

Using raw manure

Untreated animal manures, for example from poultry and cattle, can contain harmful pathogens. These pathogens can contaminate crops through the soil or leaves, and be spread by wind or water splash, making people sick if consumed.

The best way to reduce risk from manures is to only apply commercially treated products.

Growers must:

- observe the appropriate exclusion period between any application of untreated manure and planting crops
- never use untreated animal manure on short-term crops for human consumption, such as leafy vegetables and herbs.

Treating manure

The best option to reduce risk is to use only manures that have been thoroughly composted. Heat generated during composting kills human pathogens in the manure, along with weed seeds and plant diseases. Two methods can be used to ensure food safety; windrow and in-vessel composting.

Windrow composting

Raw materials are formed into windrows or piles and composted for at least 15 days with five turnings. The centre of each windrow (or pile) must heat to over 55°C for at least 3 days between turnings.

In-vessel composting

Raw materials placed inside a vessel or contained space, with aeration provided by injection or turning. All materials must heat to over 55°C for at least 3 days.

Commercial products

Commercial products must be treated in accordance with the [Australian Standard AS4454-2012 Composts, soil conditioners and mulches](#) (PDF, 305 KB). Unless manures are certified as being treated in accordance with AS4454, they are considered the same as untreated manure.

Using composted materials

Apply properly composted materials during pre-planting or in the early stages of growth near the roots and incorporate the material into the soil. Wear gloves during the application of soil amendments and always wash your hands afterwards.

Exclusion periods

If using raw manure is necessary, an exclusion period must be followed between application and harvest to allow pathogens in the soil or on plants to return to safe levels. The same exclusion periods apply after livestock has grazed the growing site.

The relevant exclusion period depends on the mean air temperature of where the produce is grown.

Determining exclusion periods

Step 1 – Establish monthly mean maximum temperature

- Visit the [Bureau of Meteorology's NSW climate data online](http://www.bom.gov.au/nsw) (access via bom.gov.au/nsw)
- Under the heading **Text search**, select:
 - Data about 'Temperature', and 'Monthly' and 'Mean maximum temperature' under **Type of data**.
 - Type a **location** in the search box. Choose a matching town and the closest bureau station before selecting **Get data**.
- Choose the year and note the monthly mean temperatures in the table, taking into account the month the crop will be planted through to the month of harvest.

Step 2 – Use a decision tree to determine exclusion period

Choose the appropriate decision tree for the mean maximum temperature on the following page – either $>20^{\circ}\text{C}$ (equal to or greater than 20°C) or $<20^{\circ}\text{C}$ (less than 20°C).

Example

Lee grows spinach in Camden. The autumn crop will be planted in early April, with harvest expected in May. Lee would like to apply **untreated chicken manure** to the crop.

Lee checks the BOM website and notes the monthly mean temperature for Camden airport is 23.6°C for April and 20.3°C for May. Lee refers to the $>20^{\circ}\text{C}$ decision tree.

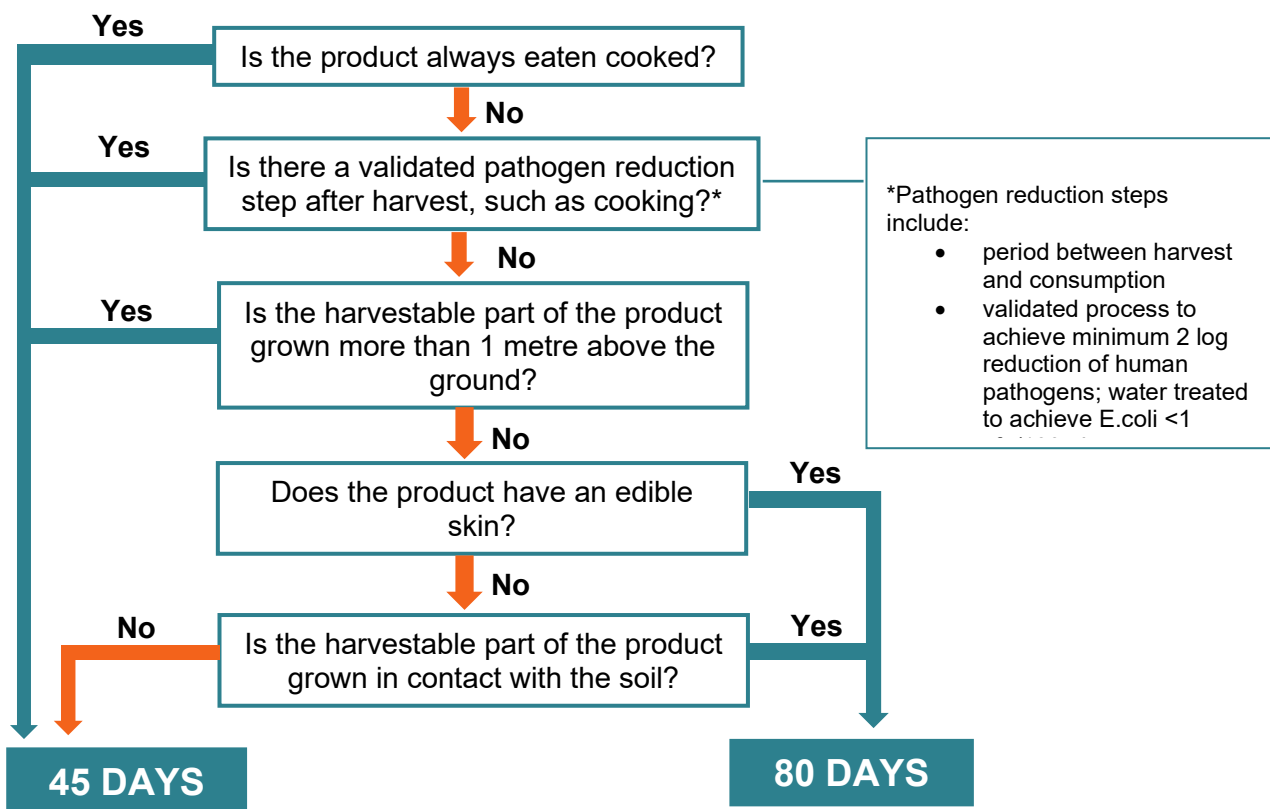
Working through the questions, Lee establishes the following:

