

Using EM to make an Insect Repellent

This mix will make a non-toxic chemical free insect repellent. It can be used to prevent pest and disease problems in the garden. It acts by creating a barrier around the plant thereby protecting it from insects. The mix can be enhanced by including garlic, hot peppers or aloe vera . These are chopped or mashed prior to adding to the mix. **Mixing**

Warm water (chlorine free)	300 ml
Molasses	50 ml
Natural vinegar	50 ml
Whiskey or ethyl alcohol	50 ml
EM liquid concentrate	50 ml

Select a suitable sized container for mixing, some plastic bottles with caps for storage and a funnel. Add the molasses to the warm water and stir till thoroughly mixed. Then add the vinegar, whiskey and EM concentrate. Pour the mix into the plastic bottles and add small quantities of chopped garlic etc. Seal as tightly as possible and leave in a warm dark place (20-30 C). **Release any gas produced at least twice daily by releasing the cap.** The EM is ready for use when the production of gas has stopped and the product has a sweet fruity smell. The mix can be stored in a dark cool place which has a uniform temperature for up to 3 months. If garlic etc. has been used, filter this out before storage. Do not store in the refrigerator.

Using EM insect repellent mix

Dilute 20 mls of the mix in 2 litres of clean water in a sprayer and spray enough of the mix to wet the crop. Spraying can begin from seed germination or plant establishment and before pests and diseases can be seen. If an attack occurs use up to 30 mls of solution in 2 litres of water Spray weekly either in the morning or after heavy rains for best results.



Problems, Questions/ Bucket and Bokashi orders:

Contact the team at Garden City Composting,
Metro Place Bromley.

