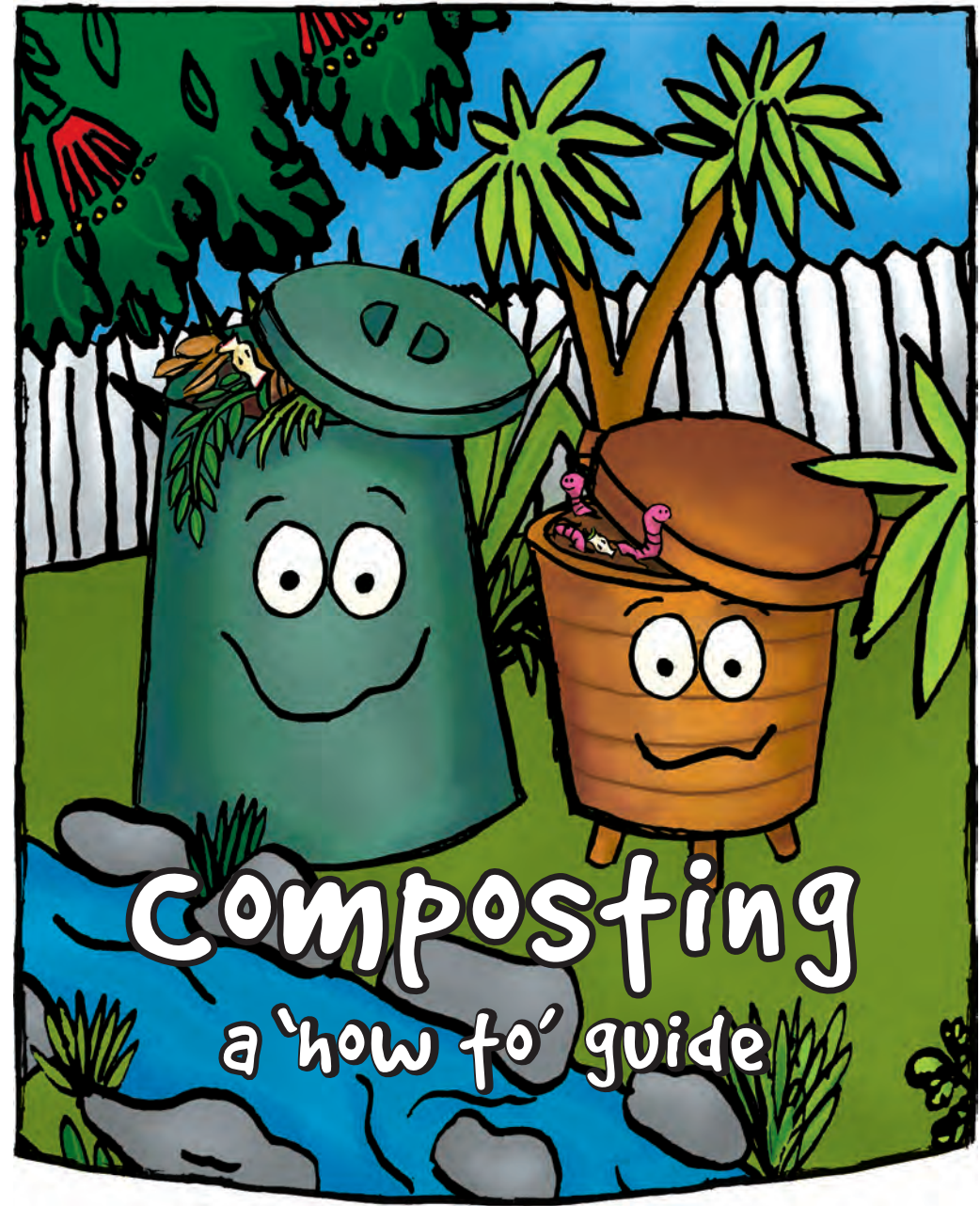
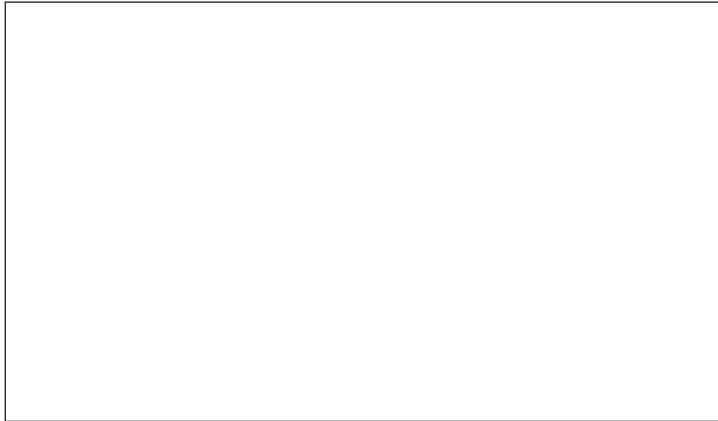




