



More crunch, less waste.

Applied Horticulture Research 2021 | VEGGIE SAVER STORAGE TRIAL

AIM

To compare storage life and quality of produce in “Veggie Saver” to fruit and vegetables stored in a domestic refrigerator using conventional packaging materials.

METHOD

Broccolini, bunches of parsley and blueberries were purchased from a major retail outlet, as they normally would be by a consumer. Care was taken to ensure that all products of each type were from the same source; items were brought out from the back of store, so as to verify supplier and batch.

The fruit and vegetables were immediately transferred to the Applied Horticultural Research Sydney laboratory. Each treatment unit consisted of a bunch of broccolini, a bunch of parsley, a punnet of blueberries. Each vegetable unit was labelled, weighed then packed in:

1. Veggie Saver
2. Plastic bag
3. Paper bag
4. Open (no packaging)

Plastic bags were twisted to close, while the tops of the paper bags were simply folded. The punnets of blueberries were either left as they were or placed under the flap of Veggie Saver.

To provide replication, four groups of each set of treatments were prepared and allocated to identical HiSense fridges A to D. All fridges were set to run at 4°C, this being the temperature normally recommended for fresh cut products, dairy etc. Temperature loggers were placed inside Veggie Savers as well as the lower vegetable crisper drawer, with one additional logger placed on the fridge shelf.

The HiSense fridges used have two vegetable crisper drawers; the upper, smaller drawer was used to store Veggie Savers, the larger, lower drawer for the products packed in paper bags or open. Products packed in plastic bags were simply placed in the main part of the fridge.

Veggie Savers were sprayed with water every 2-3 days for the trial period.

Broccolini

Colour 3 – Bright green; 2 – 10 to 30% yellow florets; 1 – >30% yellow florets

Wilting 1 – turgid, fully erect; 2 – slightly drooping, up to 45°; 3 – Limp, >45°

Acceptability 3 – fresh, marketable; 2 – no longer saleable at retail but would use from the fridge; 1 – not usable, compost only

Parsley

Colour 3 – bright green; 2 – 10 to 30% leaf area yellow; 1 – >30% yellow leaves

Wilting 3 – turgid, fully erect; 2 – slightly drooping, some stems; 3 – limp

Rots 1 – none; 2 – slight, lower part of bunch only, does not affect edible part; 3 – rots extending into leaf area, affecting edibility

Acceptability 3 – fresh, marketable; 2 – no longer saleable at retail but would use from the fridge; 1 – not usable, compost only

Blueberries

Total weight of berries With visible fungal growth / Soft when squeezed / Good to eat (calculate % of each grade)

RESULTS

Broccolini







Broccolini stored in Veggie Saver lost 8% weight in the first week. This was due to excessive drying of the Veggie Saver. It was noted that due to the fridge and crisper being largely empty, this created a much more drying environment meaning dampening was required more often than usual. Subsequently, as Veggie Savers were more regularly re-moistened, weight loss slowed to around 2-3% weekly. In contrast, broccolini stored in paper and open lost approximately 10% and 15% weight weekly throughout storage. This is reflected in the wilting scores; broccolini in all treatments except the plastic bag all wilted significantly after only a week.

Broccolini yellowed significantly within two weeks in the paper bag and open. Yellowing was also observed in the plastic bag after 3 weeks. However, broccolini inside Veggie Savers remained green throughout the trial. In addition, no rots were observed in broccolini inside Veggie Savers, whereas slight floret rots were appearing in broccolini inside plastic bags by week 3.

Although broccolini remained green inside Veggie Savers, after 2 weeks they had lost approximately 10% weight. This increased wilting reduced overall acceptability. **However, maintaining full hydration of Veggie Savers between day 15-19 may have helped to re-hydrate the stems somewhat. By week 3 broccolini in Veggie Savers was rated as more acceptable than that in plastic bags.** As a result, three of four broccolini in Veggie Savers were still graded as 'good', whereas only one of four broccolini in plastic bags were graded similarly.

The results suggest that broccolini would remain acceptable (grade 2) for approximately 8 days with no packaging, 10 days in a paper bag, 3 weeks in a plastic bag and 4 weeks in a well hydrated Veggie Saver. This represents a 25% increase in storage life inside a Veggie Saver compared to a plastic bag.

Table 1. Visual condition of broccolini during three weeks storage in a Veggie Saver, plastic bag, paper bag or open

	Storage time		
	1 week	2 weeks	3 weeks
Veggie Saver			
Plastic			

Parsley

As with the broccolini, weight loss inside Veggie Savers was similar to that in paper bags during the first week as the Veggie Saver was not kept hydrated enough during week 1. **Increased moistening of Veggie Savers during weeks 2 and 3 not only slowed this rate of loss but appears to have resulted in slight re-absorption of moisture by the bunches.** By week 3, parsley inside Veggie Saver and the plastic bag had both lost around 25% weight of their original weight. In contrast, parsley inside a paper bag or open had reduced by half. The rapid weight loss during week 1 increased wilting of parsley bunches inside Veggie Savers. However, as already noted, **maintaining higher levels of hydration slowed wilting over the subsequent weeks.** By week three, consistent with the weight loss results, there was little difference between parsley in Veggie Savers and plastic bags. In contrast, parsley stored open was completely wilted after only 1 week.

Blueberries

Storing blueberry punnets inside Veggie Savers consistently reduced weight loss. Storage in Veggie Savers also reduced the number of soft or rotten fruit at all assessment times. If it is assumed that >20% soft or rotten fruit will be unacceptable to consumers, **then storing punnets inside Veggie Saver increased storage life from approximately 13 to 18 days, an extension of 38%.**

Veggie Savers reduced shrivelling and dehydration of the blueberries inside punnets, but without increasing rots. This is likely due to restriction of excess air flow through the punnets, as well as providing a high RH environment.

The blueberries were the clear standout result. Placing the punnet inside a Veggie Saver significantly increased storage life compared to simply storing the punnet inside the fridge. Using Veggie Saver in this way provided an atmosphere that was high RH but avoided condensation. This reduced softening and shrivelling as well as the appearance of rots.

CONCLUSIONS & APPROVED CLAIMS

1. Veggie Saver keeps fruit and veggies fresh for over two weeks*

* Broccolini, parsley and blueberries kept in Veggie Savers remained fresh and marketable for more than 2 weeks. In some cases, storage life increased up to four weeks.

2. Veggie Saver extends the life of fruit and veggies for over two weeks*

* Broccolini and blueberries kept in Veggie Savers resulted in storage life extending over 2 weeks

3. Veggie Saver increases storage life of fruit and veggies up to 38% longer than when stored in plastic*

* Studies found Veggie Saver increased storage life of blueberries by 38% compared to ordinary punnets only, and increased storage life of broccolini by 25% compared to plastic

4. Studies found Veggie Saver increased storage life of veggies like broccoli for up to 4 weeks (25% longer than plastic)

5. Veggie Saver provides major quality improvements over storing vegetables in a paper bag or simply placing them in the crisper drawer with no packaging