Extending the Availability of Late-season Honey Gold Mangoes

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Research trials demonstrated that controlled atmosphere technology can extend the storage life of late-season 'Honey Gold' fruit, so growers who harvest in February can potentially sell in March at higher prices.

The Opportunity

Extending the season for late-maturing 'Honey Gold' mangoes from central Queensland is a key objective for Piñata Farms. We evaluated several postharvest technologies aimed at extending mango shelf life, including the application of edible coatings and treatment with SmartFresh™ (1-methylcyclopropene). However, these treatments did not show consistent benefits. Consequently, we selected controlled atmosphere (CA) storage. CA, when combined with an optimum storage temperature, has been demonstrated to prolong the storage life of other Australian mango varieties such as Calypso®, 'Kensington Pride' and 'R2E2'. No studies have yet examined CA storage for the 'Honey Gold' variety.

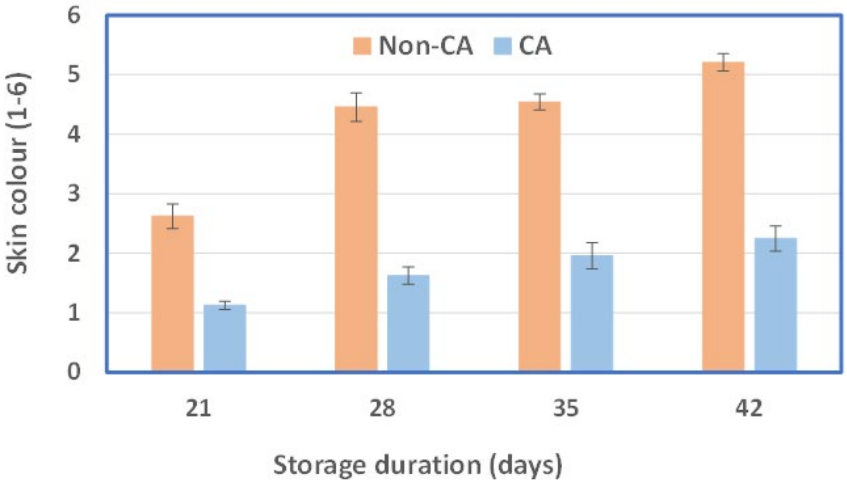
What We Did

'Honey Gold' fruit were sourced from the Bundaberg region, central Queensland, in January 2025 and stored at 12°C under CA conditions of 2% O^2 and 5% CO_2 or regular air (non-CA) for 21, 28, 35, and 42 days. Fruit quality and shelf life were then assessed at 20°C and 65% relative humidity. This article summarises the preliminary findings and potential benefits of CA storage for growers and marketers. Key findings included:

- Storage of 'Honey Gold' mangoes under a CA of 2% O^2 and 5% CO_2 at 12°C significantly delayed fruit ripening relative to samples stored in regular air (non-CA)
- CA treatment for 21-28 days was feasible, ensuring fruit retained a rubbery to early sprung stage of firmness and 70-90% green skin during storage and then delivered at least 10 days of shelf life at 20°C
- The benefits of CA storage were greatest for fruit sourced late in the season from the Bundaberg region
- There was no difference in eating quality between CA and non-CA stored fruit
- CA treatment limited the development of body and stem-end rots during storage but there was minimal difference in rot incidence by the end of shelf life for CA and non-CA fruit.

CA Delayed Skin Colour

CA storage modifies the atmosphere to slow down metabolic processes, including skin colour development. Fruit maintained under a CA at 12°C retained a colour score of 1-2 (10-30% yellow skin) for up to 35 days of storage whereas those held in regular air at 12°C reached a colour score 4-5 (50-90% yellow skin).



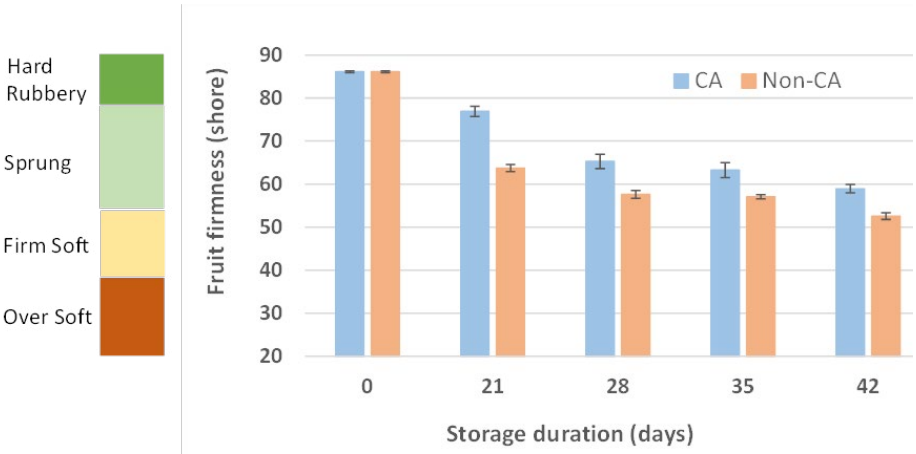
Subjective skin colour of fruit at removal from storage at 12°C under CA vs non-CA.



