

PERFORMANCE EVALUATION OF A LOW COST, THERMO ELECTRIC COOLER (TEC) BASED REFRIGERATOR COOL BOX FOR POST HARVEST STORAGE OF TOMATOES

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Postharvest losses of perishable crops remain a complex problem, in solution of which, technological, infrastructural, scientific and socioeconomic aspects are to be addressed in a multidisciplinary manner. The major causes of postharvest losses are improper handling, shielding expose to direct sunlight and high ambient temperature. These key issues had not been addressed at all in Sri Lankan condition and postharvest losses are higher. This study is mainly focused on developing a novel, low cost Thermo Electric Cooler (TEC) based refrigerator cool box. Further, a statistical comparison was also carried out to determine tomato storage efficiencies of three different storage conditions namely; novel TEC based refrigerator cool box, conventional refrigerator (National NRB33TA) and storage under room temperature. Complete randomized design was used in the experiment with replicates. Statistical analyses revealed that the mean weight loss percentage and the mean decay percentage in TEC cool box storing are comparable to that of refrigerator storage condition. The mean titratable acidity and the mean pink stage tomato percentage in TEC cool box storing are comparable to the room storage. This reflects the ability of the novel TEC based refrigerator cool box in reducing weight loss and delaying decay, while preserving internal physiological changes leading to maturity of tomatoes which ultimately results in good flavor and high quality. Achieving main research objective, the novel TEC based refrigerator demonstrated its ability to maintaining 8.438 ± 0.453 °C mean temperature and most researchers suggested 5–10 °C as optimum temperature range for storing tomatoes. TEC based refrigerator cool box which was made at a cost of 27.04 US\$, had a 44% COP of conventional domestic refrigerator. All the above factors contribute towards maintaining an economically sound and low wastage along the post harvesting cold chain. Smaller unit size and the absence of farmer feedbacks are limitations of current study.

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