[www.createyourowneden.org.nz](http://www.createyourowneden.org.nz)





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## Introduction

### What is compost?

Compost is a mixture of organic material and is used as fertiliser.

Generally, the ingredients used to make compost come from our gardens and kitchens (food scraps) although organic material is anything that was once living.

Compost results from the eventual decomposition or break down of the ingredients. It can take anywhere between two and 18 months before compost is ready to use. The length of time is governed by the method employed, what gets put into the bin, the time of year and how often the material is turned.

### What is composting?

Composting is a process which mimics nature by recycling organic material.

Composting is like baking a cake. It needs the right combination of ingredients and sufficient time for everything to “cook” – ie, break down completely – before the compost is ready. (Note that materials that are only partly composted can harm plant life.)

As the organic material breaks down, it changes and becomes what is known as humus. During the process, soil micro-organisms, worms and insects convert the organics into a soil-like material which can then be used in the garden.

There are a number of ways to compost, however the focus here is on three methods which are most common and effective – using heaps and/or bins, worm farms and Bokashi.

### The benefits

- ☞ Compost produces a valuable humus that returns organic matter to the soil.
- ☞ It reduces the harmful effects of organic waste in landfill (eg, water pollution, emissions of the potent greenhouse gas methane, and bad smells).

- ☞ It reduces the need for chemical fertilisers in your garden.
- ☞ It reduces rubbish collection costs.
- ☞ Producing your own compost saves money.
- ☞ It reduces the space needed for landfills.

*This brochure was written with help from the Kaipatiki Project, Auckland.  
Thanks to WormsRus for providing information from their website.*

## Composting



### Getting started

- ☞ Choose a site with care. Ideally, it should be warm and sheltered.
- ☞ Consider neighbours by siting the heap or bin away from any areas that are too close and could cause offence.
- ☞ To work properly, your compost heap should be at least 1m high x 1m wide x 1m deep.
- ☞ Start with a layer of coarsely chopped twiggy woody material on bare soil or grass.
- ☞ Add alternate layers of green matter (nitrogen rich) and brown matter (carbon rich) preferably in layers no more than 5-10cm deep – see list on page 5.
- ☞ Limit all materials, including grass clippings, to thin layers.
- ☞ If you can't be bothered layering, just make sure there is a mixture of green and brown matter.
- ☞ Avoid cat/ dog/ human faeces, meat, fish, bones, oil and invasive weeds.
- ☞ Smaller pieces make quicker compost – for quick compost, fibrous materials should be no bigger than the thickness of your finger (2cm).
- ☞ The heap should have a cover, eg, plastic lid, underfelt, tarpaulin.
- ☞ Be aware that it is difficult to manage rodents if a compost heap is used.
- ☞ Rodents can be kept out by cutting out a piece of chicken wire larger than the bin base. Place it underneath the bin on the soil and fold the edges 10cm up the sides of the bin.

When adding food scraps, it's especially useful to add an equal quantity of brown material on top such as dry leaves to reduce odours.

