



HAWKESBURY CITY COUNCIL

COMPOSTING AND WORM FARMING GUIDE



hawkesbury.nsw.gov.au

An aerial photograph of a river winding through a lush, green forested landscape. The river reflects the sky and the surrounding trees. In the background, there are rolling hills under a blue sky with scattered white clouds. The foreground shows a sandy bank with some vegetation and a small structure on the opposite bank.

STATEMENT OF COMMITMENT TO FIRST NATIONS PEOPLES

Council acknowledges the Darug and Darkinjung peoples as the Traditional Custodians of the land throughout the Hawkesbury.

Council recognises the continuing connection of First Nations people to their Country and respects the cultures and histories of Aboriginal and Torres Strait Islander peoples as the first peoples of this land.



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Section 1 | Introduction

What is composting and worm farming?

Composting is not a new science, humans have been recycling waste products for thousands of years and nature has been composting since the beginning of time.

Composting is a natural process that involves the decomposition of organic matter. Millions of micro-organisms drive the compost process by breaking organic matter down to its original nutrient form. This valuable nourishment is then returned to the soil to help improve plant growth, water retention and the natural capacity of plants to resist disease.

Worm farming is composting with the extra help of worms. Worms help to aerate the soil and their castings are an excellent fertiliser for the garden.

NOTE

It is important to wear gloves when handling compost to reduce the risk of infection. Avoid the disturbance of dry compost materials as this may release irritating spores and fine dust that could cause respiratory problems.



Why should you compost or worm farm?

Food is wasted at every point along the food supply and consumption chain. This includes food waste from:

- farms
- processing and transport
- hospitality operators
- supermarkets
- households.

Each year Australians waste around 7.6 million tonnes of food across the food supply chain. This equals about 312kg per person and can cost up to \$2,500 per household per year. As a sector, households generate the most food waste in Australia and are responsible for about 30% of the total. This equals around 2.5 million tonnes per year.¹

In the Hawkesbury, organic materials are the most common item disposed of in residential garbage bins.

“ The best way to reduce our food and garden waste is to convert it to compost.² ”

Organic material that is deposited in a landfill breaks down in anaerobic (without air) conditions, releasing methane and carbon dioxide. Both of these gases are major contributors to the enhanced greenhouse effect, which many of the world's scientists suggest is changing global weather patterns.

On a more local level, sending organic waste to landfill is simply a waste. Aluminium cans, newspapers and glass bottles are commonly separated for recycling; wherever possible organic waste should also be recycled.

Recycling organic waste using a compost or worm farming system will not only help the environment, the end products will improve the structure of your soil and introduce or replace valuable nutrients vital to healthy plant growth. You will also save money on expensive fertilisers and other products and increase water retention in the soil (therefore reducing your water bill).

¹ Department of Climate Change, Energy, the Environment and Water, 2023. www.dcceew.gov.au/environment/protection/waste/food-waste

² EnviroCom Australia (2001) Hawkesbury City Kerbside Domestic Waste Audit, October 2001.

Section 2 | Composting

Building a compost heap is relatively simple and can be likened to baking a cake- a good recipe and the right ingredients are essential! There are four important principles to remember for building and maintaining your compost. Each of the four principles is important on its own, but when used together they provide an effective recipe for quickly decomposing your garden and kitchen waste.

The composting recipe – ADAM

A – Aliveness

Compost is not a pile of dead, rotting rubbish.

Compost is a living system in which countless numbers of bacteria, fungi, protozoa and other critters eat their way through your garden waste and turn it into nutrient-rich humus. To encourage “aliveness” in your compost, place the pile directly on the ground and remember to regularly check the air, diversity and the moisture level.

D – Diversity

Diversity of ingredients is the key to a speedy and efficient decomposition process. Diversity provides the environmental conditions and nutrients for a wide range of organisms that will in turn provide you with balanced and nutrient rich compost.

