

## Effective Microorganisms

*EM or Emma, a wonderful weird potion that benefits everything from soil health to doggy bad breath. Inexpensive, long lasting EM is a mixture of specifically chosen and cultured facultative anaerobic microorganisms. These are similar to the microbes we use to brew beer and wine or make bread. Because these microbes can be stored in an anaerobic (without air) environment they have a long shelf life.*

### What can it be used for?

EM increases microbial diversity in the soil, and strengthens existing microbe populations, EM increases flowering, fruit production and yields. Used as a foliar spray on plant surfaces to acts it as a barrier to disease (avoid spraying on blossoms and young plants)

EM improves seed germination and plant establishment.

On food crops, the use of EM results in longer storage life.

EM improves organic matter breakdown in soil and in compost.

Animals (livestock and pets) benefit from EM added to their water and food as a probiotic. In barns and pens it helps keep odours down and fly populations low. Try spraying some in your cat's litter box!

EM is used to treat wastewater and polluted waterways, and to reduce the concentration of odours, toxic gases, pathogens, nutrients, and metals in sewage. If you have a septic system pour 1/2 cup down a drain every 3 months or so to decrease grey water odor and improve decomposition in the solid tank.

In the household use EM for washing produce, cleaning, and laundry. Humans take food grade EM as a source of powerful probiotics. EM is used in deodorant, toothpaste, and skin care products.

Also used at garbage dumps, for oil spills, and in disaster zones.

**Fac-ul-ta-tive:** In biology, facultative means able to live or take place under a range of external conditions. In the case of EM this means it can exist with or without oxygen.

### *Activating EM*

*Wake up those microbes and 1L becomes 20! After activation EM, now AEM, can be diluted up to 1 part per 10,000 parts!*

### What you need and where to get it

EM mother culture, available from the Gardener's Organic Pantry [www.gardenerspantry.ca](http://www.gardenerspantry.ca)

pH paper and pH colour comparison chart, see sources page 74.

Organic blackstrap molasses, health food store or super market .

De-chlorinated water, de-chlorinate water by letting it stand over night.

Seedling heat mat, available at garden centres.

Seedling tray with a plastic lid, available at garden centres or stores that carry garden supplies.

Styrofoam 1cm (1/2" thick), available in dumpsters, packaging from your new big screen T.V., or craft stores. This is for the base of the seedling tray to keep heat from transferring through the tray.

A bath towel or small blanket.

An empty 1 or 2 litre pop bottle. The bottle must be able to withstand the pressure of fermentation. I made my first batch in a milk jug and blew the lid right off!

The bottle and cap must be absolutely clean. Wash inside and out with hot soapy water, repeat. Fill with a solution of hot water and bleach (100ml of bleach/ 1 litre bottle and 200ml of bleach/2 litre bottle), let stand for a minimum of 1/2 hour. Shake so lid gets bleached as well. Rinse twice with hot water.

Funnel

Small spatula

Measuring cup in ml

### The Recipe For 1 Litre bottle (2 L in brackets)

40ml (80ml) Organic Blackstrap molasses

50ml (100ml) EM mother culture

750ml (1500ml) warm water about 100°F, (40°C).

1. Measure the molasses, use the funnel to add the molasses to the pop bottle. With some of the warm water rinse your measuring cup and funnel scraping molasses into the bottle with the spatula. Add water until the bottle is 1/2 full.

2. Put the lid on the bottle and swirl gently until the molasses dissolves.

3. Add the rest of the water and EM mother culture, no need to shake. Your container should not be full.

4. Put a piece of Styrofoam at the bottom of your tray. This stops heat transferring from the mat onto the surface it is sitting on.

5. Place the heat mat on the Styrofoam.

6. Wrap the bottle in the towel and place on the heat mat. Plug in the heat mat.

7. Put the plastic cover over the whole kit to keep the heat in.

Your EM will start to ferment within 24 hours and will need to be "burped" every day or two until it is done. To burp unscrew the cap and let the gas escape.

Don't neglect doing this or the bottle could burst. As fermentation continues the pH of your EM drops.

After 5 days start to test the pH of EM daily. Pour a tiny bit of EM into a separate container (do not test in the main container). Dip a 1" strip of pH paper into the EM and compare it to a pH colour chart.

Once your EM is below 3.9 pH (desired range between 2.7-3.7).it is ready to use and is now **Activated Effective Microorganisms AEM**.

Store at room temperature out of direct sunlight. Use with abandon!!

### Dilution ratios for soil or compost application

**1:50** 2 1/2 oz.( 1/4cup) of AEM per gallon of water

**1:100** 1.25 oz. 91Tbs) of AEM per gallon of water

### Dilution ratio for foliar spray outdoors and mature plants

**1:250** 1/2 oz. (1 1/2 tsp) per gallon of water

### Dilution ratio for foliar spray indoors and greenhouses

**1:1000** about 10 drops per gallon