

Vibration Simulation Testing of Banana Bulk Transport Packaging Systems

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ABSTRACT: Previous studies have reported that 20-30% of the banana harvest (9,000-13,500 t) is going into waste annually in Sri Lanka mainly due to mechanical damages. The distance of bulk transportation in main distribution channels is about 200 km. Therefore, this study was conducted to investigate an appropriate packaging system for banana bulk transportation to minimize postharvest losses due to mechanical damages in Sri Lankan distribution channels. A vibration bed operating at 6 mm amplitude at a 3.5 Hz frequency was used for transportation simulation tests. Three bulk packaging methods; laying of Styrofoam sheets of the thicknesses: 10, 8 and 5 mm between bunch layers, wrapping individual banana bunches with Styrofoam sheets of 3 and 5 mm thickness and packing banana hands in corrugated fibreboard boxes (CFB) were tested for mechanical damages and final fruit quality. Intact banana bunches were stacked without any packaging as the control. Fruits of the cultivar 'Embul' were subjected to 120 minutes vibration to simulate 100 km distance of travel. Although packing of banana hands in CFB resulted the least mechanical damage (5.9%) fruits lead to rapid ripening. Highest mechanical damage was found in the control (20.8%). Wrapping of individual bunches with Styrofoam sheets reduced the damage but packaging and handling costs were considerably high. Laying of Styrofoam sheets of 8 or 10 mm thickness as a cushioning material between the layers of bunches was found to be an appropriate method in terms of reducing mechanical damage. However, there were no significant differences of damage between two thicknesses 10 and 8 mm sheets, use of 8mm sheets reduced the cost of packaging. Therefore, considering the technical and economical feasibility, laying of 8 mm Styrofoam sheets in between banana bunch layers for long distance bulk transportation could be recommended under local conditions.

Keywords: Bulk packing, Embul banana, mechanical damage, postharvest losses, Styrofoam sheets

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