A – Aeration

More Air = Less Smell.

Air in your compost heap ensures aerobic (air breathing) bacteria will recycle your waste materials. If your compost heap lacks air, anaerobic bacteria will flourish and produce offensive gases. Regular layers of coarse material will keep air flowing through the heap. Turning your heap every 10-14 days and drilling small holes in commercial compost bins can also help aeration.

M – Moisture

All organisms in your pile require moisture.

Any dry material should be watered before the next layer is added. A dry compost heap will stop working; one that is too wet will become smelly because air has been forced from the heap. The optimum moisture content is between 50-60% (about as moist as a wrung out sponge). If your compost heap receives full sun, particularly in the afternoon, you will need to regularly check the heap and water when necessary.



Other considerations

T – Time

Composting takes time. Don't expect your compost to be ready overnight. If you follow the ADAM principles your final product will generally be ready after 6 – 10 weeks. A hotter compost heap will decompose faster.

T – Temperature

The micro-organisms in your compost heap produce heat. This heat is held in the heap by the insulating properties of the bin or the compost materials. Remembering ADAM is the simplest way to ensure your heap reaches a suitable temperature. Adding animal manure or blood and bone can assist this process.



Nitrogen

Nitrogen is a very important element for maintaining healthy compost and is used by essential micro-organisms for growth and reproduction.

A lot of garden waste is dry, brown and woody. These materials are essential for drainage and aeration in the compost heap and tend to be nitrogen 'poor' (low in nitrogen). On the other hand, kitchen scraps and soft green garden waste tend to be nitrogen 'rich' (high in nitrogen).

The trick to successful composting, is to feed your compost a balance of both nitrogen 'rich' and nitrogen 'poor' materials.

Nitrogen **RICH** materials include

- Grass clippings
- Fruit and vegetable waste
- Weeds without seeds
- Animal manures (chicken manure is best)
- Coffee grounds and tea leaves/bags
- Vacuum cleaner contents
- Human and animal hair
- Wool
- Bread

Nitrogen **POOR** materials include

- Tree prunings, small twigs and sticks
- Dry grass clippings
- Straw, hay, cane mulch
- Leaves and bark
- Sawdust
- Egg cartons
- Torn or shredded newspaper and cardboard
- Recycled paper

Other useful ingredients

- Wood ash, dolomite or lime (this helps to reduce acidity)
- Crushed egg shells
- Seaweed
- Cut flowers
- Old potting mix
- A sprinkling of blood and bone

DO NOT COMPOST

- Meat and fish scraps
- Dog or cat faeces
- Dairy Products
- Chemicals

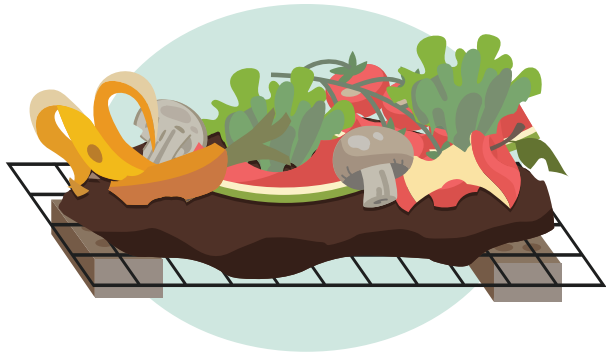
Solving composting problems

Problem	Cause	Solution
Foul odours	<ul style="list-style-type: none">• Heap is too wet• Not enough air	<ul style="list-style-type: none">• Add dry leaves• Turn the heap• Add lime
Slow decay	<ul style="list-style-type: none">• Not enough nutrients• Not enough air• Not enough water	<ul style="list-style-type: none">• Add a small amount of nitrogen based material• Turn the heap more often• Moisten the heap
Maggots	<ul style="list-style-type: none">• Meat, seafood, fats or faeces in the heap	<ul style="list-style-type: none">• Remove the cause• Cover the maggots with lime• Add soil to the top of the heap• Turn the heap the next day

Section 3 | Composting systems

There are many methods to produce compost and a range of compost systems that can be bought or built to produce compost.

