Investigating the Potential of the Sulfur Dioxide (SO_2) Pad for Decay Control of Brown and Yellow Color Figs

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Objective Evaluate decay incidence and phytotoxicity of the use of SO_2 pad on dark and yellow color figs.

Material and Methods

'Brown Turkey' (dark skinned) and 'Kadota' (yellow skinned) figs were used to determine the effect of a sulfur dioxide-generating sheet (SO_2 pad) on the quality and decay of fresh figs during cold storage at 32°F for 33 and 24 days, respectively. All of the fruit were placed in trays inside microperforated box liners (Xpedex, Fresno, CA, USA) in corrugated metric size boxes stored at 32°F. Half of the boxes had no SO_2 pad (control) and half had a UVASYS SO_2 pad (Grapetek (Pty) Ltd., Epping, South Africa) placed inside the box liner directly on top of the tray of fruit. For 'Brown Turkey', 6 boxes of 25 fruit per treatment were prepared (total 300 fruit) and for 'Kadota', 3 boxes of 48 fruit per treatment were prepared (total 288 fruit).

Fruit quality was evaluated after 15 and 33 days storage at 32°F for 'Brown Turkey', and 13 and 24 days for 'Kadota'. SO_2 pads were removed and control and treated figs were stored at 68°F for shelf life evaluation, for up to 4 days after cold storage for both cultivars. Fruit quality parameters evaluated included percent of sound fruit (commercial fruit), percent of fruit with decay, percent of fruit with off color (color not typical for the cultivar), percent of fruit with growth cracks, percent of fruit with splits, and percent of fruit with other blemishes.

Conclusions

- Firmness was not affected by SO_2 pad treatment in 'Brown Turkey' nor 'Kadota' (Table 1, 2, & 4).
- The treatment with SO_2 pad produced higher percent of sound fruit after cold storage at 32°F (Table 2 & 4).
- In 'Brown Turkey', the SO_2 pad in reduced the percent of decay during the first 2 days of shelf life after cold storage and increased the percent of sound fruit after the first day of shelf life after cold storage (Table 1).

- In ‘Kadota’, the SO_2 pad reduced the percent of off color figs during the first 2 days of shelf life after cold storage (Table 3).

Table 1. Effect of storage for 15 days at 32°F with a SO_2 generating pad on ‘Brown Turkey’ fig firmness and quality measured during shelf life (68°F).

Time/Treatment		Firmness[X] (lb)	Sound (%)	Decay (%)	Off color (%)
15 days at 32°F +1 day at 68°F					
Control		--	34.0	44.0	28.0
	(St Dev.)	--	(2.8)	(5.7)	(5.7)
SO_2 pad		--	59.4	26.3	28.6
	(St Dev.)	--	(16.1)	(13.7)	(0.8)
15 days at 32°F +2 days at 68°F					
Control		1.1	0.0	88.0	88.0
	(St Dev.)	(0.5)	(0.0)	(0.0)	(5.7)
SO_2 pad		1.2	0.0	73.4	71.3
	(St Dev.)	(0.3)	(0.0)	(3.7)	(12.4)
P-value		0.7843	--	--	--
LSD 0.05%		NS	--	--	--
15 days at 32°F +4 days at 68°F					
Control		--	0.0	98.0	98.0
	(St Dev.)	--	(0.0)	(2.8)	(2.8)
SO_2 pad		--	0.0	100.0	98.0
	(St Dev.)	--	(0.0)	(0.0)	(2.8)

[X] ‘Brown Turkey’ firmness at harvest= 1.8 lb

Table 2. Effect of adding a SO_2 generating pad after 33 days at 32°F on the firmness and quality of 'Brown Turkey' fig measured immediately after storage and during shelf life (68°F).

