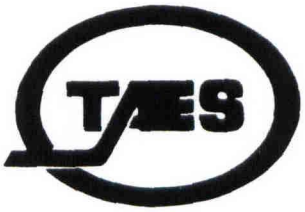

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THE TEXAS AGRICULTURAL EXPERIMENT STATION / Neville P. Clarke, Director / The Texas A&M University System / College Station, Texas

INFLUENCE OF POSTHARVEST PACKAGING ON STORAGE LIFE OF 'REDSKIN' PEACHES

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Peaches are a highly perishable commodity with a relatively short storage life, requiring refrigerated storage to maintain fruit quality. Extended storage of peaches at 34°F greatly reduces fruit quality (3). The quality factors most affected by extended cold storage are weight loss, internal browning, decreasing acidity and increasing soluble solids (2, 4).

Controlled atmosphere (CA) storage is widely used with other fruit crops to extend storage life time maintaining quality. However, the practice of CA storage for peaches has not been widely adopted (1). Studies were initiated in 1983 at the Texas A&M Agricultural Research and Extension Center, Overton to evaluate effects of packaging films and SO_2 emitters for modifying atmospheric storage conditons and extending storage life of peaches.

MATERIALS AND METHODS

Firm-ripe 'Redskin' peaches were harvested at the Texas A&M Fruit Research Station, Montague, Texas on August 22, 1983 and stored at 5°C overnight. Fruit were transported to Overton and sorted based on size,uniformity, ground color, blush, and firmness. Uniform lots of 14 fruit each were placed in 1-peck corrugated, open top, paperboard containers and weighed.

Study 1 - Open container vs film wrap. The containerized peaches were either left as open containers or enclosed in a low density polyethylene film containing 10% nylon, 1.5 mil thickness, with high CO_2 retention (designated as film 1). The film was heat sealed on all seams to create a modified internal atmosphere. Fruit were stored for 0, 5, 10 or 20 days at 1°C and 95% humidity. At each termination date fruit were weighed to determine weight (moisture) loss, then placed whole into polyethylene bags and frozen for later quality analysis. Soluble solids was determined using a hand - held refractometer. Titratable acidity (expressed as malic acid) was determined by titrating samples to pH 8.2 with 0.1 N NaOH. The study was a randomized complete block with 3 replicates and treatments assigned in

a 2 x 4 factorial.

Study 2 - Film type and SO_2. Peach containers were wrapped and sealed with either film 1 (described above) or film 2 (low density polyethylene, 1.5 mil thickness, with low CO_2 retention) with or without SO_2 emitters. The SO_2 emitters were made by enclosing .75 g of sodium metabisulfite in kraft paper. Fruit were stored for 0, 5, 10, or 20 days at 1°C and 95% humidity. Samples of the internal atmosphere of the containers were taken to monitor CO_2 and O_2 levels throughout the duration of the study. Gas samples were analyzed with a Hewlett-Packard 5750 gas chromatograph. The study was a 2 x 2 x 4 factorial, randomized complete block with 3 replicates.

RESULTS AND DISCUSSION

Study 1. Packaging method significantly affected fruit quality (Table 1). Peaches stored in film wrapped containers lost less weight (moisture) than those stored in open containers. Before values were adjusted to compensate for the concentrating effects of moisture loss, soluble solids and titratable acidity were higher when stored in open containers. However, when adjusted to compensate for the concentrating effects of moisture loss, soluble solids and acids were essentially the same for both packaging treatments.

Increasing holding time at 1°C reduced fruit quality (Table 1). As expected, weight loss increased with holding time and fruit shrivelling became apparent. Soluble solids increased and acidity declined during storage, indicating a continuation of the maturation process. However, part of the soluble solids increase was due to moisture loss and, when adjusted, rate of accumulation was reduced. Acidity, both adjusted and unadjusted, decreased during storage.

