

Identify process improvements for preserving peak freshness of Broccoli.

VG13086



**National Vegetable
Extension Network**

SOUTHERN QUEENSLAND

Broccoli has a strongly healthy image, with many consumers aware that it has potential health benefits—even if they are not sure exactly how or why these occur.

Along with broccoli's vitamin and flavonoid content, these health promoting compounds have resulted in broccoli being commonly referred to as a 'Superfood', along with products such as berries, garlic and walnuts (www.health.com).

As stated in the 2013 International Food Information Council report, while the majority of consumers say they want to make nutritious choices, when it comes to actual purchases healthiness and quality are often less important than taste and price.

New varieties have improved consumer acceptance of broccoli flavour, with cooked broccoli scoring high on sensory attributes such as fresh flavour and crispness, moderate on sweetness and low on bitterness.

A study of consumer preferences based on sensory evaluation of a range of brassica vegetables found that broccoli and cauliflower were the most preferred, with 'intention to purchase' higher for broccoli than for any of the other vegetables tested (Brussels sprouts were the lowest!).

Results from VG13086, suggests consumers are likely to be disappointed with broccoli one trip in five, due to either poor quality at the store or the vegetable failing to last more than a few days in the fridge at home. . It is perfectly conceivable that such "hit-and-miss" success could well be affecting broccoli sales.

Previous consumer research conducted in VG12045 found that purchases of broccoli were significantly reduced by inconsistent quality and freshness at retail. This study has sought to find whether there is any basis to this perceived issue, and if so why such inconsistency might be occurring.



Conclusions

Loss of firmness was a major cause of quality loss, and the cold air produced by refrigerated displays can be very low in absolute moisture content. If product remains warm but is exposed to cold, dry air then it can lose moisture rapidly, especially given the relatively high rate of air movement in such displays.

While this was by no means a comprehensive survey, and quality will inevitably vary by season and location, the study has demonstrated the range of quality that may be offered not just at different stores, but even within the one display at a store.

While it appears a positive result that **77%** of broccoli samples purchased were excellent or very good standard, this means that **23%** of samples were of limited saleability, or even completely inedible.

Samples purchased for **less than \$1.50/kg** were scored as **excellent** while others costing **\$7.98/kg** were scored as **OK to poor**. While this is by no means unusual in fresh produce—the best quality often coincides with the lowest prices—this is likely to further reduce consumer confidence in broccoli as a regularly purchased vegetable.



In summary, while many suppliers and retailers are doing a good job with storing and displaying broccoli, there remains room for improvement, especially among outlets which may have relatively low rates of turnover for fresh produce.

Helping consumers buy better broccoli;

Even though conditions at retail stores are out of the control of those who grow, pick and pack broccoli, it is important to make sure it arrives at the store as fresh as possible. What happens at the farm can have a big impact on end quality.

- Make sure broccoli is fully hydrated at harvest
- Wherever possible, harvest when conditions are cool
- Transport to the packing shed ASAP – harvested broccoli can lose up to 6% moisture if left in the sun and wind
- Cool below 5oC as quickly as possible.

Hydro-vacuum cooling is the best way to achieve this

Hydrocooling and forced air cooling can also be effective

If room cooling, ensure broccoli is misted and there is ample air circulation around bins

- Minimise warming during packing by bringing out bins just before they are needed
- Maintain the cold chain during transport and storage

Data loggers are an excellent way to check transport temperatures

- Minimise storage times and avoid exposing broccoli to sources of ethylene

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