

How to Make Activated EM

For Home and Garden

GLOSSARY

- **Activated EM** (aka Activated EM•1, bokashi spray): the activation or propagation of the EM-1 microbes by mixing and fermenting EM•1 with water, blackstrap molasses, and sea salt.
- **Bokashi**: A Japanese term, bokashi means *fermented organic matter*.
- **EM, Effective Microorganisms**: combination of 3 groups of microbes: lactic acid bacteria, yeast, and phototrophic bacteria.
- **EM•1 or EM•1 Microbial Inoculant**: the actual liquid containing the 3 groups of microbes.
- **Fermentation**: where microbes convert complex molecules (carbohydrates, sugars) into simpler molecules (carbon dioxide and alcohol).
- **Microorganisms, microbes, and microscopic organisms** all mean the same thing. Microbes are organisms too small to see with the naked eye. Microbes include archaea, bacteria, fungi, algae, protozoa, microscopic plants, and microscopic animals (an example of which is the tardigrade, or “Water Bear”). Some people will include viruses as microbes, others will not because they need a host to thrive.

MATERIALS

- PETE bottle (i.e., soda or seltzer water bottle), that is, the bottle’s design/shape can handle the gas pressure buildup. (For a glass bottle, an airlock is needed to let air buildup out but not in.)
- A funnel is helpful to pour into the bottle.
- Measurement tools: teaspoon, measuring cup (in ounces or milliliters).
- Label, pen or marker.
- Note on water: prepare the quantity of water in the chart below in a separate container, and optionally, heated to about 100°F to help dissolve the blackstrap molasses quickly.
- The sea salt (which is not part of the standard recipe, but which we add regularly) adds minerals to help stabilize the Activated EM prolonging its shelf-life to about a year.

<u>Ingredients</u>	<u>Qty</u> <u>(% ratio)</u>	<u>For ½ qt</u> <u>or 500 ml</u>	<u>For 1 qt</u> <u>or 1 liter</u>	<u>For 2 Qts</u> <u>or 2L</u>	<u>For 1 gallon</u>
Water	90%	14 fl oz or 450 ml	28 fl oz or 900 ml	57 fl oz or 1800 ml	115 fl oz
Blackstrap molasses	5%	1 fl oz or 25 ml	2 fl oz or 50 ml	3.5 fl oz or 100 ml	6.5 fl oz
EM•1	5%	1 fl oz or 25 ml	2 fl oz or 50 ml	3.5 fl oz or 100 ml	6.5 fl oz
Sea salt	~1% salinity	1 teaspoon	2 teaspoons	4 teaspoons	8 teaspoons

Ingredient quantities needed based on the volume size of the bottle.

Optional ingredients (may add one or more of the following depending on purpose or preference)

- Liquid mineral extract [a few drops to a dribble] — also helpful for longer stable activated EM.
- Lemon or lemon extract [1 whole lemon, juice squeezed and the peel sliced and also added]— for cleaning, antiviral and anti-pathogenic properties; adds lemon scent.

- Other materials may also be added, something that is known for their property; the fermentation can then incorporate or enhance that property (e.g., apple cider vinegar at 5%).

How To Mix

1. Fill 1/4 of the bottle with water.
2. Add sea salt and swirl the bottle to dissolve it.
3. Add the molasses and swirl the bottle to get the molasses to fully dissolve.
4. Add EM-1.
5. Fill the rest of the bottle with water.

Let ferment for 2 weeks at room temperature and out of direct sunlight. Daily check for gas (CO₂) build-up. Burp/release the gas by very slightly opening the cap; do not fully open the bottle — during gassing, can close the cap without over-tightening it. The Activated EM should be ready by the end of 2 weeks at which point the color should've turned from black to dark brown and the smell of molasses should be much less with a sour-like fragrance (acidic, vinegary). Optionally, you can use a pH meter or pH paper to check if it's ready; when the pH is 3.7 or below, it is ready to use.

When ready, use as suggested below. Store out of sunlight. Keep at room temperature and airtight. Squeeze out the air if the bottle is soft plastic, or use a wine saver type vacuum cap and pump for glass bottles.

Uses of Activated EM (AEM)

The fl oz/gallon refers to fluid ounce of Activated EM per 1 gallon of water.

Garden & Houseplants: Use 1 fl oz/gallon for watering your garden and houseplants. You can apply with every watering or at least once a week, or 2-3 times a month.

Foliar feeding: Use 0.5 fl oz/gallon for foliar feeding (spraying to the plant leaves), or about 1 teaspoon/quart of water. Spray every other week or once a month.

Laundry: For your regular laundry, you can either use only Activated EM (example, ¼ cup to pre-wash drawer, if available; ⅓–½ cup to detergent drawer or in the laundry drum on the dirty clothes; and ¼ cup to the fabric softener drawer), or use half the amount of your laundry detergent and the other half with AEM.

Tough Stains/Grime: Use 2 to 10 fl oz/gallon for tough stains, especially on grime, greasy or oily stains or buildup, including ovens, oven hoods, drains, etc. For best results, let soak for several minutes to half hour before wiping clean. If does not go away at first, then apply & wipe every day until gone.

Odor Control: Use 2 fl oz/gallon (2-3 teaspoons/quart) for odor problems, including pet odors, urine, as well as for general cleaning (floors, windows, etc.). Use a spray bottle where useful.

Reference.

EM Research Organization (EMRO) emro.co.jp (English version: emrojapan.com), TeraGanix (teraganix.com).

EM-1 is OMRI Listed (Organic Materials Review Institute), omri.org, and can be used by certified organic operations.