Objectives and Rationale

- To determine if internal heat damage in Laetitia plums can be expressed within 3 to 5 days after harvest using rapid cooling as a prediction method.
- To determine if the expression of internal heat damage can be reduced or eliminated in Laetitia plums by SmartFreshSM and/or slower cooling rates.

Methods

Objective 1

Laetitia plums that were exposed to heat waves to the extent that external heat damage was visible were harvested. Fruit were cooled rapidly (within 6 hours) or slowly (within 24 hours) to -0.5 °C. Fruit were then stored for 3 and 2 days, respectively for each cooling rate and the examined for internal heat damage. A second examination was conducted again after 2 days at 20 °C.

Objective 2

Fruit from the same source used for objective 1 were cooled within 6, 24, 48 or 72 hours. Half of the fruit of each treatment, except for the 6 hour cooling treatment, was treated with SmartFreshSM. Fruit cooled within 6 hours was added as a reference treatment. After cooling the fruit was cold stored at a 42 day PD 7 dual-temperature regime and subsequently quality examined before and after 5 days shelf life.

Key Results

Objective 1

Internal heat damage was detected in fruit after the cooling treatments and a further 2/3 days at -0.5°C. The levels were significantly higher if plums were cooled within 6 hours, compared to 24 hours. The heat damage levels were also significantly higher after the 2 days ripening at 20°C, compared to directly after cooling.

Objective 2

- Fruit cooled within 24 hours and treated with SmartFreshSM were significantly firmer than fruit from other treatments after cold storage.
- Laetitia plums cooled within 6 and 24 hours developed significantly more internal heat damage compared to fruit cooled slower.
- SmartFreshSM did not reduce the expression of internal heat damage after cold storage, but did reduce gel breakdown, skin cracks and gave firmer fruit.
- 48 and 72 hours slow cooling plus SmartFreshSM gave best overall fruit quality after cold storage, however, after shelf life the slower cooling exhibited slightly higher shrivel levels.

Conclusion and Discussion

The results confirmed that rapid cooling can exacerbate internal heat damage in Laetitia plums. Modifications to the rapid cooling prediction model that was tested in the previous
year proved successful. This must be confirmed with ongoing research. In addition, pack house can evaluate the method or contact ExperiCo for assistance.