### Keeping it going

- ☞ Compost activators or accelerators can be added to the compost to hasten the natural break-down process. They usually contain a natural nitrogen or bacterial enzyme and can be bought at most garden centres.
- ☞ Sprinkling on lime and untreated wood ash can help balance pH & reduce smells.
- ☞ The heap should be as moist as a wrung out sponge. Add water if needed.
- ☞ Avoid excessive moisture by keeping the heap covered.
- ☞ To work properly, your compost heap needs to reach temperatures between 30 and 60°C. From time to time, check that it is heating up in the centre; it should feel warm.
- ☞ Compost needs air – turn and mix it up to aerate and speed up decomposition.

### The final touches

- ☞ Once an open heap is 1 metre in height, you should finish it by turning it with a pitchfork and mixing it up every week or two.
- ☞ Either use a new bin for the new heap, or use your original bin and just keep the old heap covered with underfelt, tarpaulin or something similar.
- ☞ Compost is ready when it becomes a sweet, dark, crumbly material and you cannot distinguish the original materials in it.
- ☞ If compost is well maintained and turned often it can be ready in as little as 6-8 weeks. If it is never turned, it will be ready in 12-18 months.
- ☞ When it's ready, put it onto the soil or dig it into your garden. You can also use it for pot plants and for potting up seedlings.

*Don't forget to wash your hands when you've finished composting and gardening!*

### Green and brown matter

#### Green - Nitrogen rich, wet

Food scraps  
Manure  
Fresh grass clippings  
Weeds without seeds  
Vegetable scraps  
Seaweed  
Tea leaves and bags  
Coffee grounds

#### Brown - Carbon rich, dry

Torn newspaper/cardboard  
Egg cartons  
Tree prunings  
Dry leaves  
Bark, untreated sawdust  
Wood ash  
Twigs and sticks  
Crushed shells

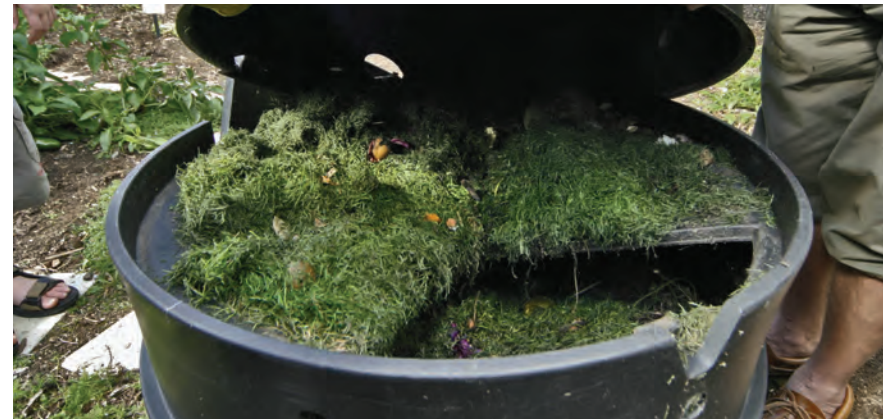
## What not to compost

Although in theory anything organic can be composted, some things are best avoided when composting at home.

Material	Reason
Cat and dog faeces	Can cause disease
Meat, fish, oil, bones, fat	Can attract rats
Non-organics eg: tin, glass, plastics	Won't break down
Invasive weeds, eg: kikuyu, wandering willy, jasmine	Could spread in or beyond your garden – however they can be composted after treatment (see page 7)
Large amounts of pine needles or gum leaves	Allopathic- create environment hostile to compost creatures
Woody materials in pieces larger than the diameter of your finger	Too slow to break down
Diseased plants (eg, with blight)	Disease may spread
Bamboo, flax and cabbage tree leaves	Not suitable for composting and not taken by composting companies (bury in the ground, or take to a transfer station for landfilling)

