
Getting the best from organic fruit and vegetables: Post harvest

This is the second in a series of factsheets to help horticultural businesses improve the quality of their produce, and focuses on the period between harvest and retail; the others deal with the growing crop and presentation at the point of sale. Producing a quality crop benefits everyone. Producers get better prices and fewer crop rejections; wholesalers and retailers can build good reputations and secure customer loyalty; and the consumer gets a quality product that reinforces a positive image of organic food.

The importance of post harvest management is sometimes underestimated, but in some respects it is most important stage. There has been considerable investment in time and money to bring the crop through to maturity and mistakes at this time are more costly (in terms of both money and morale!) than at any other point in the production process.

The living harvest

Although the harvested portion has been removed from the growing plant, it is still very much alive and that means biochemical processes are still in progress; respiration is still occurring, generating heat and causing water loss and for crops in storage the ripening maturation and senescence processes continue leading to the natural decline of cells which gradually makes the crop more vulnerable to rots. The trick is to slow these processes down as much as possible without actually killing the crop.

The first few minutes

The deterioration process starts as soon as you harvest, so the keep the following in mind during and immediately after harvest.

- Keep all equipment serviced and clean to prevent the spread of post harvest diseases.
- Harvest in the cool of the morning or evening.
- Keep the harvested crop in the shade and cover the boxes or trays with wet towels or newspaper – this will lengthen subsequent storage/ shelf life considerably.
- Mains water is cold, relatively cheap and the quickest way of cooling the crop. Apply generously in the field if necessary.
- Handle with care - Wounds and bruising mean faster water loss and shorter shelf life.

Organic Centre Wales • Factsheet K5 - May 2011

*Published by Organic Centre Wales, Institute of Biological, Environmental & Rural Sciences (IBERS),
Aberystwyth University, Ceredigion, SY23 3EB. Tel. 01970 622248.*

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Grading, packing and storage

After harvest, crops are treated differently according to type and whether they are being packed, processed or sent into storage. Whatever the immediate destination, try and stay as close as possible to the ideal temperatures and humidities detailed in Table 1 and keep the following in mind:

- Grade and/or and pack as soon as possible (especially leafy crops)
- Never slam boxes; bruises are sure to appear later. Bananas are particularly vulnerable.
- Make sure you stick closely to the buyer's specifications. An obvious point, perhaps, but growers are frequently penalised unnecessarily
- Only store undamaged, good quality crops that are pest and disease free
- Keep storage areas clean ie swept floors, washed cold store walls
- Record temperatures at set intervals and apply water if humidity/moisture levels appear too low
- Wrap washed roots such as carrots and parsnips in film as soon possible. They will quickly deteriorate otherwise.

Transport

- Aim to maintain the "Cold Chain" from field to shelf. Deterioration progresses rapidly as the temperature rises.
- Use chilled hauliers who can maintain temperatures of 5°C or less wherever possible. If you use your own vehicle consider insulating it, travelling at night or using 'thermotainers' for smaller loads.
- Keep moisture in by making sure the crop is appropriately wet at departure and wrapping the pallet/ package in plastic film. Wrapping also protects against Ethylene gas given off by ripening fruits such as tomatoes, which is particularly damaging to brocolli heads.

If you are receiving produce, bear in mind that delivery notes act as legal proof of satisfactory temperature control, so only sign it if you are happy with the condition of the produce. Use a probe thermometer to ensure it is delivered at the right temperature.

Further reading

Bevan, J.R. Firth, C. and M. Neicho 1997. Storage of organically produced crops *Henry Doubleday Research Association* <http://orgprints.org/8241>

Frost, D; Van Deipen, P (2007)'Organic vegetable storage in Wales – Opportunities and constraints' Organic Centre Wales

http://www.organiccentrewales.org.uk/uploads/veg_storage.pdf

Table 1: Ideal post harvest temperatures and humidities for some key crops

Crop	Temperature (°C)	Humidity (%RH)	Notes
Asparagus	1 - 4	95-98	Spears may be stored overnight with butts in water
Beans	5 - 8	>95	
Beetroot	3 – 8	>95	Sugar conversion and loss of flavour below 0°C
Brassicas	1 – 4	>95	High humidity important
Carrots & Parsnips	1 – 4	>95	Avoid severe washing – damages skin which encourages rots
Courgettes	5 - 10	90 – 95	Below 10°C ideal, but will store well up to 15°C
Onions (bulb)	3 – 7	70-80	Low humidity very important – roots and shoots develop above 85%RH
Pumpkin	10 - 13	60-70	Storage life very dependent on variety
Rhubarb,	1 - 4	>95	
Sweetcorn	1 - 4	>95	Keep leaves on as long as possible.
Potato (Ware)	6 - 10	90- 95	Keep in the dark to avoid greening. Avoid plastic sacks (they encourage high humidity & sprouting). Below 5°C starch turns to sugar affecting taste
Tomatoes & peppers	6 - 9	85 - 90	Don't store too cold - Low temperatures prevent ripening
Leaf crops (Lettuce, leaf beets , Spinach etc)	1 - 4	>95	High humidity very important. If possible keep in plastic bags to minimise water loss

Source: Adapted from Frost & Van Deipen (2007) and Bevan et al (1997)