Telephone 941 8830

E-mail waste@ccc.govt.nz

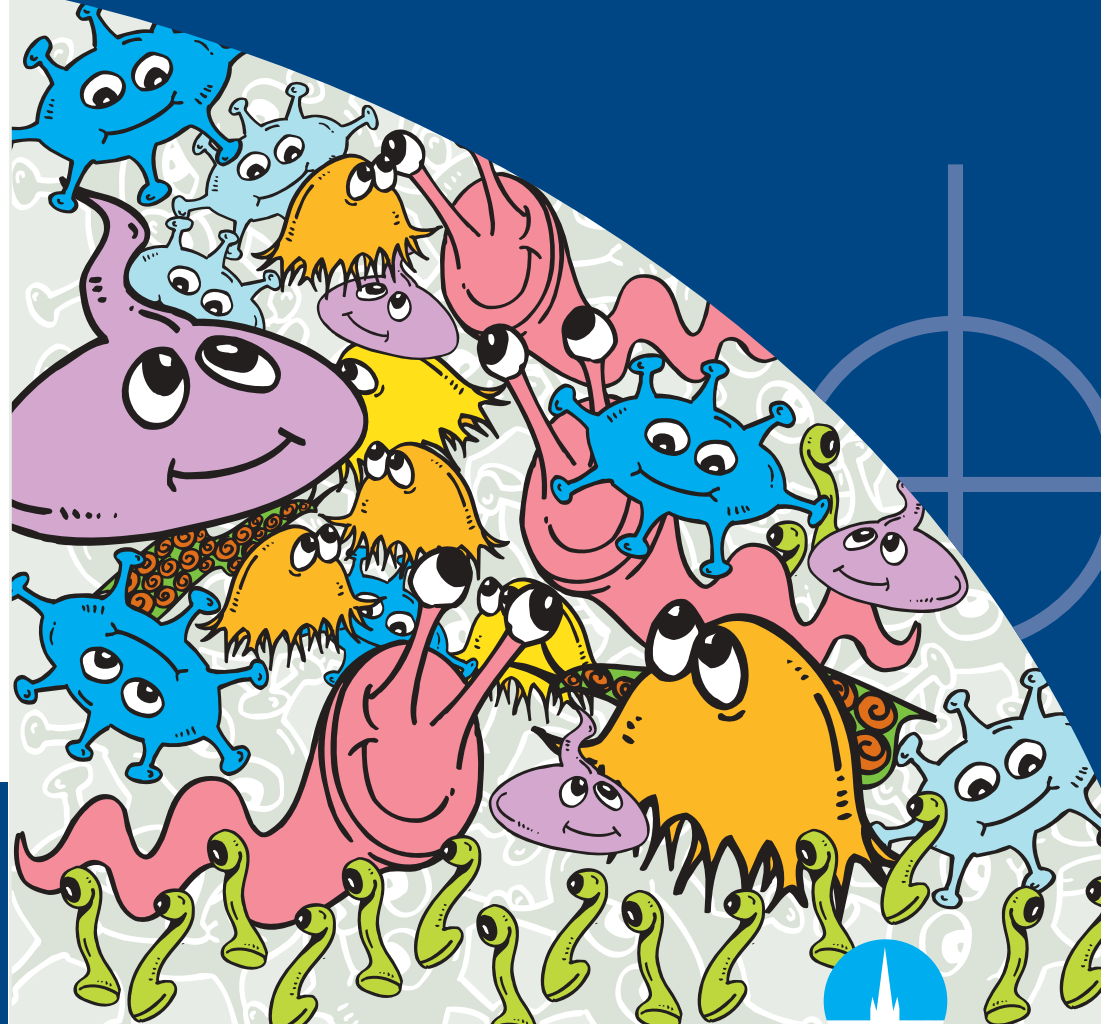


Or check out our website:

www.ccc.govt.nz/waste

A GUIDE TO

Effective Micro-organisms (EM)



Garden City Composting
THE COMPOSTING PROFESSIONALS
in conjunction with NZNFS

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E.M. is an abbreviation for EFFECTIVE MICROORGANISMS

Microorganisms are tiny units of life that are too small to be seen with the naked eye and they exist everywhere in nature. Microorganisms are crucial for maintaining the ecological balance. They carry out chemical processes that make it possible for all other organisms including humans to live. There are friendly guys of the microbial worlds known as beneficial microorganisms and a not so friendly group called pathogens that are harmful and capable of producing disease, decay and pollution.

EM origins

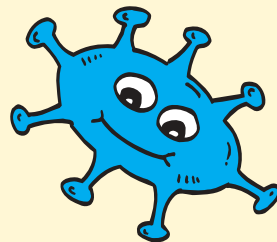
In 1982 Dr. Higa at the University of Ryukyus, Okinawa Japan, discovered a specific group of naturally occurring beneficial microorganisms with an amazing ability to revive, restore, and preserve. He named this group E.M. (Effective microorganisms).

EM the natural product

- EM is the trade mark used to identify this particular mixture of beneficial organisms
- E.M. is a combined culture of aerobic microorganisms (requiring oxygen to survive) and anaerobic (requires no oxygen to survive) that co-exist together to the mutual advantage of both (symbiosis).
- E.M. combines with the existing microorganisms within the soil. They work together to build a healthy living soil.
- E.M. is not toxic or pathogenic and is safe for humans, animals and the environment

EM in action

Current research indicates that EM cultures can suppress soil-borne pathogens, accelerate the decomposition of organic wastes, increase the availability of mineral nutrients and useful organic compounds to plants, enhance the activities of beneficial micro-organisms, e.g., mycorrhizae, nitrogen fixing bacteria, and reduce the need for chemical fertilisers and pesticides. EM helps to increase beneficial soil micro-organisms and suppression of harmful ones.



Using EM Liquid Concentrate:

As a foliage application:

Apply weekly using a clean sprayer and spray directly onto the plants ensuring through wetting. This should be done in early morning or late afternoon for best results and to prevent leaf scorch.

As a soil application:

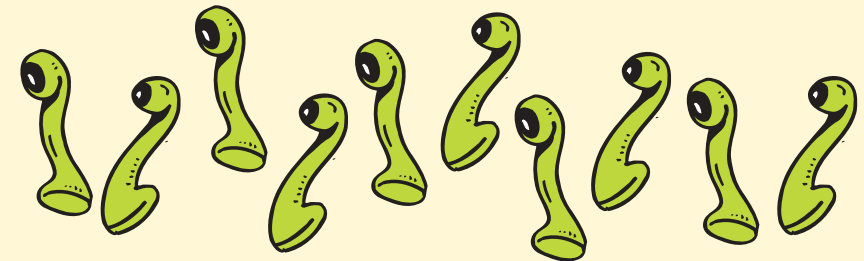
Give a good watering ensuring the solution fully drenches / wets the soil. Apply as required around mature plants or on open ground. When incorporating organic matter/compost into the soil, apply EM dilution to the organic matter before digging in.

