

Controlling Early Season Brown Rot on Fresh Citrus

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Acknowledgments

- Joe Smilanick (USDA)
- Jiuxu Zhang (FDOC)
- Megan Dewdney (UF)
- Cuifeng Hu
- Mac Hossain

Industry Partners:

- PACE International
- DECCO US Post-Harvest

Control Options



Diplodia stem-end rot

- Preharvest - No reliable replacement yet for Benlate or Topsin
 - Copper, Aliette, and Phosphorous acid products to reduce Brown rot
- Postharvest control measures
 - Good sanitation practices
 - Careful handling
 - Use of fungicide
 - Must be effective against latent organisms such as Diplodia and Anthracnose

Currently Registered Fungicides for Postharvest Citrus Treatments

- Thiabendazole (TBZ)
- Imazalil
- Sodium o-phenylphenate (SOPP)
- Fludioxonil (Graduate)
- Fludioxonil + Azoxystrobin (Graduate A+)
- Pyrimethanil (Penbotec)
- Potassium Phosphite (KPHOS & Fungi-Phite)

Postharvest Fungicide MRLs

Chemical Name	U.S. (Citrus)	Canada (Citrus)	CODEX (Citrus)	EU (Citrus)	Japan (G & O)	Taiwan (G & O)	Korea (G & O)
Azoxystrobin	15	10	15	15	10	10	7 (G); 5 (O)
Fludioxonil	10	10	10	10	10	5	10 (G); 5 (O)
Imazalil	10	5	5	5	5	2	5
Pyrimethanil	10; 11 (L)	10	7	10	15	7	1
SOPP (2 Phenylphenol, O-phenylphenol)	10	10	10	5 (valid until 9/30/14)	10		10
Thiabendazole (TBZ)	10	10	7	5	10	10	10
Potassium Phosphite	Exempt	Exempt	?	75	No Food Additive Status	?	?

Brown Rot



Brown rot

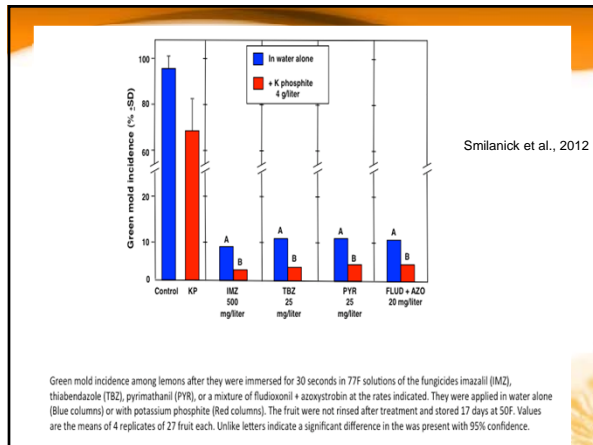
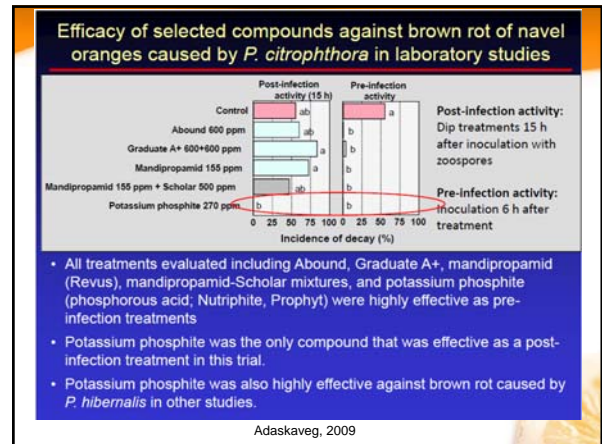
- *Phytophthora* species
- Often appears from mid-August until rainy periods cease
- Preharvest control methods:
 - “Usually, a single application of Aliette, Phostrol, or ProPhyt before the first signs of brown rot appear in late July is sufficient to protect fruit through most of the normal infection period.” Provides 60-90 days control.
 - Copper fungicides “may be applied in August before or after brown rot appearance and provide protection for 45-60 days.”

TABLE 2
Effect of Fosetyl-aluminium in Aqueous Solution on the Incidence of Brown Rot in Four Citrus Fruit Varieties* (Packing house treatment applied 1, 2 and 3 days after laboratory inoculation)

Fruit variety	Fosetyl-aluminium ^b (g litre ⁻¹)	Decay (±s.d.) (%)		
		Time between treatment and inoculation (days)		
		1	2	3
Grapefruit	0	11.9 (±2.4)	17.7 (±4.0)	70.9 (±11.6)
	7.5	3.3 (±1.5)	3.9 (±1.3)	38.4 (±4.1)
Shamouti orange	0	24.9 (±12.4)	66.0 (±3.4)	43.6 (±7.2)
	6.0	10.8 (±4.1)	17.3 (±4.3)	18.1 (±5.5)
Mineola tangerine	0	0.2 (±0.4)	2.3 (±4.5)	11.9 (±8.3)
	7.5	0.2 (±0.4)	0.2 (±0.4)	2.2 (±0.8)
Late Valencia orange	0	11.0 (±5.7)	44.7 (±4.2)	62.9 (±6.2)
	4.0	2.0 (±0.6)	12.6 (±4.9)	22.6 (±5.3)
	8.0	1.5 (±1.0)	7.2 (±1.0)	8.4 (±1.2)

^aData recorded after 30 days storage at 11°C+7 days of shelf life at 17°C.
^bThe fosetyl-aluminium was added to the normal treatment which incorporated thiabendazole.

Cohen, 1987



2013 FL Experiments

- Murcott
- Fruit inoculated 36 hrs before dipping into the treatment solutions for 30 sec.

14 d after inoculation

Treat	Total Decay (%)	Brown Rot (%)	Diplodia (%)
Dry Control	40.00 a	27.50 a	12.50 a
Control	30.00 a	17.50 b	11.88 a
TBZ (250 ppm)	18.13 b	15.63 bc	1.88 b
Fludioxonil (300 ppm)	17.63 b	13.22 bcd	4.41 b
KPHOS (1.2%) + TBZ (250 ppm)	10.72 b	6.25 cde	3.16 b
KPHOS (1.2%)	7.50 b	3.13 e	4.38 b
KPHOS (1.2%) + Fludioxonil (300ppm)	5.63 b	4.38 de	0.63 b
Temperature			
72F	22.31 a	14.81 a	7.50 a
120F	9.04 b	6.28 b	1.69 b

Thank You!

- For more information, visit the UF Postharvest Website

<http://irrec.ifas.ufl.edu/postharvest/>