This guide will outline 5 different kinds of composting systems including:



COMPOST PILES



**STEEL WIRE ENCLOSURE
COMPOSTS**



**BESSER BLOCK/RAILWAY
SLEEPER COMPOSTS**



**COMMERCIAL BIN
COMPOSTS**



**BARRELS AND TUMBLER
COMPOSTS**

Compost piles

Materials	No materials necessary, suitable space is needed.
Cost	Cheap, minimal cost.
Advantages	Cheap to build.
Disadvantages	Requires regular turning, is open to scavengers and can seem untidy.

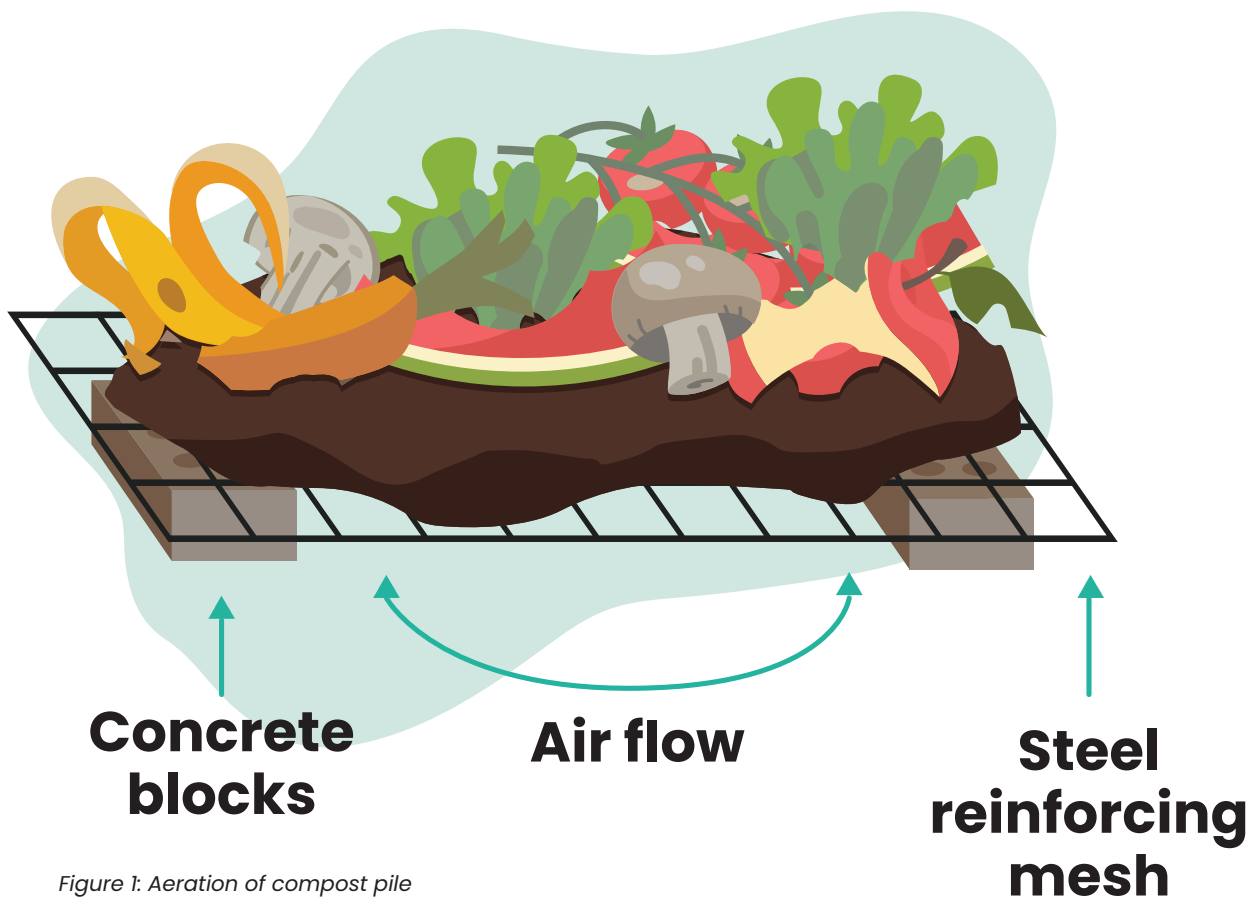
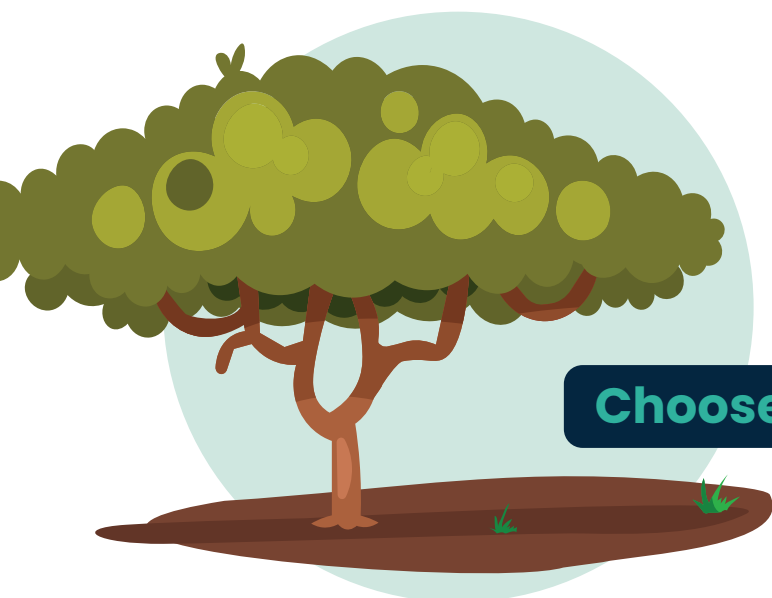