No dig gardening:

Cut any annual weeds, grass, or crop residues at least 5 cm from the ground and place the material on the soil as a mulch. Spray EM liquid weekly on the mulch and plants.

As a compost application:

Apply to the compost heap to reduce troublesome odours and flies as well as improving the compost process and quality. Preferably spray on with a hand sprayer to prevent over wetting the compost heap and apply at each addition of fresh material if possible.



EM for the garden

EM is a liquid concentrate and in this form the micro organisms are alive but dormant. It is a dark brown liquid with a pleasant vinegary yeasty type smell. The pH of this liquid is approx. 3.5. To activate the EM simply dilute the concentrated solution with clean chlorine free water. The EM solution which is then produced is a yellowish-brown in colour with a pleasant smell.

Where to use EM Liquid Concentrate:

EM Liquid Concentrate can be used as a pre planting treatment, as a foliar spray, or for actively growing fruit and veggie crops, and for all ornamental plants. In fact anywhere in the garden including your compost heap or areas of poor or stagnant soil.

Applying EM Liquid Concentrate

Use EM liquid concentrate in the garden at the rate of 5ml EM concentrated solution diluted in 1 litre of clean chlorine free water. Apply at the rate of one litre per square metre. These are minimum recommended rates for use.

How to improve the performance of EM concentrate.

(This following procedure is optional)

You will need

- 10 litre watering can
- 10 litres of chlorine free water (water can be left to stand for 24hrs to allow the chlorine to evaporate)
- 10-20mls EM Concentrate
- 10-20mls Molasses or
- 2 tblsp of brown sugar

If necessary, dissolve the molasses or brown sugar in a little warm water first. Then pour the molasses or brown sugar into the 10 litres of water and stir thoroughly. Add the EM Concentrate into the molasses, water mix and stir well. The EM then uses the molasses as a food source, so kick starting it into action quicker.

Leave the mix to stand in a warm place out of direct sunlight for 1-2 hours to allow the EM to activate more fully. Apply at the rate of one litre per square metre. Do not store any of the made up solution. These are minimum recommended rates for use.



6

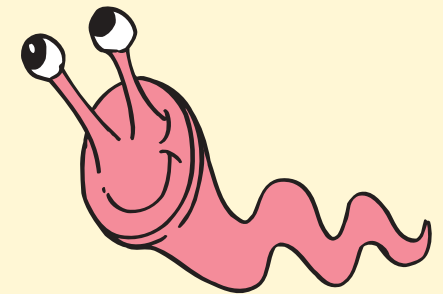
EM in the soil

Most organics including animal manures and composts have populations of micro-organisms. Many of these are beneficial upon introduction to the soil, however they are soon overwhelmed by the existing soil micro-organisms. Thus, the beneficial effects of micro-organisms introduced with the application of composts are often short lived. On application EM cultures are subject to the same fate when applied to the soil environment. But the advantage of EM is that beneficial micro-organisms are in much greater numbers, and in optimally-balanced populations when introduced, so remain dominant in the soil for a much longer time. The effectiveness of EM can be extended in soils by three applications of EM at 8 - 10 day intervals during the first 3 to 4 weeks after planting a crop. This will insure that EM populations remain high throughout a critical a period when young seedlings and plants are vulnerable to environmental stresses (drought, heat, weeds, and pathogens). It is at this stage when the greatest loss in crop yield and quality occurs.

EM cultures and organics

EM cultures have been used effectively to inoculate both farm wastes as well as urban wastes to reduce odours and hasten the treatment process. EM has also been used with great success as an inoculant for composting a wide variety of organic wastes. An EM culture known as EM Bokashi can be used for composting food organics and other compostable materials. EM Bokashi is a fermented compost starter made from sawdust and wheat bran. When the correct conditions are provided EM sets in motion a fermentation process to transform food and other organic materials into compost.

