ENDFOODWASTE
COOPERATIVE RESEARCH CENTRE

FACT SHEET

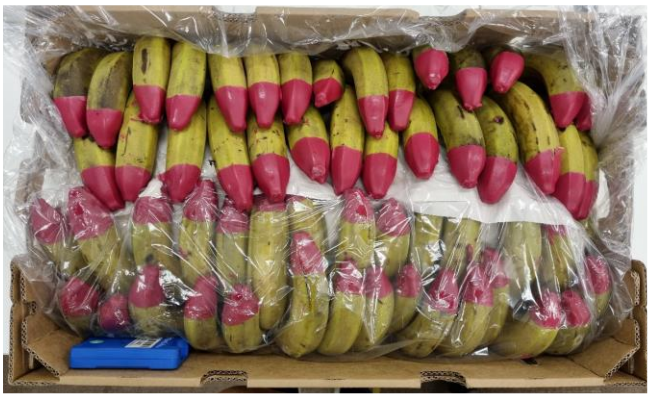
REDUCING BANANA CHILLING DAMAGE DURING TRANSPORT

THE **CHALLENGE**

'Williams' Cavendish banana fruit develop under peel chilling injury when exposed to <13°C. This can occur during winter production or when fruit are stored and transported too cold. The severity of chilling injury is a function of exposure time and temperature.

Bananas are at risk of developing chilling injury during storage and transport with other commodities that have a lower holding temperature requirement. When handling mixed commodity consignments, priority is usually given to maintaining the most perishable items at the lowest safe temperature. Mixed loads are common at retail distribution centres, during delivery to stores or airfreight export consignments.

Banana airfreight consignments may be kept at <5°C if packed with sensitive berries and vegetables that need to be kept cold. This can result in severe chilling injury and render the fruit as unmarketable.



Chilling injury symptoms in export Ecoganic® bananas.

OUR **PLAN**

Where low temperature storage environments cannot be avoided, insulated packaging may be used to protect bananas from getting too cold. We tested the capacity of readily available packaging materials to slow down rates of fruit cooling in a 5°C storage room. Products showing the most potential included:

- Styrofoam boxes with a wall thickness of 27mm
- Kingspan® Air-cell insulated liner

THE **IMPACT**

Transferring green bananas in cardboard boxes lined with the industry standard perforated polyethylene film from a 15°C to 5°C room was associated with rapid fruit cooling to 12°C in 2-3 hours.

Wrapping cardboard boxes of green bananas in a layer of Air-cell insulation delayed the drop in fruit temperature to 12°C by 3 hours and to 10°C by 6-7 hours.

Placing green bananas inside Styrofoam boxes further delayed fruit reaching 12°C by 19 hours and to 10°C by 30 hours, relative to fruit in cardboard boxes.

This means that, when transported at 5 °C, bananas packed in Styrofoam boxes (net load per box: 22.5 kg) are likely to remain warm enough during flights of less than 19 hours and to avoid chilling injury.

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HOW TO **USE**

Repacking into Styrofoam boxes

Bananas are repacked into Styrofoam boxes with foam liners. Handling in air-condition.

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Put lids on and seal with tapes. Boxes are ready for loading with other produces.

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Open the lids when freight is finished. Store at 14°C for green or delayed ripening fruits; 20-23°C for ripe ones.

Wrapping with an insulation sheet

Cover a whole box with an insulation sheet. Folded the edge of the sheet.

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Seal the edges with tapes and boxes are ready for mix load with other produces.

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Remove the insulation sheets ASAP when chill airfreight is finished. Keep fruits at 14°C for green or delayed ripening ones; 20-23°C for ripe fruits.

Other **Considerations**

Once the shipment lands, transfer bananas into a 14–15°C environment without delay. Budget for extra staff to unpack and, if necessary, re-pack the cartons. Removing the fruit from its insulated liners immediately on arrival prevents heat build-up and excess CO_2, protecting both quality and shelf-life

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PACIFIC COAST ECO BANANAS

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ACKNOWLEDGEMENTS

This work has been supported by the End Food Waste Cooperative Research Centre, whose activities are funded by the Australian Government's Cooperative Research Centre Program, plus co-investment from DPI and Pacific Coast Produce.

"…ending food waste starts with all of us."

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