

Information and websites:

RecycleFoodWaste.org

EMROJapan.com

TeraGanix.com

MoSCollective.net

SustainableJC.org

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**How
to
Recycle
ALL
Food Waste
by
Fermentation**

(Pickling food waste using the **Bokashi Method**)

**2 weeks to ferment
2 weeks in the soil**

RecycleFoodWaste.org

Start in the kitchen

What do you need?

- **Airtight containers** that's convenient for your kitchen
- **Fermentation starter (FS)** so the food waste will ferment instead of rot



How to ferment food waste

First, add handful of fermentation starter (FS) to bottom of empty container.

Sprinkle FS every time you add food waste. (ideal ratio 1:33)

Keep container closed **airtight** and at room temperature.

White mold is good if it appears.

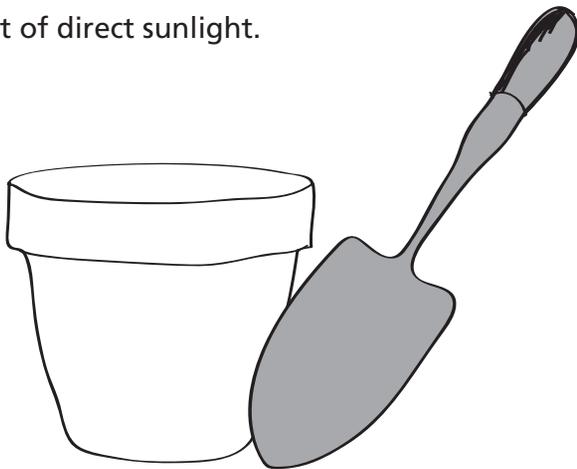
When container is full

Add a final layer (handful) of FS on top.

Let it sit for **2 weeks** at room temperature.

Keep it **airtight**.

Keep it out of direct sunlight.



Comparison

composting	fermenting
30 days – 2 years	2 weeks – 3 months bones: 6 – 9 months
Restrictions on meats, oils, etc.	All food waste
Heats up to 150°F – 180°F Can lose up to half the mass	Under 100°F Very little loss of mass
Greenhouse gases, carbon neutral	Very little to no greenhouse gases, carbon negative
Can burn off nutrients (>160°F)	More nutrients made available
Odor & pests may be problematic if not managed	None or very minimal malodors No pest attraction
Can be labor intensive	Microbes do the work
Pathogens if heat not maintained	Prevents pathogens (pH<4)

What are good microbes?

Beyond just useful, they:

- exist naturally.
- are the dominant species. (not swayed or neutralized by the bad microbes; keep pathogens at bay)
- benefit us wholly.
- are safe if ingested.

Why EM•1?

Culturing, **combining**, and coupling are done for us.

Contains the **dominant species** needed from each type: lactic acid bacteria, yeast, & phototrophic bacteria.

Consistency in **fermenting**.

What is this method?

A 2-Step Process

- Step 1. Ferment the food waste
- Step 2. Convert to a soil amendment

Not a composting method

Very low-tech

Lactic/yeast fermentation or “food-type” fermentation

Food-type = uses same microbes as pickling, curdling, baking & brewing

Developed in Japan and so also referred to as the **bokashi method** (bokashi = fermented organic matter).

The “fermentation starter” is also referred to as **EM Bokashi** (i.e., organic matter fermented with EM•1).

Why ferment?

Fermentation is opposite of putrefaction (rotting)

To recycle ALL food waste

including meats, dairy, bones, citrus, bread, baked goods

To let the microbes do the work

Breaks down more quickly

(microbes break the lignin, fibers, cellulose, and chitin)

Suppresses pathogens

including soil-borne pathogenic fungi (molds that affect plants)

Deters rats

(based on observations of a significant reduction of rats after FFW was trenched several times in NYC community gardens)

No greenhouse gases

(This method is considered as carbon negative.)

