

Research Paper :

Construction, performance and evaluation of double cooling pad evaporative cooling chamber for storage of tomato

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ABSTRACT

During the storage and transit from farmer's fields to market place, there is a substantial loss in quality and shelf-life of vegetable due to improper post harvest handling and storage methods which is about 30-35 per cent. To overcome this problem, the evaporative cooling chamber is introduced to the farmers. Three evaporative cooling chamber to store the tomato vegetable viz., Double cooling pad (T_2), Single cooling pad (T_1) and Room temp. storage (T_0) were constructed. Results of present investigation indicated that, depending upon quality parameters viz., colour index, softness index, PLW, M.C, T.S.S. and acidity, double cooling pad showed better result followed by the single cooling pad and room temperature storage. The shelf life of tomato in double cooling pad was up to 27 days followed by treatment T_1 (21 days) and T_0 (12 days). The shelf-life of tomato was increased by 15 days in double cooling pad as compared to room temperature storage. Also, depending upon inside temperature and relative humidity treatment T_2 was reported better than other treatments. Considering the above double cooling pad was best suited for storage of tomato with low cost and negligible operational cost.

Key words : Colour index, Softness index, Acidity, Percentage loss in weight, Total soluble salt

Tomato is one of the most important vegetable crops grown throughout the world. It is mainly consumed as kitchen and table purpose. The pulp of fresh and ripened fruits is used for preparation of sauce, jam, ketchup. Tomato is also used in preparation of tonic, antipyretic drug and febrifuge. Temperature plays an important and key role in maintaining the quality and shelf-life of fruit vegetable. To maintain the optimum temperature of fruit vegetable to its lowest safe temperature increase the quality and shelf life by lowering the respiration rate and water loss. Shriveling and wilting which causes serious post harvest losses are reduced by decreasing the rate of water loss. If the temperature of fruit vegetable decreases below the safe lowest temperature it causes the chilling injury. In Konkan region the environmental conditions are hot and humid. Economical conditions of farmers are not sound. Hence, there is necessity to store the tomato after harvesting for longer time by using low cost storage technique such as evaporative cooling chamber. Due to high operational cost and energy consumption, it is not possible to everyone to take advantage of the costly techniques and methods. The evaporating chamber gives better cooling effect with zero energy consumption to increase the shelf-life. Generally, evaporative cooling chamber is constructed with single cooling pad having thickness 7.5 cm with different cooling pad material. The inside temperature for this cooling chamber is recorded

in range of 18° C to 24° C and relative humidity is recorded in range of 85 to 93% depending upon application of water, cooling pad material, prevailing wind direction, outside temperature etc. But evaporative cooling chamber is low cost and zero energy consumption method of storage of perishable products. It is generally constructed by locally available material such as bricks for chamber walls and mortar mixed clay for binding the brick layer in position. The gap between the outer wall and inner wall is generally filled with fine sand, coarse sand, brick batt or combination of either two or three materials mentioned earlier. By considering above condition the project was undertaken with following objectives : to study the effect of single and double cooling pad on shelf life of perishable commodity and to estimate the cost of double cooling pad evaporative cooling chamber

METHODOLOGY

Study area of evaporative cooling chambers was located at latitude (15° 37' N to 20° 20' N), longitude (70° 17' E to 74° 31' E) and altitude range (200 to 450m). Following material was used during the experiment. Tomato of variety Samrat was used as perishable commodity.

Bricks:

For construction of evaporative cooling chamber,