

DOES ZINC PLAY A ROLE IN REDUCING PULP SPOT?

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PRELIMINARY REPORT

Ca-related disorders of cold stored avocado fruit arise mostly from internal Ca distribution problems and its allocation between mature and growing regions of the plant (Whitney, Wolstenholme and Hofman, 1986). In fruit and vegetables, Shear (1975) listed 35 physiological disorders associated with Ca nutrition, Poovaiah (1985) emphasised the Ca nutrition of target organs such as fruit, rather than whole plant nutrition.

Results obtained by Testoni and Pizzocaro (1980) suggest that zinc has a synergistic effect on the penetration and accumulation of Ca in the tissues of apples. Chvapil (1973) reported that zinc is tightly bound to all membranes in leaves and that it has the greatest affinity for membranes followed by Cu, Fe and Ca. These findings indicate that foliar sprays of Zn or Cu may release bound Ca from various chelating and complexing agents (lignin, organic acids, proteins) for transport to the fruit. Faust and Klein (1974) were able to exchange most of the Ca in apple fruit tissue with Zn, and showed that the remaining 10 per cent of the Ca was biologically active as measured by respiration or by C-valine uptake.

Chvapil (1973) reports considerable evidence that Zn may increase the stability of membranes. Shear (1980) also speculated that increases in Zn-status in fruit may increase fruit quality.

Fuerte avocado fruit was collected from the commercial line of the packhouse at Westfalia Estate and stored at 5,5°C for 28 days. The fruit then ripened at room temperature, was bisected longitudinally and inspected visually for pulp spot. Samples for analysis consisted of five avocados (four replications), showing pulp spot and the same number of fruit found to be free of pulp spot (control). The fruits were analysed for Ca, Mg, K, Zn and B. Fruits without pulp spot were obtained from the same carton in which the pulp spot affected avocados were collected. Analyses were conducted at the NTC laboratory, Potgietersrust.

TABLE 1 Ca, Mg, K, Zn and B contents (ppm) and the Ca/Mg ratio of fruit with and without pulp spot

	Replicate	Ca	Mg	Ca/Mg	K	Zn	B
Fruit without pulp spot (control)	A	74	326	1:4,4	4676	16	79
	B	60	276	1:4,6	4532	17	79
	C	72	326	1:4,5	4548	16	72
	D	59	276	1:4,6	6014	17	94
Mean		66,25	301		4942,5	16,5	81,0
Fruit with pulp spot	A	43	332	1:7,7	4888	9	102
	B	47	282	1:6	5426	10	72
	C	57	332	1:5,8	4492	7	79
	D	59	228	1:3,8	5544	10	72
Mean		51,5	293,5		5087,5	9	81,25
Significance		P = 0,05	NS		NS	P = 0,01	NS

In this preliminary experiment, statistically significant differences were obtained (Table 1) regarding the Zn ($P = 0,01$) and Ca ($P = 0,05$) contents of the fruit. From the results it was evident that fruit without pulp spot had a higher Zn and-Ca content than fruit with pulp spot (Table 1). The Ca/Mg ratio for fruit without pulp spot was generally lower (exception D) than fruit with pulp spot. These results correlated with the speculations made by Shear (1980) and warrant further investigation. It might have been that because of the higher Zn content, more bound Ca was released from various chelating and complexing agents for transport to the fruit. It could

then follow that because of the higher content of mobile or active Ca, less physiological disorders were found,

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