Honey Gold skin colour after 21 and 42 days at 12°C under non-CA and CA storage.

CA Retained Fruit Firmness

CA storage consistently showed strong benefits over non-CA (air) storage in retaining fruit firmness. At harvest, all fruit were typically at the 'Hard' stage. CA fruit slowly softened to 'Rubbery' and 'Sprung' stages during storage for up to 42 days. In contrast, non-CA fruit softened more rapidly approaching 'Firm Soft' eating ripe stage within 28-35 days of storage.

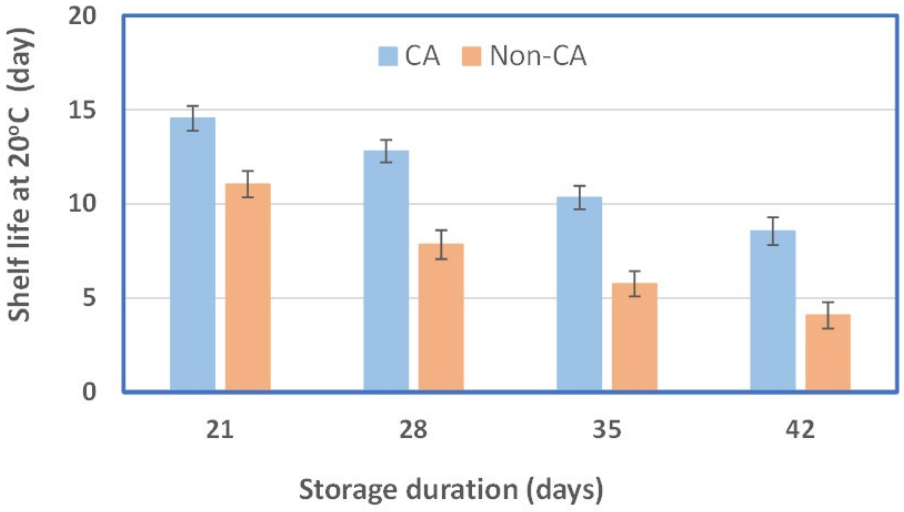


Durometer firmness of fruit at removal from storage at 12°C for 21, 28, 35 and 42 days under CA vs non-CA.

CA Extended Fruit Shelf Life

In general, the longer the storage duration, the less shelf life that remained. However, on average, fruit stored under a CA delivered 4.4 days more shelf life at 20oC than those stored in air. CA fruit exhibited at least 10 days of shelf life following removal from storage durations of up to 35 days. In contrast, once non-CA storage durations exceeded 21 days, the remaining shelf life was less than 8 days, which does not allow enough time for retail logistics to meet consumer expectations.

In summary, CA technology is a potential solution for extending the storage and shelf of 'Honey Gold' mangoes. However, this is a preliminary result and needs further testing to confirm the findings. Piñata Farms are undertaking commercial scale trials this season.



Shelf life at 20°C after removal from storage at 12°C for 21, 28, 35 and 42 days under CA vs non-CA.

"We are excited by the outcome from this research as it could make a real difference to the ongoing profitability of our late season growers. If we can extend the sales window by even 2 weeks that enables us to collectively produce another 200,000 trays to be sold over the extended window. Consumers also win by having really good eating mangoes available well into March."

GAVIN SCURR
MANAGING DIRECTOR
PIÑATA FARMS

Economic Impact

An independent economic analysis was conducted to quantify the impact on business profit from adopting CA storage practice. Working with late-season mangoes, the team showed that applying a CA in combination with standard 12°C storage could extend fruit availability in the market by 3-4 weeks. For Queensland business, Piñata Farms who supply about 100,000 trays of 'Honey Gold' mangoes per week, the trial findings could prompt them to plant more trees to supply additional fruit at the end of the season and potentially command a 20-30% price premium. The return on investment of such an approach has been estimated at as high as 10:1 accounting for the potential increase in revenue less the cost of applying CA storage.

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