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Potential of a Charcoal Evaporative Cooling Chamber for Extending the Shelf Life of Vegetables

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Abstract

There are wide varieties of vegetables in Sri Lanka. The ambient temperature and relative humidity have an impact on rate of vegetables deteriorate. Evaporative cooling is a well-known, cost-effective way to reduce postharvest lost in order to lower the temperature and increase the relative humidity. This research was done to create a charcoal cooling chamber for increase the shelf life of vegetables combining polythene packaging and active packaging additives. The study was carried out in wet zone, Sri Lanka with a sizable chamber made of coconut shell charcoal. A rectangular box made of chicken wire with a 1 m³ capacity serves as the evaporative cooling chamber. It made of chicken wire mesh with a hardwood frame. The walls filled with 50 mm thick coconut shell charcoal and a water outflow 8.33 ml/min for wetting the walls. Vegetable samples without any treatment were placed in the charcoal chamber along with vegetables wrapped in sealed polyethylene (gauge 300) with and without active packing components. With a control sample held in ambient settings, the treatments were put to the test four times over the course of nine days. Both unloading and loading situations were used to evaluate the performance of chamber. Temperature drops of 4° C on average and 2.07° C on average, respectively, were seen in dry and wet climate conditions. 92.49% on average was the cooling efficiency. Sealed polyethylene bags without active packaging components were found to be the best treatment when taking into account physiological weight loss and sensory tests. When compared to the control group on days 3, 6 and 9 physiological weight loss was considerably (P<0.05) less in the sealed polyethylene bags without active packing components. When compared to the control sample total soluble solid content less in sealed polythene bag. The sensory evaluation for the treatments inside the chamber was more acceptable than for the control. Vegetables can store fresh for up to three days in evaporative cooling chamber without packaging. These chambers can install vegetable stalls on the side of the roads in Sri Lanka for temporary purposes.

Keywords: Charcoal, Evaporation, Shelf-life, Temperature, Vegetables