Time/Treatment	Firmness[X] (lb)	Sound (%)	Decay (%)	Off color (%)	Growth cracks (%)	Splits (%)	Blemishes (%)
33 days at 32°F							
Control	1.4	0.0 b	96.0	50.0	1.0	13.0	21.0
SO_2 pad	1.7	9.0 a	74.0	32.0	6.0	16.0	19.0
P-value	0.4068	0.0117	0.0644	0.6217	0.1210	0.7710	0.9142
LSD 0.05%	NS	6.2	NS	NS	NS	NS	NS
33 days at 32°F +1 day at 68°F							
Control	--	0.0	100.0	100.0	0.0	0.0	0.0
SO_2 pad	--	0.0	98.8	98.8	0.0	0.0	0.0
P-value	--	--	0.3559	0.3559	--	--	--
LSD 0.05%	--	NS	NS	NS	NS	NS	NS

[X] 'Brown Turkey' firmness at harvest= 1.8 lb

Table 3. Effect of adding a SO_2 generating pad after 13 days at 32°F on the quality of 'Kadota' fig measured during shelf life (68°F).

Time/Treatment	Sound (%)	Decay (%)	Off color (%)
13 days at 32°F +1 day at 68°F			
Control	29.2	0.0	70.8
SO_2 pad	77.1	0.0	20.8
13 days at 32°F +2 days at 68°F			
Control	25.0	0.0	75.0
SO_2 pad	68.8	4.2	31.3
13 days at 32°F +4 days at 68°F			
Control	12.5	87.5	75.0
SO_2 pad	4.2	87.5	100.0

Table 4. Effect of adding a SO_2 generating pad after 24 days at 32°F on the firmness and quality of 'Kadota' fig measured immediately after storage and during shelf life (68°F).

Time/Treatment		Firmness[X] (lb)	Sound (%)	Decay (%)	Off color (%)	Growth cracks (%)	Splits (%)	Blemishes (%)
After 24 days at 32°F								
Control		1.7	3.9	73.7	9.2	34.2	43.4	60.5
	(St Dev.)	(0.8)	(1.9)	(29.8)	(5.6)	(7.4)	(5.6)	(18.6)
SO_2 pad		1.7	50.0	3.9	6.6	27.6	36.8	40.8
	(St Dev.)	(1.4)	(11.2)	(1.9)	(1.9)	(13.0)	(7.4)	(13.0)
P-value		0.8629	--	--	--	--	--	--
LSD 0.05%		NS	--	--	--	--	--	--
24 days at 32°F +1 day at 68°F								
Control		1.9	2.6	72.4	55.3	34.2	57.9	86.8
	(St Dev.)	(0.7)	(3.7)	(9.3)	(59.5)	(7.4)	(7.4)	(18.6)
SO_2 pad		1.3	1.3	51.3	85.5	27.6	63.2	40.8
	(St Dev.)	(0.5)	(1.9)	(50.2)	(16.7)	(13.0)	(14.9)	(13.0)
P-value		0.0607	--	--	--	--	--	--
LSD 0.05%		NS	--	--	--	--	--	--
24 days at 32°F +2 days at 68°F								
Control		--	3.0	87.9	93.9	39.4	66.7	100.0
	(St Dev.)	--	(4.3)	(0.0)	(4.3)	(8.6)	(8.6)	(21.4)
SO_2 pad		--	1.5	83.3	87.9	31.8	72.7	47.0
	(St Dev.)	--	(2.1)	(6.4)	(12.9)	(15.0)	(17.1)	(15.0)
24 days at 32°F +3 days at 68°F								
Control		--	3.0	95.5	90.9	39.4	66.7	100.0
	(St Dev.)	--	(4.3)	(6.4)	(8.6)	(8.6)	(8.6)	(21.4)
SO_2 pad		--	1.5	95.5	93.9	31.8	72.7	47.0
	(St Dev.)	--	(2.1)	(2.1)	(4.3)	(15.0)	(17.1)	(15.0)

[X] 'Kadota' firmness at harvest= 4 lb