Makes a rich organic fertilizer

- more nutrients made available for the plants
- foods grown have higher nutritional values
- Promotes good microbes which attract other beneficial organisms

What to do after 2 weeks fermentation

Three ways to convert fermented food waste (FFW)

In all cases below, mash the FFW with a trowel for a few minutes to create a paste and mix with soil or worm castings before covering.

1. Bury, Trench, or Pit

- Burying FFW in your garden or backyard is a clean and easy way to fertilize the soil.
- If in a **trench**, bury with about 6 inches of soil on top; can plant seeds right away, or seedlings after 2 weeks.
- If in a **pit**, at least 1 foot away from existing plants and 3 feet away from trees; bury about 1 foot deep and cover with at least 6 inches of soil on top; can plant after 2 weeks, or let it be the nutrients for surrounding plants.

2. Into Pots or Planters

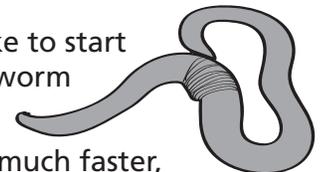
FFW is actually a rich fermented organic fertilizer. You can sandwich FFW between soil in a pot or planter.

1. First, add pebbles or small rocks with/without sand to the bottom of the pot or planter (about 1 inch)
2. Add 1–2 inches of soil (or 1/4 height of pot/planter)
3. Add FFW about 1/4 the height of the pot.
4. And fill to the top with soil.
5. Can plant seeds right away; if planting seedlings, wait 2 weeks, but keep soil moist, do not water too much.

3. Feed To Earthworms

If you have a worm bin or would like to start one, follow the general rules for a worm bin, except:

- Earthworms can go through FFW much faster, 2–3 weeks (usually up to 3 months or more)
- You can feed them more often



How to Make Your Own Fermentation Starter

- Can use any kind of **organic material**: wheat bran, rice bran, saw dust, shredded fall leaves, chipped yard waste, etc.
- Material has to be **dry** and in **granular** form.
- We use **wheat bran** because they are easy to use, they're relatively inexpensive at bulk quantities, and ready to use (no need to dry or crush into granular form).

Ingredients

wheat bran 10 lbs (18.75 qts or 75 cups; 7.5 cups/lb)

molasses 0.8 fl oz (blackstrap molasses)

EM•1 Microbial Inoculant 0.8 fl oz

water 80 fl oz (2.5 qts or 10 cups; 1 cup/lb of bran)

The liquid ratio is 1:1:100, that is,

1 part molasses

1 part EM•1

100 parts water

measuring cup

bowl to mix the liquids

mixing bin

airtight container to ferment the bran in

If excess liquid mix, then bottle it for other uses,
see www.goodmicrobes.org/aem/

(optional) funnel

Mixing

1. Place wheat bran (very dry and flaky) in the mixing bin.
2. Mix the liquids in a bowl:
20 parts water, 1 part molasses, and 1 part EM•1
Fully dissolve the molasses.
3. Slowly add the liquid mixture to the wheat bran and mix until it's about 30% moist (by hand, it should form into a ball but break apart easily when touched).
4. Mix the liquid into the wheat bran thoroughly (no dry spots and no too-wet spots).

When using other materials that may not absorb liquids easily, such as leaves or saw dust, use slightly less liquid. The amount of liquid should be just enough to dampen the material.

Fermenting

After thoroughly mixing, put into an airtight container.

Press down to squeeze out air.

Put a plastic bag or sheet on top of it.

Close lid tight. (optional: place books, or such, on top of the lid)

Mark the container: "**Do Not Open**"
"**Ready after** <date 2 weeks after>"

Let it sit at room temperature, out of direct sunlight.

White mold is good if it appears.

After 2 weeks, air-dry by spreading it out thinly or sun-dry it.

When dry (crunchy feel to it), keep in a container or ziploc away from moisture (keeps for over 1 year), and it's ready to use.