

Development of a low-cost evaporative cooling storage structure for perishable commodities

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All fruits and vegetables are not consumed immediately after their harvest. Proper storage of perishable commodities is one of the most important post-harvest operations to reduce the giant food scarcity crisis. Controlling the temperature and relative humidity of the storage environment are the key steps of extending the shelf-life of the perishable commodities. In this study, a double-wall evaporative cooler was developed using low cost and locally available porous materials: saw dust in outer wall and rice husk in inner wall for storage of perishable commodities for a short period of time. The performance of the evaporative cooler was evaluated under no load condition for 3 days. The cooling efficiency throughout the day of the evaporative cooler was calculated. Tomatoes and grapes were stored in the evaporative cooler. The quality of tomatoes and grapes were evaluated in terms of physiological weight loss, moisture content and the change in colour. Comparison of the performance of the evaporative cooler was made keeping same amount of tomatoes and grapes at room temperature and in refrigerator. The total cost of the evaporative cooler was calculated. The results indicated a temperature drop of 10-12°C and an overall increase of 62-68 per cent relative humidity inside the evaporative cooler in comparison to the ambient condition. It is also found from the results that tomatoes and grapes could be stored in good condition for 31 days and 19 days, respectively without significant weight loss, gain in moisture content and colour change. The use of locally available materials kept the cost of evaporative cooler to a low amount of Rs. 1926. The evaporative cooler developed is robust and technically sound equipment providing optimum temperature and relative humidity for storage of perishable commodities. This type of structure is low-cost and feasible giving good results in comparison to refrigerator and can be adopted by farmers anywhere in the globe.

Key Words : Evaporative cooling, Cooling efficiency, Storage condition, Temperature drop, Perishable commodities

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