

## Effect of Pre- and Postharvest Factors on Fresh Citrus Peel Breakdown

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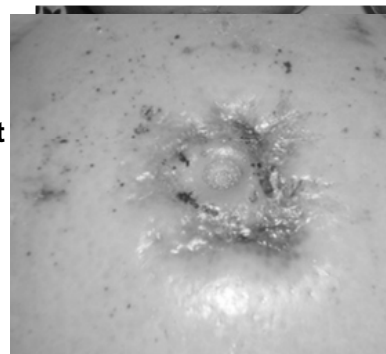
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## Background

- Peel problems on fresh grapefruit
- 2006-07
- 2007-08



## Possible Causes

- Water stress?
- Nutrient Imbalances?
- Sudden changes in relative humidity (“RH shock”)?

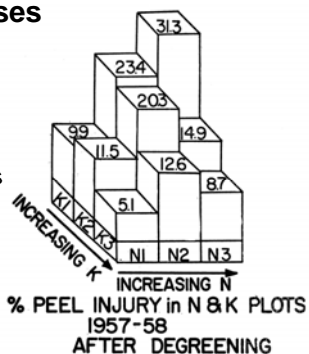


Figure 1. Peel injury as percentage of stem-end rind breakdown in Valencia oranges from Reitz & Koo nitrogen-potash plots. Each figure is the average of samples from four plots.

## Grove Treatments

- Treatments:
  - Control – normal grove practices
  - Withhold irrigation & rain (Feb. 8)
  - Foliar MKP Treatments (23.5 lb MKP/acre + 4 lb/acre low-biuret urea, 125 gal/acre:
    - Postbloom (May) + fall (Oct.), + pre-harvest (Jan.)
    - Postbloom (May) + fall (Oct.)
    - Postbloom (May) only
    - Pre-harvest (Jan.) only

## Results

- Block #1
  - Harvested before we could apply our final MKP treatment or take fruit samples for postharvest evaluations.
- Block #2
  - Harvested Jan. 2<sup>nd</sup> & 3<sup>rd</sup> and then again March 10<sup>th</sup>.
  - No significant treatment differences from either harvest.

## Results

- Fruit harvested 48 days after withholding water, held for 3 d at 70F (60% RH), washed (no wax), and then held under ambient conditions on the air-conditioned room floor ~73F.

Days after harvest	Treatment	Marketable (%)	Stem-end rot (%)	Penicillium (%)	Total decay (%)	Peel pitting (%)	Stem-end rind breakdown (%)	Total peel breakdown (%)
13	Control	91.33 a <sup>†</sup>	3.33	1.33	3.33	2.67	3.33	6.00 a
	Water def.	78.67 b	5.33	4.67	5.33	10.00	6.00	16.00 b
	Significance	*	NS	NS	NS	NS	NS	*
25	Control	81.00 a	4.67	1.33	5.33	3.33 a	13.00	14.33
	Water def.	60.00 b	15.33	6.00	17.33	11.33 b	13.33	24.00
	Significance	*	NS	NS	NS	*	NS	NS

<sup>†</sup>Values within each column followed by unlike letters are significantly different by Duncan's multiple range test at  $P \leq 0.05$ .

<sup>‡</sup>Irrigation and rain withheld for 49 days prior to harvest.

<sup>NS</sup>Non-significant or significant at  $P \leq 0.05$ , respectively.

## Results

- Fruit harvested two weeks after commercial MKP application, held for 4 d at 70F (60% RH), washed (no wax), and then held under ambient conditions on the air-conditioned room floor ~73F.

Harvest <sup>t</sup> (weeks)	Days after harvest <sup>t</sup>	Treatment	Marketable (%)	Total decay (%)	Pitting (%)	Stem-end rind breakdown (%)	Total peel breakdown (%)
2	25	Control	70.50 a*	1.00	1.00	27.50 a	27.50 a
		MKP	86.50 b	1.00	1.50	11.00 b	11.00 b
		Significance	**	NS	NS	**	**
3	27	Control	82.58	10.25	1.67	7.67 a	9.33 a
		MKP	85.70	9.66	0.67	2.64 b	2.97 b
		Significance	NS	NS	NS	*	*
4	12	Control	64.32 b	2.52	6.87	25.32 a	32.10 a
		MKP	72.89 a	3.19	4.61	18.89 b	23.50 b
		Significance	***	NS	NS	***	***

## Results

- Fruit harvested March 11, 2008, held for 3 d at 70F & indicated RH, given packingline treatments, then held under ambient conditions on the air-conditioned room floor ~73F. Evaluated 49 d after harvest.

