FOCUS: GRAPES, BERRIES, VINEYARDS AND WINERIES

Long live Sovereign Coronation grapes: extending postharvest storability

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Slowing down the aging process, preventing excessive dehydration, maintaining firmness and fighting infection – these tasks sound like the benefits of a miracle cream, but in reality each one is part of the job of a postharvest scientist. At Vineland Research and Innovation Centre (Vineland), postharvest scientists focus on developing and applying techniques to extend shelf and storage life for fresh horticultural products, as well as, creating innovative technologies.

Enter Sovereign Coronation table grapes. These blue-skinned berries are the most widely grown table grape in the Niagara region and a perfect candidate for evaluating methods to extend storage life. Coronation grapes are available during a short window of time, from late summer to early fall. In the past, demand for lengthy storage postharvest has not been high. However in recent years, growers have had to compete with the local market, which is saturated with other produce, resulting in picked and packed grapes that cannot be sold in this short timeframe. Combined with this situation and the limited ability to store grapes postharvest, there has been a need for developing strategies to extend the storage life of these berries.

The two main goals when storing grapes are inhibiting mould caused by growth of the fungus *Botrytis cinerea* and preventing stem browning due to water loss. In order to obtain the best fruit quality and longest duration of storage, preparation must begin in the field. Proper care, including gentle handling, removal of diseased and damaged berries, quick transport, rapid cooling and storage at optimal conditions will extend postharvest storage life. The use of sulphur dioxide is also a key factor in inhibiting the growth of *Botrytis* and preventing stem browning.

In 2014, Vineland's postharvest team performed a study to investigate the use of sulphur dioxide-generating pads during storage of Coronation grapes. Sulphur dioxide is released from the pads when exposed to humidity in the air and works to inhibit mould and reduce stem browning until the active ingredient is depleted. In the study, grapes were stored with two different types of pads or with no pad at all. The grapes were removed from storage at various time intervals, followed by three days at room temperature in order to simulate shelf life conditions. They were then evaluated for marketability.

Scientists at Vineland were able to demonstrate that Coronation grapes could be successfully stored under optimal conditions (-1°C to 0°C and 90-95% RH) for at least five weeks, using dual release sulphur dioxide-generating pads with six grams of active ingredient (Infruta S.A., Santiago, Chile). The grapes stored with no sulphur treatment were completely unmarketable by three weeks storage time.

The next step would be to evaluate the potential of using sulphur dioxide fumigation during storage of Coronation grapes, through a gas treatment system. Such an approach would produce a richer concentration of active ingredients around the grapes than sulphur dioxide-generating pads. In addition, the sulphur could be continually renewed during storage, which has the potential to further extend the storability of Coronation grapes, beyond what can be accomplished with sulphur pads.

It might not be creating the next miracle cream, but the goal of a postharvest scientist is to extend the life of horticultural products and to allow for the progression of a "graceful aging" process. Innovative ideas and the adoption of new techniques in order to improve the quality and extend the marketability and storage of horticultural products, such as Sovereign Coronation grapes, is what postharvest science is all about.

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Sovereign Coronation grapes. Photo by Glenn Lowson

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