas from ripened fruit which promotes ripening of other fruits in the lot. Before sealing the chamber, a glass with 8 ml ethrel was placed inside and 2g caustic soda pellets were added in order to release ethylene gas artificially. A battery operated fan was also placed inside the chamber for effective flow of ethylene gas inside the chamber. The chamber was opened after 24 hrs and the treated mangoes were removed from the chamber.

RESULTS AND DISCUSSION

Table 1. Comparison between parameters of traditional method and low cost ripening chamber.

Parameter	Traditional method	Low cost ripening chamber
Cost of Chamber	Rs. 2000/-	Rs. 5000/-
Quantity handled	1 t	1 t
Recovery %	70	90
Selling price	Rs. 70/-	Rs. 70/-
Space required	5 sq. meter	1 sq. meter
Time required	5 days	3 days
Labour saving	More	Less
Ripening process	Non uniform	Uniform
Ripening time	7 days	3 days
Shelf life	3 days	5 days

Table 2. Economics of Low cost ripening Chamber.

Sr. No.	Critical inputs	Cost (Rs.)
1	Cost of silpaulin	1500
2	Cost of PVC framework	2500
3	Cost of chemicals	500
	Total	5000

The results of study revealed that with low cost ripening chamber the ripening time was 3 where as the time required for traditional method was almost 7 (Pujari *et al*, 2018). Enhancement of shelf life of

Traditional method of ripening with newspaper and poison nut leaves

Matured mangoes in crates ready to be placed in ripening chamber

IIHR-Low cost ripening chamber

5 days was noticed in low cost ripening chamber as against 3 days in traditional method similar results were reported by Chikkanna *et al* (2022). Apart from this, the recovery percentage of mangoes in low cost ripening chamber and traditional method were 90 per cent and 70 per cent respectively. Similar research findings were observed in studies carried by Pujari *et al* (2018). Furthermore, the low cost ripening chamber required minimum space and minimum number of labourers than traditional method. Uniform ripening of mangoes were observed in low cost ripening chamber where as non uniform ripening was noticed in traditional method (Table 11). The total expenditure incurred for the construction of low cost ripening chamber with 1 tonne mango capacity is presented in table 2. The advantage is that the chamber can be reused for ripening several batches of mango.

CONCLUSION

The low cost ripening chamber has highly benefitted Kuttiattoor farmers in several ways. Since, the chamber requires only 2.5 sq.m area, implementation of such chamber is possible in every homesteads of Kuttiattor village. The benefits observed were reduction of post harvest losses in mangoes, labour and time saving. By using this technology the farmers could ripen nearly fifty percent of the total mangoes produced during the last year.

REFERENCES

Chikkanna G S, Shashidhar K R, Jyothi Kattegoudar and Ambika D S (2022). Low cost ripening chamber is boon to small and marginal farmers for ripening of mangoes. *The Pharma Innov J* SP-11(9): 2823-2828.

Dharini Sivakumar, Yuming Jiang, Elhadi M and Yahia (2011). Maintaining mango (*Mangifera indica L.*) fruit quality during the export chain, *Food Res Int* **44**(5): 1254-1263.

FAO (2016).Case study on the mango value chain in the Republic of India. Food loss analysis-causes and solutions, Chapter 3:31

Pujari K H, Relekar P P, Shedge M S, Patil V K, Rane A D , Haldankar P M and Bhattacharyya T (2018). Low cost ripening chamber - a technology for marginal mango-growers . *Adv Agri Res & Technol J* II (2):171-174.

Received on 10/8/2023 *Accepted on 15/10/2023*