1. **Is the product always eaten cooked?** No, spinach is often eaten raw.
2. **Is there a pathogen reduction step after harvest?** No, it's important to get the harvest to the processor quickly – so Lee does not use a 'kill step'.
3. **Is the harvestable part of the product grown above the ground (typically more than 1 metre)?** No, spinach is grown close to the ground.
4. **Does the product have an edible skin?** No, although it is edible, it's not an edible skin, like an apple or pear.
5. **Is the harvestable part of the product grown in contact with the soil?** Yes, the spinach is grown in the soil and often has soil that needs removing from the leaves.

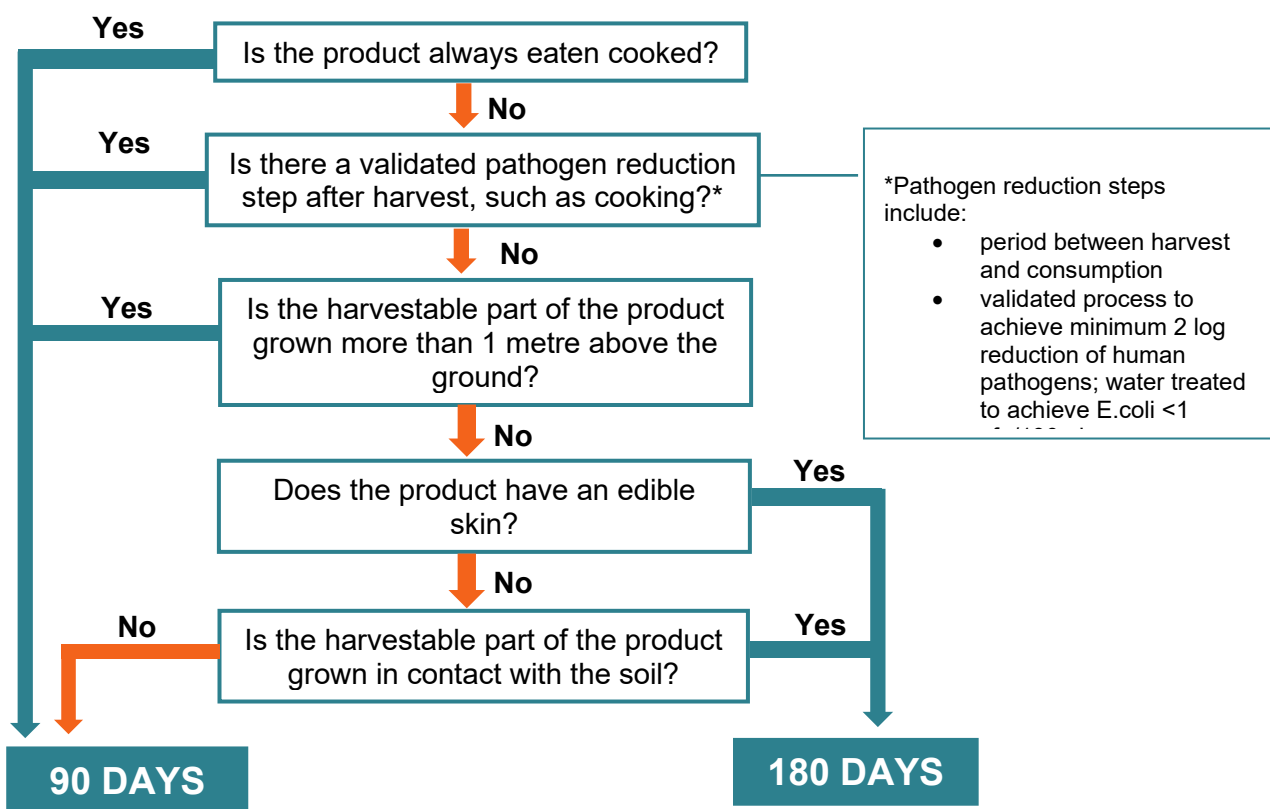
Result = 80-day exclusion period.

An 80-day exclusion period means Lee must not apply raw (untreated) manure (or have animals graze on the land) where spinach is grown for at least 80 days prior to harvest. As Lee plans to harvest the crop around 30 May, raw manure cannot be applied at any point after 11 March (that is, 80 days prior). Lee determines raw manure cannot be used at all for this example as the seeds were planted in April for a May harvest.

Decision tree 1: Mean maximum temperature >20°C



Decision tree 2: Mean maximum temperature <20°C



More information and resources

- [Using manures to grow vegetables – A guide to reducing risk](#) (PDF, 4.9 MB) – Hort Innovation
- [Guidelines for Fresh Produce Food Safety 2022](#) (PDF, 7.4 MB) - Fresh Produce Safety Centre Australia & New Zealand
- foodauthority.nsw.gov.au
- Phone the Food Authority helpline on 1300 552 406
- Email food.contact@dpi.nsw.gov.au

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