## Common composting problems

Problem	Cause	Solution
Smelly, slimy heap	Not enough air Too wet Too much nitrogen	Turn heap Add brown material (eg, dry leaves) Add brown material
Materials are not decomposing	Heap too small Not enough heat due to lack of green materials or water Materials in heap are too large	Increase size of heap Add green materials (eg, manure or blood and bone) and water Break materials down into small pieces
Pests attracted to heap eg, flies, cockroaches, rats, mice	Wrong food added Bin not rodent proof	Don't use meat/bones/ fish Bury food scraps in centre of heap Rodent proof your bin
Fruit flies (vinegar flies)	Heap is too acidic	Sprinkle lime on heap
Ants	Heap is too dry	Add water and lime
Other "mini-beasts", eg, beetles, worms	This is not a problem – creatures are essential to the composting process	Appreciate the work they do!



Limit all materials, including grass clippings, to thin layers

## Invasive weeds

It can be difficult for people to accept that well-loved plants like honeysuckle and Mexican daisy are deemed to be pests, but it is essential to control them. Plants like ginger, jasmine and privet can cause serious harm to our native environment and others can threaten the livelihoods of producers of commercial crops.

To find out more and to identify invasive weeds, visit

[www.doc.govt.nz](http://www.doc.govt.nz)

[www.weedbusters.org.nz](http://www.weedbusters.org.nz)

[www.arc.govt.nz](http://www.arc.govt.nz)

## Composting invasive weeds

It is possible to compost invasive weeds, however it is essential that they first go through a "pre-compost" process in order to ensure that they die.

There is also another way to handle noxious weeds.

- ☞ Put the weeds in a large plastic bag with a handful of soil and water.
- ☞ Tie the top and leave for at least two months, until there are no green shoots or other signs of life.
- ☞ Add them to your compost heap as a green.

- ☞ Put them into a closed bin and cover them with water (or submerge them in a sack).
- ☞ Leave for 2-3 months by which time the water will turn a green/ brown colour but it can be used as fertiliser for your plants.
- ☞ Empty the solids into your compost bin.

If you leave them for long enough, they will turn into soil.



Mature compost, ready for use

## Types of compost bins

Before you choose a compost bin you should consider what you will be putting in it. Larger, open bins are better for people with large amounts of garden waste. Smaller, enclosed bins are more suitable for households with large quantities of food waste as they provide a barrier to rodents. You may find you need both!

### Choosing a bin

There are a number of points to consider before you buy a bin so that you get one appropriate for your needs. These are:

- ✎ the number of people in your home
  - ✎ the size of your garden
  - ✎ the capacity of the bin, taking the above into consideration
  - ✎ your ability to turn compost with a garden fork
  - ✎ the bin design (ie, whether different parts need be lifted)
  - ✎ materials used in the making the bin (eg, some are made of recycled plastic)
  - ✎ whether the bin is made locally.
- If it's hard on your back, your back needs to be up to it!

**TIP!** Make sure you get all your questions answered by the refailer or manufacturer before purchase and check out whether there is any further support available once you've bought the bin. Make sure the bin is manageable for you!

### Buying a bin

There is a range of commercial compost bins which vary in size and complexity. With regard to size, a medium-sized compost bin (240 litres) should cope with all the kitchen waste and garden waste of 2-4 people.

Worm bins are especially suitable for households with limited outdoor space and are designed to process kitchen waste, not garden waste – see Composting with worms page 10.

Bins are usually available from hardware and garden stores, and range in price from \$40 to \$220. Generally speaking, bins that require less turning are more expensive.

While larger bins are obviously more suitable for larger households, bins may not vary significantly in performance. The most important thing is knowing how to manage your bin so that you make good compost.

### Make your own compost bin

If you are making your own bin, you can use a wide range of material, including chicken wire, wood, plywood, bricks, concrete blocks, etc. It must be on the soil and no smaller than 1m high x 1m wide x 1m deep and no larger than 5m<sup>3</sup>.

For large amounts of garden waste, units can be made from wood, bricks or concrete blocks. Ready access from the front is necessary.

