

bokashi

A beginners guide

Bokashi Research and Education
bokashiresearch.org

What is bokashi?

- A fermented material (solid or liquid)

bokashi = fermented organic matter

- A microbial inoculant (added to soil or water)
- A fermentation starter (to ferment food waste)
- Different kinds of bokashi (bokashi ferments)
- Used in different fields (farming, gardening, livestock, water, bioremediation)

Bokashi and EM•1

bokashi method = applying microorganisms and organic matter

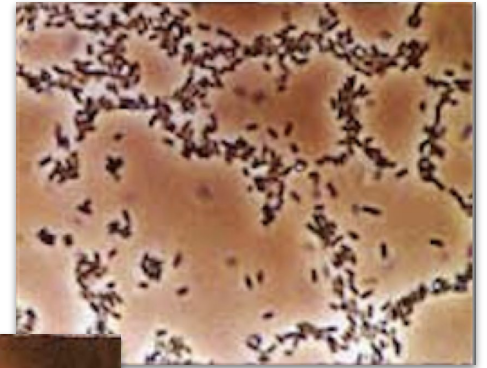
bokashi = fermented organic matter

microbes + molasses + organic matter => fermentation

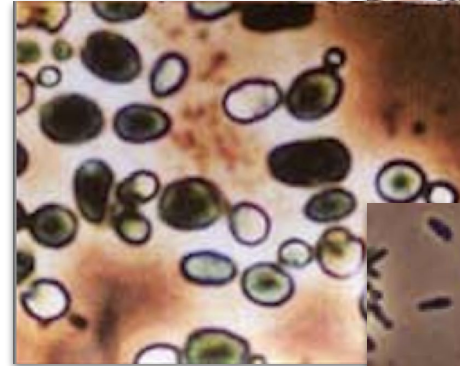
The microbes = EM•1

Effective Microorganisms, EM and EM•1

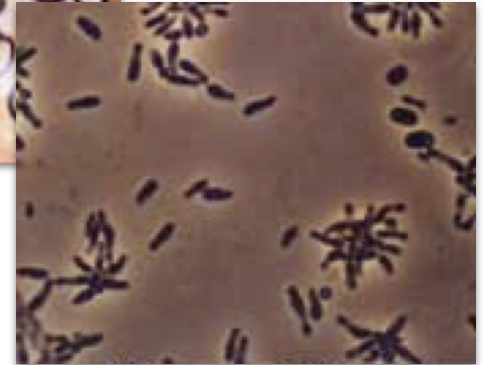
- Combination of 3 groups of microbes
- Microbes function differently when combined
- Naturally exists most everywhere but are usually not found together
- The discoverer (Teruo Higa) called them **Effective Microorganisms** or **EM**.
- **EM•1** is the liquid containing these 3 groups of microbes.



Lactic acid
bacteria



Yeast



Photosynthetic bacteria

The Bokashi Ferments

1. **bokashi spray** or Activated EM
2. **bokashi sprinkle** or bokashi bran
3. **bokashi food waste** or fermented food waste
4. **bokashi mudballs** or EM mudballs
5. **bokashi silage**
6. **EM FPE** (fermented plant extract)
7. **EM•5**

Why Bokashi

- Improves soil health
- Multiplies microbes
- Probiotic for the soil
- Microbes produce metabolites:
 - Feed other microbes
 - Pop. density & diversity
 - Protect plants from stresses
 - Bioavailability of nutrients
- Ambient to warm temperatures
- A biofertilizer
- A biostimulant

Microbial Metabolites

Amino acids

Bacteriocins

Coenzymes

Enzymes

Organic acids

Pigments

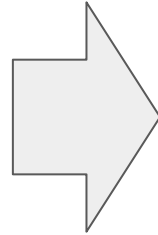
Short-chain fatty acids

Vitamins

Purpose of Bokashi

Primarily

1. Increase microbial pop. & diversity
2. Increase organic matter content
3. Make nutrients more bioavailable



Healthy living soil

By situation

- Good / not-so-bad soil => maintain / improve
- Poor soil => rebuild the soil
- Contaminated soil => bioremediate

How is bokashi used?