Figure 1: Aeration of compost pile

NOTE: Placing the heap on wire mesh or inserting PVC pipes with holes can increase airflow

Putting together a **compost pile**



Choose a site and add compost materials

Maximum size should be around **1.5 x 1.5m**



Heap should be turned every **10 -14 days**

Steel wire enclosure

Materials	Star droppers/wooden stakes, wire mesh.
Cost	Varies depending on materials used. Maximum cost is approximately \$60.
Advantages	Relatively cheap, easy to erect and move.
Disadvantages	Difficult to access for turning and adding large volumes of compost materials.

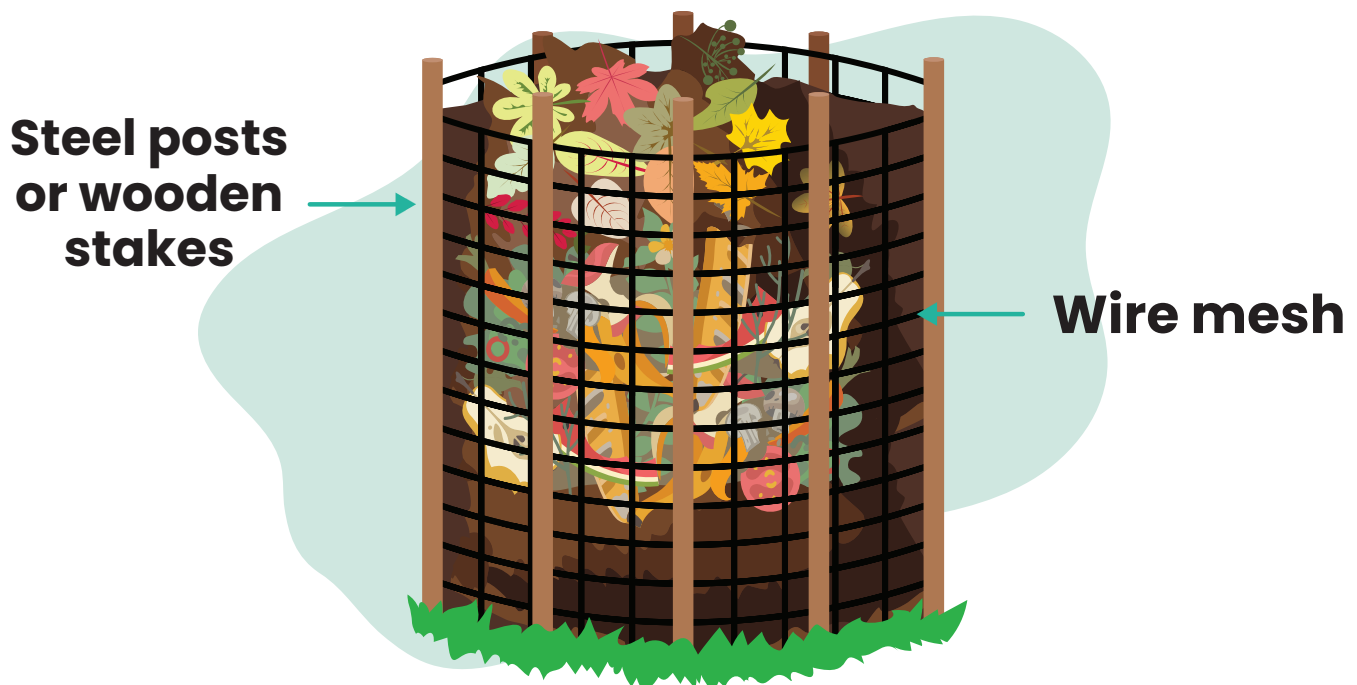


Figure 2: Steel Wire enclosure

NOTE: Open composting systems may dry out easily – keep moist

Besser block/railway sleeper composts

Materials	Sleepers or besser blocks as required. Old pallets also make excellent sides.
Cost	Varies depending on materials used. Maximum cost is approximately \$200.
Advantages	Allows good airflow, easy access when adding materials, long lasting.
Disadvantages	Can be costly, significant space is required.