Stacking bins have the advantage of being moveable and can be extended to cope with large amounts of waste. Black polythene or sacks may be used

for lining, warmth and moisture control. Wrap netting frame around wooden stakes. Line these with newspaper or cardboard to retain heat.

Check for designs in books at your public library in books on compost such as *The Suburban/Urban Composter* by Mark Cullen.

Some designs can also be found at:

[www.solidwaste.org/combins.htm](http://www.solidwaste.org/combins.htm)

[www.digitalseed.com/composter/bins](http://www.digitalseed.com/composter/bins)

[www.backyardgardener.com/compost](http://www.backyardgardener.com/compost)



## Worm Farming

### What is worm farming?

Compost can also be produced using worms. This is known as worm farming. It is also called 'vermiculture' or vermi-composting.

Usually tiger worms are used for worm farming in NZ, though red worms can also be used. Worm farming uses the same principles as composting, but it does not generate heat, making it cold

composting. Value is added to the materials when they are eaten and excreted by the worms. This produces what is called vermicast and worm tea which have high levels of nitrogen, phosphorous and potassium (NPK) compared to ordinary soil. This makes them valuable for your plants' leaf growth, root and stem strength and flower and fruit set.

### The benefits

- ☞ Casts and worm-tea are fantastic for plants (always dilute the worm-tea to the colour of weak tea – usually about 1:10).
- ☞ Kids enjoy them.
- ☞ If you have mostly kitchen waste and live in a home with little or no outdoor space, a worm farm is a good option.
- ☞ Same benefits as page 3.



Worms at work: a population of 1000 - 2000 worms is needed to get started

### Getting started

- ☞ Choose a site which is sheltered from sun, wind and rain. Carports or sheltered porches are ideal.
- ☞ Use a layer of bedding first – eg, hay/ coconut fibre/ shredded cardboard/paper.
- ☞ Bedding should be damp and porous.
- ☞ Add worms – 1000(250g) is fine; 2000 is even better.
- ☞ Food can then be added. You can cover food scraps with damp newspaper or cardboard to limit flies and odour.
- ☞ Worms can eat their own weight each day but don't overfeed at start (eg, for 250g of worms give about 200g of food).
- ☞ Worms need air but not light (worms are photophobic).

### Keeping it going

- ☞ Worms need a moist environment.
- ☞ Check that their surroundings are damp, add water if needed.
- ☞ Add dry leaves or torn up paper products if it is too wet – the working area should be as damp as a wrung out sponge.
- ☞ Add food scraps regularly.
- ☞ Smaller pieces (no larger than 2cm) will be eaten more quickly and prevent odours.
- ☞ Worms cannot tolerate very hot or cold conditions (10-30° is ok).
- ☞ Small flies or white worms/bugs indicate the worm farm has become too acidic and you should add a sprinkling of lime to neutralise pH.
- ☞ Worms are omnivores and will eat almost anything, but some things are best avoided (see page 12).
- ☞ If worms are overfed, uneaten food will rot.



View from the top with worm tea in bucket below

## The diet

### What worms like

most fruit and vege scraps  
 coffee grounds and teabags  
 aged horse manure  
 dirty paper  
 crushed eggshells  
 vacuum cleaner dust  
 hair

### What worms don't like

spicy food, chili, onion, garlic  
 meat and milk products  
 flour products  
 large amounts of cooked food  
 garden waste  
 shiny paper  
 citrus / very acidic food

## Harvesting your worm casts

- ☞ After a few months or when a layer is full, you should harvest the casts.
- ☞ Remove the top layer and take off the bottom layer. This bottom layer contains the casts. It is ready when few worms can be seen.
- ☞ Remove worm tea from the bottom level. (When using, dilute to the colour of weak tea, usually about 1:10)
- ☞ When one working layer is full, you can add another layer to your worm farm.
- ☞ Place new layer on top of the old one and then add bedding (paper/ straw/ manure) and then add more food scraps.
- ☞ Add food only to the new layer. The worms will migrate slowly to the food layer.
- ☞ If you have large layers in your plastic bin and you want to harvest casts earlier, you could add a layer of chicken wire instead of a new plastic layer.