Pre-run RH (%)	Packingline treatment	Marketable (%)	Stem-end rot (%)	Penicillium (%)	Total decay (%)	Pitting (%)	Stem-end rind breakdown (%)	Total peel breakdown (%)
30	Wax	24.51 d <sup>1</sup>	43.01 a	2.29 ab	51.16 a	16.23 a	13.44 a	23.90 a
55	Wax	35.29 d	46.25 a	4.62 ab	49.82 a	8.72 b	7.74 ab	14.89 ab
95	Wax	62.89 bc	26.41 abc	3.41 ab	29.75 b	0.50 de	6.85 ab	6.85 c
95	Wax + TBZ <sup>2</sup>	88.20 a	5.30 d	2.16 b	7.03 d	0.00 e	4.77 b	4.77 cd
95	Wax + Imazalil <sup>3</sup>	74.68 abc	20.48 bc	5.75 ab	22.94 bc	0.48 de	0.47 c	0.95 d
95	No Wax	76.51 ab	12.92 cd	0.95 b	12.98 cd	4.33 bc	6.22 ab	9.59 bc
95	No Rinse or Wax <sup>4</sup>	55.27 c	32.03 ab	12.94 ab	33.47 ab	1.92 cd	6.87 ab	8.79 bc
	Significance	***	***	NS	***	***	**	***

## Results

- Fruit harvested March 18, 2008, held for 3 d at 70F & indicated RH, given packingline treatments, then held under ambient conditions on the air-conditioned room floor ~73F. Evaluated 43 d after harvest.

Pre-run RH (%)	Packingline treatment	Marketable (%)	Stem-end rot (%)	Penicillium (%)	Total decay (%)	Pitting (%)	Stem-end rind disorders (%)	Total peel disorders (%)
30	Wax	58.50 c <sup>2</sup>	25.00 a	1.50 bc	28.00 a	2.50 ab	12.50 a	14.00 a
55	Wax	75.00 bc	20.50 ab	2.50 bc	21.00 ab	1.00 ab	2.50 c	3.50 c
95	Wax	73.50 bc	19.00 ab	1.50 bc	19.50 ab	1.00 ab	6.00 ab	7.00 abc
95	Wax + TBZ <sup>2</sup>	95.50 a	1.00 c	0.00 c	1.00 c	0.50 b	3.00 bc	3.50 bc
95	Wax + Imazalil <sup>3</sup>	79.00 b	10.00 b	0.00 c	10.50 b	3.50 ab	6.50 ab	9.50 ab
95	No Wax	61.50 bc	25.00 a	3.50 ab	26.50 a	5.00 a	7.00 ab	12.00 a
95	No Rinse or Wax <sup>4</sup>	66.50 bc	22.50 ab	7.00 a	23.50 ab	3.00 ab	7.50 ab	10.00 ab
	Significance	***	***	**	***	**	*	*

## Results

- Fruit harvested March 20, 2008, held for 4 d at 70F & indicated RH, washed (not waxed), then held under ambient conditions on the air-conditioned room floor ~70-73F.

Days after harvest	Treatment	Health (%)	Diplodia (%)	Total decay (%)	SERB (%)
20Days	Control	92.73	4.89	4.89	3.39
	Antitranspirant	96.49	1.99	1.99	1.51
	<i>P Value</i>	0.303	0.4431	0.4431	0.2972
46 days	Control	72.90	23.32	23.32	4.30
	Antitranspirant	83.43	13.07	13.07	3.97
	<i>P Value</i>	0.3378	0.3569	0.3569	0.952

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## Thank You!