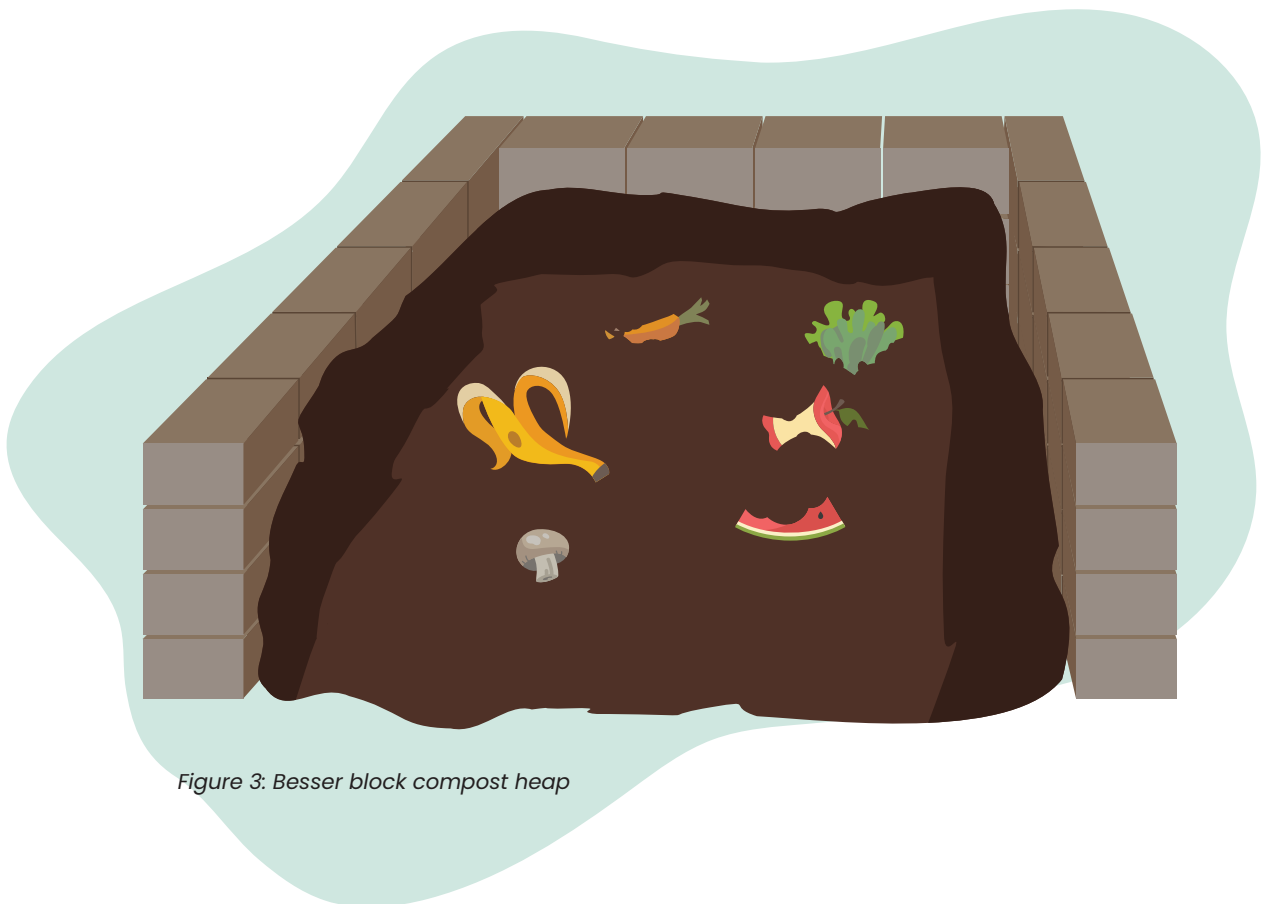


Figure 3: Besser block compost heap

NOTE: Can be made using old or recycled materials

Commercial bin composts

A huge range of compost bins are available from most hardware stores, nurseries and some department stores.

Cost	Varies depending on design. Cost ranges from approximately \$50-\$200.
Advantages	Fully enclosed, neat and easy to move.
Disadvantages	Some bins can become anaerobic (no oxygen) which can produce smells; bin capacity may be too small for keen composters.



Figure 4: Commercially bought compost bin

NOTE: Perfect for the average householder

Barrels and tumbler composts

A range of commercial barrels and tumblers are available. Barrels and tumblers use a tumbling action to aerate the compost- just like a clothes drier! Tumblers can also be made using steel drums and other suitable materials.

Cost	Varies depending on design. Cost ranges from approximately \$120-\$500.
Advantages	Can produce compost very quickly.
Disadvantages	Can be costly and can require more attention to produce results than other methods.



Figure 5: Commercially bought barrel compost system

NOTE: Turn regularly to speed up the composting process

Section 4 | Using compost

There are many ways to use the end product of your composting efforts.

Here are some useful ideas:

- When planting out seedlings, add some compost to provide a growing boost.
- Compost can be used as a starting mix for vegetable and flower seeds. Mix one-third sand with two-thirds compost to create a fine textured soil. Use a sieve to separate the larger particles – these can be returned to your compost heap to decompose further.
- Top-dress the lawn with fine compost- sprinkle a thin layer of compost on your lawn once or twice a year to encourage healthy growth.
- Use your finished compost as a mulch to fertilise plants and garden beds. To mulch with compost, add a depth of 5-7cm of compost to the soils around the drip line of plants. Don't place compost mulch directly up against the trunk of trees or main stem of plants.
- Finished compost can be used as bedding material for your worm farm.