## Common worm farming problems

<i>Problem</i>	<i>Cause</i>	<i>Solution</i>
Rotting food	Too much for population	Feed less
Fruit/ vinegar flies around farm or small white bugs and worms	Too acidic	Cover food with damp paper Add lime to increase pH
Worms climbing up sides Worms very fat & pale	Too wet	Add paper products and dry leaves, gently fork holes in the working layer
Ants	Too dry or acidic	Add water/lime If your worm farm is on legs, place each leg in a container of water to stop such pests from getting in
Food rotting and not eaten	Too much food/ wrong food/ pieces too big	Add less food, break into small pieces
No worm tea	Not enough water	Add water

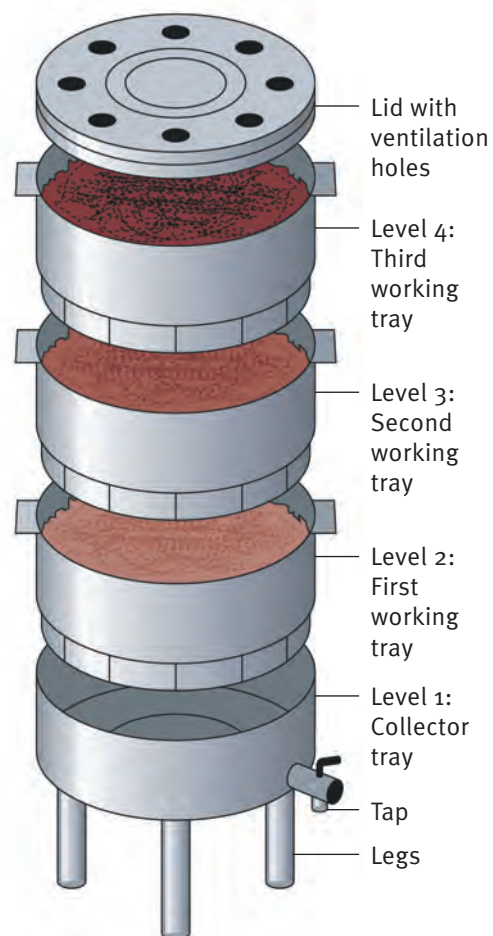
Worm casts ready for use



## Types of worm bins

There are different types of worm bins but most have a number of layers. Note that it is easier to harvest worm casts from bins which have more shallow layers. Bins generally have two to three layers; some bins can have extra layers added to increase capacity. When buying a bin, ask the retailer whether there is any back up if you need advice.

- ✎ A tray/layer/stacker system allows for easy removal of worm casts
- ✎ Bins with taps allow the worm tea to be extracted easily
- ✎ Some bins stand on legs which can be easier to proof against pests (legs can stand in bowls of water if need be)
- ✎ Some bins are made from recycled plastic and made locally
- ✎ Sizes vary and costs vary between \$20 and \$200
- ✎ Worms and food scraps are added to the top working tray which generally has a vented lid
- ✎ More levels can be added once the first working tray has filled with worm casts
- ✎ A three-tray system allows for easy removal of worm casts with minimal loss of worms
- ✎ Size, price and functionality vary a lot, so ask questions and think carefully before you buy!



## Make your own worm bin

You can easily make a worm bin out of large buckets, polystyrene trays or an old bath.

If you use a bath, remove the plug. If you want to, you could build a frame to allow the bath to sit securely at waist height. Bricks, posts or blocks may be used for elevation, and for stability, ie, 100-150mm height (allowing room for the liquid collection container placed beneath plug outlet). The plug outlet end must be no less than a 5 degree fall to the lowest point to achieve adequate drainage. Roofing such as ply or corrugated iron will be needed to shed water and provide protection from summer sun.