The interactive effects of packing treatment and storage time at 1°C indicated that peaches in film wrapped containers maintained higher quality during storage than peaches stored in open containers (Table 2). Fruit in sealed containers lost only 0.2% weight over 20 days, compared to 6.2% for those in open containers. Soluble solids remained fairly constant in peaches stored in film sealed containers, but increased in open containers. When soluble solids were adjusted to compensate for concentrating effects of moisture loss, the ripening trend of open- container packaged fruit was still evident. Titratable

acidity tended to decrease over time for both packaging treatments.

Study 2. Film type, with or without SO_2 emitters, had little effect on fruit quality (Table 3). Analysis of the internal atmospheres of the packages revealed that after 48 hours, atmospheric conditions remained fairly constant (Figure 1). Film 1 maintained an internal atmosphere of 2.25% CO_2 and 19.0% O_2, while Film 2 maintained 1.75% CO_2 and 19.0% O_2. Although there was a slight difference in CO_2 levels (0.5%) between film types, fruit quality was not greatly affected (Table 3). The SO_2 emitters (incorporated primarily as a sterilent to inhibit decay organisms) had no effect on fruit quality and no decay developed during the 20-day storage period in any treatment.

SUMMARY

'Redskin' peaches may be stored up to 3 weeks at 1°C in film sealed containers with minimal quality loss. Fruit stored in open containers had a poorer visual quality and tended to increase in soluble solids and decrease in acidity compared to sealed containers. Weight loss of peaches in unwrapped containers was up to 6.2% which caused shriveling of the fruit, decreasing visual quality. Film type had little effect on fruit quality or internal atmospheres of sealed containers.

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Table 1. Main effects of packaging treatment and holding time at 34° on quality of 'Redskin' peach.

Main effect	Weight loss (%)	Soluble solids (%) unadjusted[z]	Soluble solids (%) adjusted[y]	Titratable acidity (%) unadjusted	Titratable acidity (%) adjusted
Packaging treatment					
Open Container	2.5	13.9	13.5	0.82	0.80
Film wrapped	0.1	13.5	13.5	0.78	0.78
LSD @ 5%	0.2	0.3	NS	0.02	NS
Storage time (days)					
0	0.0	13.3	13.3	0.84	0.84
5	0.7	13.5	13.4	0.82	0.82
10	1.4	13.7	13.6	0.78	0.77
20	3.2	14.1	13.7	0.76	0.74
LSD @ 5%	0.3	0.5	NS	0.03	0.03

[z]Means are actual values.

[z]Means adjusted to compensate for the concentrating effects of moisture loss.

Table 2. Interactive effects of packaging treatment and holding time on quality of 'Redskin' peaches.

Packaging treatment	Holding time	Weight loss (%)	Soluble solids (%) unadjusted[z]	Soluble solids (%) adjusted[y]	Titratable acidity (%) unadjusted	Titratable acidity (%) adjusted
Open container	0	0.0	13.1	13.1	0.87	0.87
	5	1.2	13.5	13.3	0.83	0.82
	10	2.8	14.2	13.8	0.80	0.78
	20	6.2	14.7	13.9	0.78	0.73
Film wrapped	0	0.0	13.4	13.4	0.80	0.80
	5	0.1	13.5	13.5	0.82	0.82
	10	0.1	13.6	13.6	0.76	0.76
	20	0.2	13.4	13.4	0.75	0.75
LSD @ 5%		0.4	0.7	NS	NS	0.04

[z]Means are actual values.

[y]Means adjusted to compensate for the concentrating effects of moisture loss.

Table 3. Main effects of film type and SO_2 on quality of 'Redskin' peaches.

Main effect	Weight loss (%)	Soluble solids (%)	Titratable acidity (%)
Film type			
1	0.13	13.9	0.77
2	0.12	13.7	0.78
LSD @ 5%	NS	0.1	NS
SO_2			
with	0.14	13.8	0.77
without	0.12	13.9	0.78
LSD @ 5%	NS	NS	NS