Section 5 | Worm farming

Making a worm farm

Worm farming is an excellent way to compost and the by-products of a worm farm are an excellent fertiliser for your garden. Worms mix and aerate soil and produce nutrient rich castings that help to keep our soils healthy. Worm farms are also useful for people who live in flats or units who may not have the space to set up a compost heap.

Worm farms are simple structures that you can either make yourself or buy from hardware stores, nurseries and large department stores. Check in the Yellow Pages under 'Worm Farms' for a list of local suppliers.

A commercial worm farm is a neat and attractive way to recycle food waste and comes complete with instructions and all the materials necessary for setting it up.

Home-made worm farms

1. Find two stackable containers of equal size for your worm farm – old wooden drawers, plastic crates or polystyrene fruit boxes make good farms.
2. Punch or drill some holes in the bottom of your upper container to allow worm juice to drain to the lower container. In the lower container, make a tap so that you are able to drain and collect the worm juice.
3. Place an up-turned empty ice-cream box in the bottom of your lower container. This will assist any worms that fall through to the lower container to climb back up to the top. It will also form an island for your worms and prevent them from drowning in the worm juice.
4. Make a 10–15cm layer of bedding for your worms in the bottom of your upper container. A mixture of aged compost, coconut fibre and shredded newspaper makes excellent bedding. Soak the bedding in water before it is added to the container.
5. Add your worms – you will need at least 1,000 worms to start your worm farm. Worms from your garden are not suitable; you will need to buy suitable worms (such as Red worms or Tiger worms) from a worm breeder.
6. Allow the worms to settle into their new home for approximately a week before feeding them for the first time. Feed your worms to one side of the upper container to allow a food free area for worms to roam.
7. Cover the upper container of your worm farm with a few sheets of newspaper or a piece of hessian. This will help to keep the worm farm dark and moist.

Hints for happy worms

Food

Worms like to eat most fruit and vegetable scraps but since worms don't have teeth, it is helpful to cut scraps into small pieces.

Worms also like to eat:

✓ Paper ✓ Soil ✓ Leaves ✓ Hair ✓ Crushed egg shells ✓ Shredded and soaked cardboard

There are a number of foods that worms would prefer not to eat. Avoid feeding your worms meat as it can lead to odours and may encourage maggots.

Other foods you should avoid feeding your worms include:

✓ Citrus Fruits ✓ Dairy Products ✓ Onion (including garlic and shallots)

Add a sprinkle of wood ash, dolomite or lime every few weeks to help prevent the worm farm from becoming too acidic.

Light and moisture

Worms usually live underground where it is cool, dark and moist. Make sure your worm farm is not in direct sunlight and ensure that the cover on your worm farm is kept moist.

Using worm casting and worm juice

Worm farms produce two types of garden product: worm castings (or worm poo) and worm juice (or liquid fertiliser).

Worm castings

Worm castings can be collected from your worm farm by light separation. Open the lid of your worm farm and wait for the worms to burrow down. Simply remove the top layer of worm castings and replace with a new layer of soil.

Worm castings can be used as an excellent fertiliser by applying it straight on the garden or onto your pot plants. Worm castings can be mixed with potting soil or sand to make a potting mix suitable for many types of seedlings.

Worm juice

Drain the worm juice from the lower layer of your worm farm into a suitable container. Dilute the worm juice 1:10 with water using 1 part worm juice and 10 parts water. Worm juice can be used as a fertiliser for all plants.

Vegetables particularly love it but it is also good for feeding indoor plants and garden flowers. Worm juice can also be used as an organic spray to strengthen the immune system of your plants. Worm juice can be stored almost indefinitely in a cool, shaded site.



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