Place into the base of the bath 1.5m of 65mm perforated drainage pipe with two layers of old stockings. This seals the ends and covers the perforations which stops the pipe blocking. Add pumice sand or scoria to a depth of 75mm then place shade cloth, doubled over and cut to fit, on top of filtering layer.

### Bedding

A free-draining fibrous matured compost is ideal given that it is not going to produce heat. Dampened shredded corrugated cardboard and lunch paper give increased air availability and reduce the risk of bedding material heating up. You need to water well and leave at least two days. Then check for temperatures over 25 degrees. If there are any unpleasant

odours, apply two handfuls of garden lime and mix in.

Only apply old lawn clippings. Fresh clippings heat up and cook the worms.

For quick results, 500g-1kg (2000-4000 worms) should be enough for your worm farm to cope with 400gms to 800gms of mixed food waste each day. This volume will increase as the worms multiply. Spread worms on to bedding and spread food scraps in one area and rotate feed sites.

As the bath fills use garden fork and loosen bedding; this increases air circulation and reduces bedding compaction.

To remove the casts, once the worm farm is full (after nine to 18 months), place a plastic sheet or large container next to the bath, and using a garden fork remove the top half of the worms' bedding. This is undigested food and is where the majority of worms will be. Place this to one side.

Remove all casts. Rinse drainage layer thoroughly catching all liquid.

Replace the contents that were put aside and commence the feeding, forking, watering process when required.

Your bath worm farm will ultimately digest about 1-2 litres of mixed organic waste a day.



# Bokashi

## Composting with Bokashi

### What is Bokashi?

Bokashi was developed in Japan and literally means 'fermented organic matter'. fermented wheat- bran mixture called Compost-Zing is used in a bucket system where food is literally pickled. The final product has a slight sweet/sour smell.

### The System

The Bokashi bucket system consists of a few simple elements. A two-bucket system with one nested on top of the other. The top bucket has a tight fitting lid and holes in its base to drain to the lower bucket. In addition there is a bag of Compost-Zing made from wheat-bran and untreated saw dust that has been mixed with molasses and water and Effective Micro-organisms. You can make your own system as long as it is air tight. Old paint buckets which have been cleaned out work. Drill holes in the base of the top bucket and sit inside the other one. A good seal is very important.

### The benefits

- ☞ The benefit of this system is that you can add products such as meat and fish, which are discouraged in the usual compost due to vermin & odours.
- ☞ It produces a compost product within 2-4 weeks after being buried rather than 3 or more months in a compost pile.
- ☞ No space is required as fermentation takes place in the bucket, which makes it ideal for small houses, apartments and schools.
- ☞ Buckets can be kept indoors as the smell is inoffensive.
- ☞ It keeps food waste out of the landfill and it is good for your plants adding beneficial vitamins to the soil.



### Getting started

- ☞ Sprinkle a layer of Compost-Zing in the base of your bucket (1 tablespoon).
- ☞ Add a layer of food and remember to break it into small pieces. Once you have a layer of about 3cm, add another handful of Compost-Zing. More may be used in summer than winter.
- ☞ Push layer down gently to remove any air, as this is an anaerobic process (a potato masher is ideal).
- ☞ It is best to minimise opening the bucket to avoid excess air.
- ☞ Close the bucket lid tightly. This can be easily removed by pressing down on the centre of the lid.
- ☞ Drain any liquid that forms at the bottom of the bucket every 3 - 4 days. Dilute as required.
- ☞ When bucket is full, close lid and keep in a warm place for about 10 -14 days.
- ☞ When the food waste smells like pickles, it is ready to be buried in the garden.
- ☞ Plants can be put directly into the soil after 10 days.



## *Foods you can compost*

All food waste which is well drained which includes:

- ☞ fresh fruit and vegetables
- ☞ prepared foods
- ☞ cooked & uncooked meat and fish
- ☞ cheese and eggs, coffee grinds, tea bags
- ☞ wilted flowers

## *Do not use*

- ☞ liquids such as milk, orange juice and oils
- ☞ paper and plastic wrap and meat bones
- ☞ shells from seafood

For more information about Bokashi see [www.bokashi.co.nz](http://www.bokashi.co.nz)

## *Stockists*

Compost bins & worm farms are available from various outlets including your local garden centre and hardware store.

