Recent advances in shelf-life extension for the rubus and blueberry growers

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Implementing appropriate postharvest practices can improve product quality and consistency to the customer, reduce product losses, and ultimately save growers money.

Current supply chains focus heavily on cool chain management to preserve fruit quality. Before investing time and money in expensive post-harvest systems and solutions, growers are encouraged to undertake a simple cold chain audit to check the health of their temperature management systems and pathways. This can be done by placing temperature, time and GPS trackers inside punnets at picking so the air temperature the fruit is being exposed to can be traced by time and location from the field to arrival at retail.

Once growers have sorted out the cold chain pathway, growers can look to incorporate more advanced technologies to further improve storage and shelf-life. The use of postharvest preservation technologies has been well studied in strawberries, but to date little research has been conducted on how these technologies can be applied to higher value berry fruit like raspberries, blackberries and blueberries.

Nha Huynh, PhD candidate at the University of Tasmania, has recently reviewed advances in berry shelf-life technologies, and is investigating how they can be used to improve the shelf life of raspberries, blackberries, blueberries and other complex berries.

In her review, Nha documents the drivers of quality loss in these complex fruits, including physical structure, cuticle structure, acid content and internal chemistry. In particular, blueberries have a simple spherical structure and thick cuticle that make them resilient against minor impact damage and reduce dehydration but have a waxy bloom on the epicuticle that must be preserved to maintain quality market acceptability. In contrast, raspberries, blackberries and other members of the Rubus genus have complex structures and soft skins, making them highly susceptible to impact damage, compression damage, and dehydration.

With the physical limitations of each fruit species in mind, Nha documents the different physicochemical treatments available to the food industry to preserve berry quality and reduce the incidence of fruit decay. These include heat treatments, sanitisation, different types of ultraviolet (UV) irradiation, and the application of thin edible coatings.

The review noted that the most promising new technologies to preserve shelf life of raspberries and blackberries are gaseous sulphur dioxide and chlorine dioxide, which are still in the early research stage.

These compounds are antimicrobial agents and their gaseous form provides good coverage around and inside drupelets. Whilst not yet registered for commercial use on raspberries and blackberries, this tool is used by some blueberry growers and can be readily adopted by industry through Sulphur dioxide releasing pads. More complex technological options were unsuited for use by industry as fruit is increasingly directly picked and sorted into punnets.

SEE PAGE 52 for the article Raspberry Rescue – Increasing storage life with SO_2 sheets by Dr Jenny Ekman, Research Scientist, Applied Horticultural Research

For blueberry growers, UV-B (medium wave) irradiation was identified as a potentially suitable antimicrobial technology. Able to be applied directly to the fruit in the packhouse as they travel and rotate across a grading line, UV-B irradiation can be used for microbial sterilisation without requiring additional handling, chemical application or causing fruit damage.

Whichever treatment or technology or combination a grower chooses to implement, the review notes that consideration should be given to coupling physicochemical treatments with advanced packaging materials like modified atmosphere packaging (MAP) liners and active packaging to further extend berry shelf life.

These materials can be used to prevent the build-up or loss of key gas substrates, minimising excessive moisture loss, and slowing sugar and acid respiration, slowing internal respiration and degradation processes and extending berry quality.

An example of this is the use of MAP pallet liners, which prolong the efficacy of ethylene control and gaseous substrates more effectively. This approach would reduce weight loss, retain sensorial quality and prevent fungal decay.

By understanding what each technology aims to achieve and combining them appropriately, growers are able to have a cumulative impact that is greater than each individual technology or approach.

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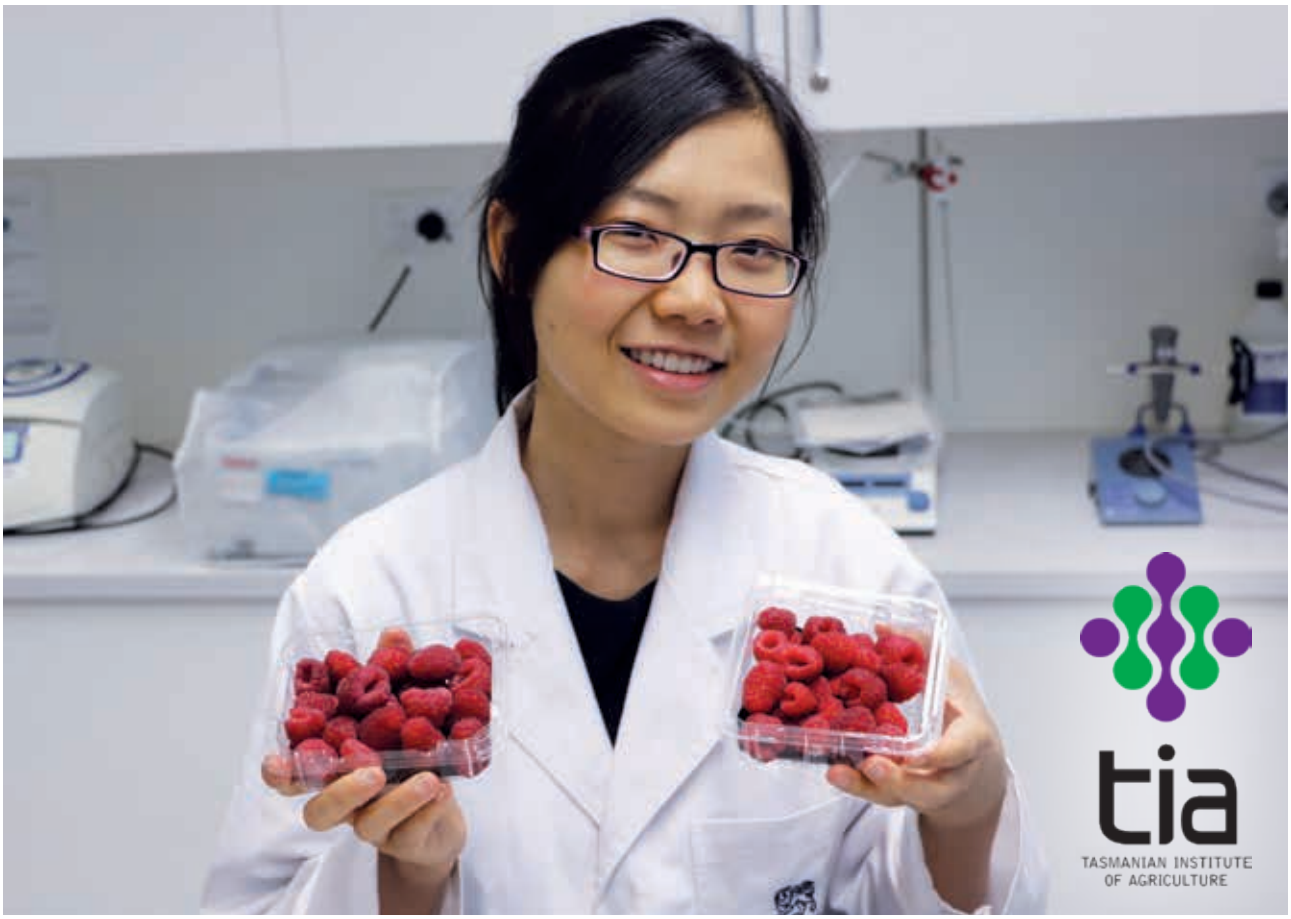

Nha Huynh in the laboratory at the Tasmanian Institute of Agriculture