Title Modified atmosphere packaging to improve shelf life of tomato fruit in Cambodia

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Citation ISHS Acta Horticulturae 804:453-458. 2008.

Keywords *Lycopersicun esculentum* L., ripening, fruit quality, genotypic trait, polymeric films, postharvest technology

Abstract

Tomato fruits cv. CLN1462A at the breaker stage were held in five types of commercially available polymeric films as modified atmosphere packaging (MAP) medium; 25 and 50 micron-thick low-density polyethylene (LDPE) and polypropylene (PP) and 25 micron-thick high density PE (HDPE) films. The fruits were held in MAP for 10 days to simulate prolonged transport and holding period and then transferred to open condition. Fruits continuously held in the open served as control. All MAP films delayed fruit reddening. No MAP film stood out as a better treatment to elicit this effect. However, thicker films (i.e. 50 micron thickness) promoted decay. In terms of weight loss, MAP had marked inhibitory effect. The 25 micron-thick LDPE and HDPE reduced weight loss more than the 25 micron-thick PP. In the follow-up experiment, the two promising films, 25 micron-thick LDPE and HDPE, were used for holding bigger volume of fruits that could compare with commercial condition. MAP again inhibited fruit reddening and weight loss. However, decay incidence was higher in HDPE than in LDPE, suggesting that for large volume of fruits, films less permeable to water vapor, such as HDPE, would be less advantageous since accumulation of free water inside the film increased, creating favorable condition for decay development. As the most promising MAP film, the 25 micron-thick LDPE was tested for the storage of fruits of two elite AVRDC varieties, TLCV15 and CLN1462A, and two local varieties, T56 and TMK1. MAP slowed down red color development and this effect was more dramatic in TLCV15, T56 and TMK1 than in CLV1462A which appeared to exhibit slower ripening rate among varieties. Similarly, MAP greatly reduced weight loss. The fruits lost less than 2% of their initial weight for every 3 days of storage whereas those held in the open lost 4% or more. CLN1462A fruits held in MAP lost the least weight among varieties. Decay incidence was low, with less than 10% of fruits samples being affected except for TMK1. At red-ripe stage, the physicochemical and sensory quality attributes of MAP fruits in all experiments did not deviate much from that of the control fruits.