

EFFECT OF DIFFERENT PACKAGING METHODS ON TEMPERATURE BUILD UP AND PHYSICO-CHEMICAL PROPERTIES OF VEGETABLES DURING TRANSPORTATION

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Vegetables are highly perishable, and transportation is accountable for around 20% of the total postharvest losses in vegetables in Sri Lanka. This study was carried out to evaluate the effect of different packaging methods, temperature buildup and physico-chemical properties during transportation of selected vegetables. The above parameters along low country conventional vegetable supply chains were determined with regard to brinjal, okra and tomato packed in conventional packaging (polysacks and wooden boxes) and plastic crates. Temperature fluctuations inside packaging were recorded in 30 minutes intervals in both packaging methods. Physico-chemical properties of vegetables were assessed at the farmer and retailer of the channel. Physiological Weight Loss (PWL), colour, texture and Total Soluble Solid (TSS) were determined. There was a significant increase ($p < 0.05$) in temperature of all three crops in conventional packaging. Temperature increased from $27.30 \pm 0.91^\circ\text{C}$ to $32.94 \pm 1.42^\circ\text{C}$ in okra, $27.14 \pm 1.23^\circ\text{C}$ to $32.52 \pm 2.27^\circ\text{C}$ in brinjal and $26.18 \pm 1.12^\circ\text{C}$ to $30.15 \pm 1.47^\circ\text{C}$ in tomato. The increases in temperature were significantly higher in conventional packaging than in plastic crates for all crops. There was a significance difference ($p < 0.05$) with the packing method on PWL in all three crops. PWL was higher in poly sacks and wooden boxes than the plastic crates. The TSS significantly decreased in brinjal (3.82 ± 0.1 to $2.91 \pm 0.1^\circ\text{Brix}$) and increased in tomato (3.06 ± 0.2 to $3.37 \pm 0.4^\circ\text{Brix}$) and okra (4.56 ± 0.5 to $5.72 \pm 0.4^\circ\text{Brix}$) in all methods of packaging. Firmness value was significantly ($p > 0.05$) increased in brinjal and okra while it decreased in tomato. L^* value in colour significantly decreased, while a^* and b^* values had significantly increased in all types of crops and packaging methods. However, firmness, TSS, and colour values didn't show significant differences with packaging method. Packaging method increases temperature inside packaging and changes the physicochemical properties of the packed vegetables.

Keywords: Packaging, Perishables, Post-harvest loss, Temperature