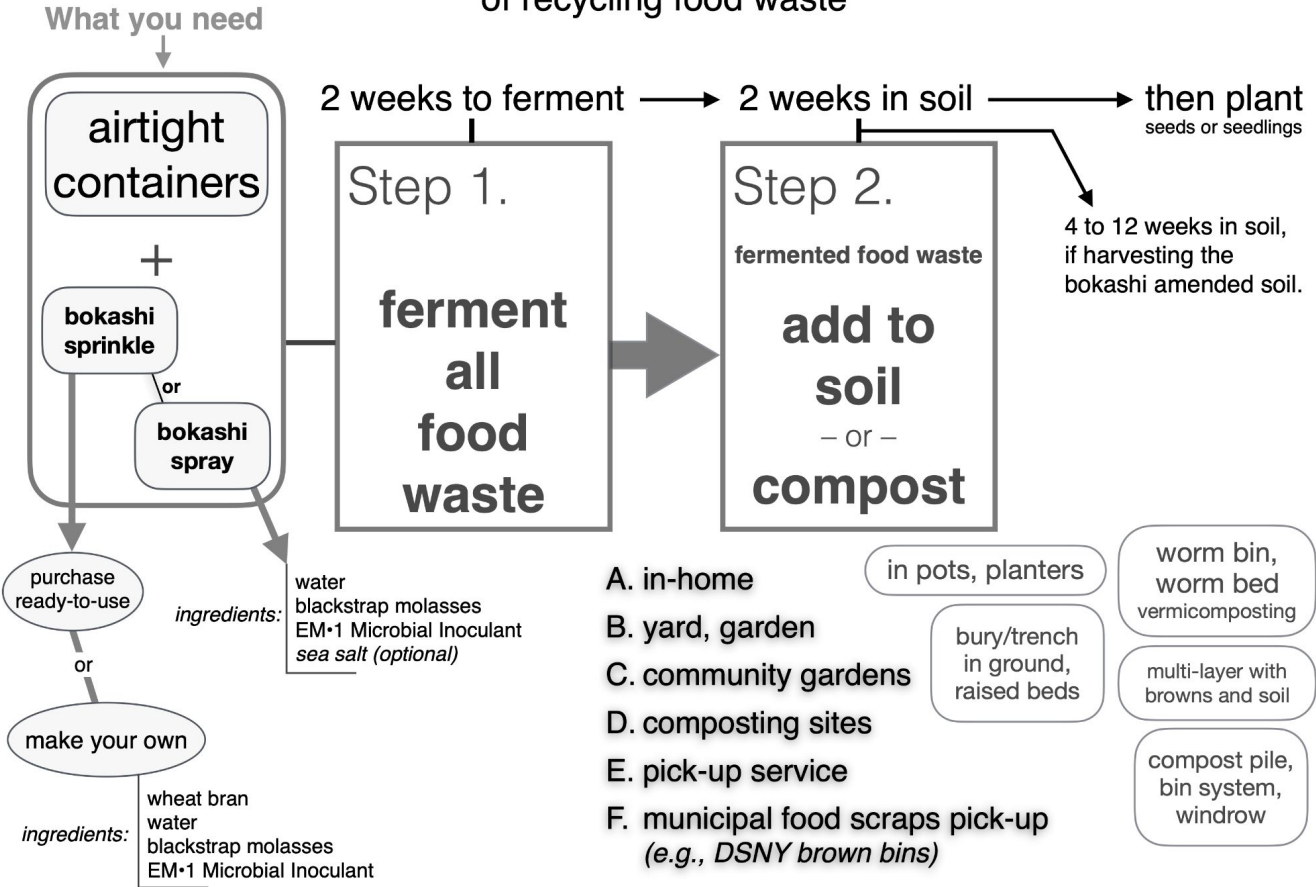
Direct application (one fermentation step)

- Using nutrient-rich organic matter
- Using specific plant/herb traits

As a fermentation starter (two fermentation steps)

- Organic matter as a carrier (or multiplier)
- Ferment other organic matter

The bokashi method of recycling food waste



Difference between bokashi and composting

bokashi	composting
<ul style="list-style-type: none">● Ferments food waste (2 weeks)● Without heat, turning, or air● Fermented food waste:<ul style="list-style-type: none">○ To soil (2 weeks and plant)○ To worms (~6 weeks)○ Composted (4–6 weeks+)● Organic matter:<ul style="list-style-type: none">○ Microbe-dense○ Metabolite-rich	<ul style="list-style-type: none">● Aerobic decomposition● Heat (thermophilic composting)● Turning (a few weeks – 14 weeks)● Curing period (1 month – 1 year+)● Produce humus that contains microbes

How to make bokashi sprinkle



blackstrap molasses
1% to water



EM•1
1% to water



organic material
wheat bran



mix to ~30% moisture
(1 cup water/lb)



pack airtight to ferment



after 2 weeks, ready to use
"wheat bran bokashi"

Bokashi Spray (Activated EM)



Airtight bottle		500 ml	16.9 fl oz
Water		450 ml	15.2 fl oz
Sea salt	~1% salinity	1 teaspoon	
Blackstrap molasses	5%	25 ml	0.8 fl oz
EM•1	5%	25 ml	0.8 fl oz

bokashi composting

Step 1

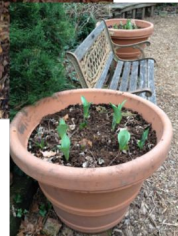
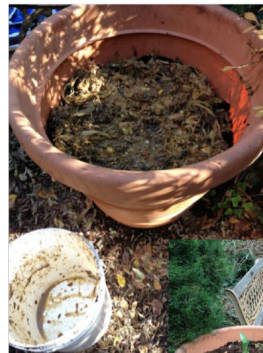
ferment food waste



*El Sol Brillante Community Garden
and the Children's Garden
East 12th St. Ave A & B
East Village/Lower East Side
New York, NY*

Step 2

as soil amendment





Trenching/burying bokashi food waste



Growing various vegetables. Bokashi food waste fed soil is on the left side



Earthworms on what was bokashi food waste mixed with plant matter



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