

Effect of Postharvest Heating on Electrolyte Leakage and Fresh Weight Loss from Stored Muskmelon Fruit

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Exposure of muskmelon (*Cucumis melo* L. Group *reticulatus*) fruit to high temperatures at harvest causes sunburning, decreases firmness, lessens overall quality (2), and may accelerate fresh weight loss. The purpose of this study was to examine the effect of high prestorage temperatures on muskmelon fresh weight loss and on relative storage life measured as electrolyte leakage of shrink-film wrapped and nonwrapped fruit.

Local, commercially grown, full-slip 'Magnum 45' muskmelon with a mean fruit weight of 1.5 kg, free of defects, and harvested just after sunrise were treated with 1.98 ml·liter⁻¹ Imazalil (Janssen Pharmaceutica, Beerse, Belgium) for pathogen control (1). Wrapped (3) or nonwrapped fruit were placed in a Lab-line incubator (Lab-line, Melrose Park, Ill.) at 100% RH for 30 min to equilibrate to 45°C, then held for 1.5 or 3 hr at 45°C. Equilibration was determined by measuring the temperature of the mesocarp tissue 1 mm beneath the epicarp with a hypodermic needle thermocouple. Heated and nonheated control fruit were placed in ventilated, waxed containers at 4° ± 1° with 90% ± 5% RH for 0, 6, 12, or 18 days.

Fresh weight loss was calculated as a percentage of the initial postharvest fruit weight. Electrolyte leakage was determined on 20 equatorial region hypodermal-mesocarp tissue disks (10 × 1 mm) as previously described (3). Leakage was calculated by measuring the conductivity of a double-distilled water bathing solution after 1-hr incubation of disks at 21°C. Electrolyte leakage was expressed as a percentage of the total conductivity after homogenizing the fruit disks in the incubation solution and filtering it

through two layers of Miracloth (Calbiochem-Behring, LaJolla, Calif.).

Arcsin transformations of all percentage data were made and then analyzed by analysis of variance. All treatments were replicated three times with three fruit per replicate.

No loss of fresh weight was detected in any treatment immediately after wrapping or after heat treatment (Table 1). A difference in fresh weight loss between wrapped and nonwrapped fruit occurred during storage. Wrapped fruit, regardless of heat treatment, did not lose more than 0.8% fresh weight after 18 days of storage. Nonwrapped fruit weight loss ranged from 4.4% to 5.1% after 18 days of storage, depending on length of heating.

Electrolyte leakage of wrapped fruit increased after 1.5 hr at 45°C, but there was no difference between 1.5 and 3 hr (Table 2). However, in nonwrapped fruit, electro-

lyte leakage increased after all heat treatments. Electrolyte leakage increased significantly only in nonheated wrapped fruit. Electrolyte leakage of nonwrapped fruit generally increased with each additional 6 days of storage, regardless of heat treatment. Previously, no differences in the rate of quality loss of heated vs. nonheated muskmelon fruit were reported (2). Our data show that heat treatments had an immediate and significant effect on muskmelon fruit electrolyte leakage. Percent fresh weight loss in nonwrapped fruit was > 5% after 18 days storage, making them soft and unmarketable (3), and electrolyte leakage was greater in nonwrapped than wrapped fruit after 18 days of storage. Restriction of evapotranspiration during storage with shrink-film wrap allowed for no significant increase in fruit electrolyte leakage.

Protecting muskmelon fruit from heat at harvest coupled with shrink-film wrapping during storage should minimize electrolyte leakage and reduce fresh weight loss.

Literature Cited

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Table 1. Percent fresh weight loss from shrink-film-wrapped and nonwrapped 'Magnum 45' muskmelon fruit heated for 0, 1.5, and 3 hr at 45°C then stored for 0, 6, 12, and 18 days at 4° ± 1° with 90% ± 5% RH.

Hours at 45°C	Wrapped				Nonwrapped			
	Days of storage				Days of storage			
	0	6	12	18	0	6	12	18
0	0.0	0.5	0.7	0.8	0.0	1.5	3.1	4.4
1.5	0.0	0.4	0.6	0.8	0.0	1.9	2.9	4.8
3	0.0	0.4	0.4	0.6	0.0	2.1	3.5	5.1

Overall Fisher's protected LSD (1%) = 0.4.

Table 2. Percent electrolyte leakage from shrink-film-wrapped and nonwrapped 'Magnum 45' muskmelon fruit heated for 0, 1.5, and 3 hr at 45°C then stored for 0, 6, 12, and 18 days at 4° ± 1°C with 90% ± 5% RH.

Hours at 45°C	Wrapped				Nonwrapped			
	Days of storage				Days of storage			
	0	6	12	18	0	6	12	18
0	60.3	62.6	66.0	67.6	60.0	69.6	81.0	82.0
1.5	72.7	74.0	75.7	76.0	67.7	72.3	81.3	87.3
3	72.3	75.6	75.6	76.7	74.0	75.0	78.7	84.0

Overall Fisher's protected LSD (1%) = 4.8.

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