Worms can also be purchased from the following outlets:

Kiwi Earthworm Distributors (Matakana) - 0800 539 676  
Natural Waste Solutions/WormsRus - 0508 967 677  
Kaipatiki Project 09 482 1172 (Auckland only)

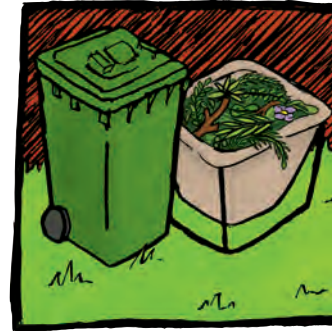
Check our website for a stockist in your local area.

## *Alternative Options*

### *Garden bag and bin collections*

There are many garden bag and bin collection services available countrywide. Many accept invasive weeds as well as ordinary garden waste.

Check in the Yellow Pages under “Garden Bags and Bins” to find services in your area.



### *Garden waste disposal*

Transfer stations provide another option for garden waste disposal. You will need to contact them directly to check what kind of garden waste they will accept, their opening hours and their charges.

Check with your local council for your nearest transfer station.



## Questions & Answers

### Composting



#### *What makes my compost smell?*

A compost high in nitrogen with no air will become acidic. Add carbon and turn your compost.

#### *How do I stop rodents getting into my compost bin?*

Add grass clippings to increase heat and turn regularly.

#### *What can and can't go into a compost bin?*

Don't put in meat, bread, heavy unshredded prunings (see "What not to compost" page 6).

#### *How long do I have to wait until my compost is ready?*

A well maintained compost bin will produce compost in 3-4 months in summer and up to 6 months in winter. However, it can take a shorter or longer time depending on the method, what goes into the bin, time of year and regularity of turning.

#### *Do I need to add water to my compost bin?*

If you add to your compost a 50/50 mix of nitrogen, materials which are wet, and carbon materials that are dry, it will be of a crumbly consistency.

#### *How will compost help my garden?*

Compost feeds the soil, helps with water retention and encourages earthworms into your garden.

### Worm Farming



#### *How many worms do you need to start a worm bin?*

1,000 is ok, but bin takes some time to get going; 2,000 worms (500g) will get a worm bin working much more quickly and efficiently.

#### *What food can and can't go into a worm bin?*

Worms like a diet of fruit and vegetables with 30% of their diet being carbon. (Carbon material can be provided in the form of scrunched up envelopes, handee towels, tissues, shredded paper; any paper that's not shiny and coloured or has a plastic film coating is ok). Worms don't like citrus, bread, meat, onions, garlic, excess kiwifruit or large amounts of grass, leaves.

#### *What do I do if there are lots of fruit flies?*

Add a decent sprinkling of lime and wait a day or two. If you still have flies in your bin, add more lime and carbon material (eg, paper or dried leaves).

#### *Do I need to lime my worm bin?*

A small handful of lime or gypsum once a month helps to keep the food sweet.

#### *What do I do if I go on holiday?*

Add to the bin as follows.

1 – 2 weeks, empty out your fridge of any fruit and vegetables

2 – 3 weeks, dried grass or coconut fibre from garden centre or worm grower

4+ weeks, coconut fibre block from garden centre or worm grower

#### *How much do I dilute the worm 'tea'?*

Worm tea is very high in nitrogen and needs to be watered down to about 1:10, or so it's the colour of weak tea. The liquid is so rich that it can be harmful if not diluted.

#### *What can I do with the worm casts?*

Worms casts can be mixed with potting mix, seed raising mix and compost (about 20% casts to 80% mix), and is the perfect medium into which to plant seedlings, plants and trees. Casts do not have to be diluted for use in the garden, but make sure they are tilled into the soil. For best results, add compost and mulch as soil cover.

