

Effective Micro-organisms EM

Bokashi Compost and Ekihi Liquid Fertiliser Workshop November 2014

EM is a collection of beneficial anaerobic organisms used in “Bokashi” composting systems. EM consists of three main groups of beneficial microbes: Lactic acid bacteria, photosynthetic bacteria, and yeasts. These three anaerobic groups work synergistically together and are plant friendly. They dominate, outcompete, and even consume harmful anaerobes.

EM was developed in Japan in the 1980's by Dr Teruo Higa, Ryukyus University, Okinawa. Dr Higa proposed that three types of microbes exist:

1. Positive Organisms (Regenerative) 5%
2. Negative Organisms (Degenerative) 5%
3. Opportunistic Orgs (Trend followers) 90%

The ratio of positive to negative is critical because the Opportunistic majority follow the trend to regenerate or degenerate. Because of this, Dr Higa showed that you can positively influence the soil (or other media) by adding “Positive” micro-organisms.

EM is available in Australia from VRM in Townsville and EM Australia in South Australia.

BOKASHI

Bokashi compost refers to the compost made using EM. **The compost is made in two stages-** firstly, the anaerobic stage, using EM microbes to inoculate and fully colonize the organic materials. This stage takes place in the absence of oxygen. The second stage in the Bokashi compost process is aerobic where the inoculated (or “pickled”) organic materials are spread on the ground and become colonized by beneficial aerobic organisms.

An inoculant is made using EM in a carrier such as wheat or rice bran. Inoculant can also be made in a liquid form using EM, water and molasses. Prepared inoculant can be cheaply purchased from Bunnings – Maze Microbe Solutions Bokashi inoculant in dry (bran) form or liquid spray.

To make the Bokashi compost you need a bucket with an airtight lid. Add kitchen scraps to the bucket (chopped up is better as this increases the surface areas and provides greater contact with the inoculant). Virtually all food-scrap can be added including meat, fish, eggs and shells, onions, cheese and other dairy products, and teabags. Each time you add scraps to the bucket, sprinkle a little bran inoculant over the top (or spray with liquid inoculant), and place the lid on firmly. Continue adding fruit and vegetable scraps and layers of inoculant until the bucket is full. Make sure the lid is on properly, and then leave the bucket in a shady place to allow the EM to fully colonize the organic matter. After this time the contents of the bucket will be “pickled” or fully inoculated. This can be used as a garden fertiliser – spread the Bokashi thinly over the ground, and leave for 2 or 3 days. During this time it becomes re-inoculated with beneficial Aerobic organisms, and can then be dug in around plants roots and will quickly break down.

EKIHI

However, I prefer to use this “**Bokashi Pickle**” to make another fertilizer called Ekihi.

Ekihi is a **Japanese Bio – fertiliser made using freshly cut vibrant healthy chemical free plants, seawater, molasses and Bokashi**. Japanese farmers stress the importance of using lush, healthy plants from chemical free soil. It is best to cut in the morning when the grass is a little moist, and the materials are used immediately. Favourite plants are clover, wormwood, parsley and comfrey, but any healthy plants can be used. I prefer a mixture of whatever weeds and plants look the healthiest.

Here’s the recipe for a 200 litre drum but it can be made in smaller or larger containers – adjust the quantities proportionately .You can make small experimental batches in strong plastic bags like garbage bags.

EKIHI RECIPE

- 130 litres of freshly cut healthy lush grass, weeds, and herbs. Plants should be cut in the morning and used as soon as possible.
- 130 litres of rainwater (if chlorinated water is all that’s available, fill containers and leave for 24 hours to allow chlorine to gas off – sunshine helps, as does agitation).
- 3 litres of molasses (preferably organic, at least food grade)
- 6.5 litres of seawater
- 6.5 litres of Bokashi “pickle”

METHOD

- Put layers of grass in the drum (about 20 litres at a time)
- Over each layer, spread a bit of Bokashi pickle. The recipe calls for 6.5 litres but this is minimum - more is fine (I use my whole bucket- about 15 litres).
- Squash layers down, and then when half full, start adding some liquids. Mix molasses with some hot water to dissolve it, then add it to some of the fresh water to dilute it. Then mix in the seawater, and add this to the drum. Continue adding grass and liquids until all the ingredients are used.
- The drum should now be almost full – about 150mm-200mm from the top. Put a piece of plastic over the top, and then fill with water on top of the plastic to form an air-seal. Some drums may have lids, and this makes it pretty easy to exclude air. If using a plastic bag to make it in, all you need to do is wind the end of the bag up and secure it. Whichever way you do it, air must be excluded.
- Leave the batch to ferment for about a week. After this time fermentation has slowed or finished, and the liquid can be decanted and stored. The grass in the drum can be re-fermented to make a second batch by adding the liquid ingredients again.

The Ekihi liquid is ready to be used straight away – dilute 150:1 as a foliar or ground fertiliser. It can be used stronger with no harm to plants, but do not spray in hot sun. It can be diluted 10:1 and used as a cleaner and deodoriser, or add a cup to the toilet bowl periodically to keep septic systems healthy. Dilute about 50:1 (about a cup in a watering can) to treat compacted soil. It’s great as a lawn fertiliser.

Ekihi stores well in a cool dark place, but it is wise to check shortly after bottling (the first couple of days) – just briefly loosen cap and listen for a hiss of escaping gas. If there is no more gas after a few days, then you know fermentation has ceased, and it is safe to store. I have kept bottles of Ekihi for 12 months or more at room temperature with no problems, tests also showing that the quality had not deteriorated.

So out of a 200 litre drum single fermentation I get over 100 litres of liquid fertiliser (Ekihi), and about 130 litres of fermented grass mulch. This stuff is just like Bokashi “pickle” compost – just spread it out for a few days on the ground and allow the aerobic organisms in the ground to colonise the pickle. It only takes 2 or 3 days, and then you can use it like compost. It’s great! If you like you can help or enhance the aerobic colonization process by adding a little well- made compost as an inoculant.

MINERAL SUPPLIMENTS

I often add a couple of handfuls of powdered basalt dust to the grass/weed/herb mixture to provide extra minerals. If you know your soil has a particular mineral deficiency (say for instance, Boron; then you could add 500gms of Borax, spread very lightly throughout the grass. As the microbes multiply in the fermentation process, they tie up the boron into their biomass (i.e. it becomes chelated) and this will then become available to the plants in a biologically available and useable form. **Don’t add more than 500gms of minerals and be careful what forms the minerals come in.** Oxides are probably the safest forms, and sulphites are OK in small doses (300gms max). Powdered basalt is the best broad spectrum mineral source. But you don’t have to add minerals unless you are targeting a specific deficiency. The grass and the seawater both contain a good range of minerals. But the main value in the Ekihi comes from the particular set of anaerobic organisms, and the way they enhance the environment for a multitude of other beneficial aerobic organisms.

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