SUMMARY

Title: The testing of specific pre- and post-harvest treatments for reducing the Incidence of chilling injury in pineapple

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Internal Browning disorder in pineapple, encountered during prolonged cold storage, is a major obstacle to long distance export of fruit under sea freight. In the present study, the internal browning of fruits of two pineapple cultivars was investigated with the view of, a) further understanding the development process and associated events which was expected to provide clues to overcome the problem, and b) establishing suitable post-harvest physical treatments that induce tolerance to disorder and reduce its incidence. Fresh fruits harvested from Gampaha area at mature, 100% green stage were immediately transported to the University of Peradeniya for storage trials at 10 C and 85% Relative Humidity. The fruits removed following cold storage (usually 21 days) were kept for two further days at room temperature before they were examined for internal browning symptoms. The extent of IB was assessed using a scale. There was a clear difference in the time of incidence of internal browning and the pattern of symptom development between the two cultivars. The cultivar *Kew* was relatively more resistant to the disorder than *Mauritius* under similar storage conditions. Both cultivars when harvested early at 100% green stage developed lesser browning symptoms. Brief heat treatment in the form of a hot water dip immediately after

harvest was found to induce fruit tolerance to internal browning in both cultivars and the best temperature-time combination was 38°C for 60 minutes. The treated fruits developed 80% and 40% lesser browning in the flesh and core region respectively. The overall reduction of internal browning was about 55-60%. The results obtained from trials at different temperature-time combinations suggested that an internal tissue temperature of 36-38°C following heat treatment is a prerequisite for induction of fruit tolerance. Although heat treatment significantly reduced internal browning, it slowed down fruit ripening and associated changes and increased water loss compared to untreated controls. However, providing Modified Atmosphere conditions to heat-treated fruits during cold storage enhanced cold tolerance by another 5% and resulted in lesser water loss, hence better appearance. The mechanism of induction of fruit tolerance following heat treatment appears to be through production of Heat Shock Proteins. It is possible that the cellular repair mechanisms following cold injury may be taking place in treated fruit more rapidly. Pre-storage low-temperature treatments alone or in combination with a brief heat treatment and also intermittent warming of fruits during the cold storage regime were also found to be effective in reducing the extent of internal browning in the cultivar *Mauritius*.

Post-harvest heat treatment at 38°C for 60 minutes followed by storage of fruits in polyethylene bags under Modified Atmosphere conditions at 10°C could be recommended for partial control of internal browning in pineapple.

Communications made on work done under the contract:

Weerahewa, D., Dharmasiri, S. and Adikaram, N.K.B. (1998). Study of internal browning and some associated physico-chemical parameters in two pineapple cultivars during cold storage. *Proceedings of the Annual Research Sessions of the University of Peradeniya*, p30 (Abs.).

Weerahewa, D. and Adikaram, N.K.B. (1999). Postharvest heat-shock reduces internal browning of pineapple cv. *`Mauritius'* and *`kew'* during cold storage. *Proceedings of the Annual Research Sessions of the University of Peradeniya*, p29 (Abs.).

Darshani Weerahewa and N. K. B. Adikaram (2000). Heat treatment followed by MA storage reduces the internal browning of pineapple during cold storage. *Proceedings of 56th Annual Sessions f the Sri Lanka Association for the Advancement of Science, Peradeniya*, p70 (Abs.).