(See 'Guide to EM Bokashi, Bucket Composting Systems')



3

EM effects on soils and crops

EM has been used on many different soils and crops over a wide range of conditions. Results show that in most cases EM gives positive results. EM is not a substitute for other management practices. EM technology is an added dimension for optimising our best soil and crop management practices such as crop rotations, use of composts, crop residue recycling, and biological control of pests. If used properly EM enhances soil fertility and promotes growth, flowering, fruit development and ripening in crops. It can increase crop yields and improve crop quality as well as accelerating the breakdown of organic matter from crop residues. The population of beneficial micro-organisms in the soil is also increased helping to control soil diseases through competitive exclusion. In New Zealand EM has Bio-Gro certification as an "Approved organic product"



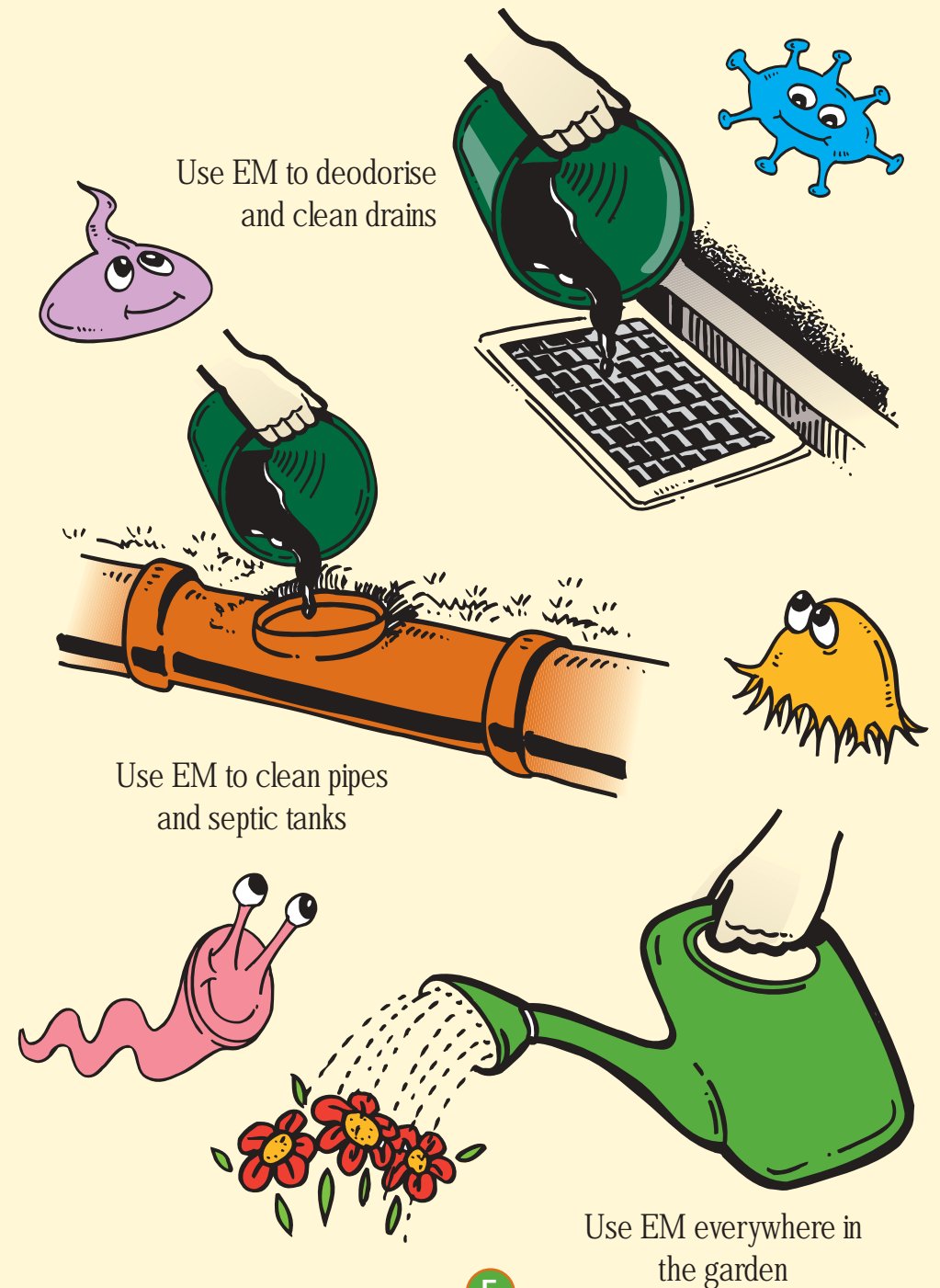
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EM for weeds pests and diseases

EM is not a pesticide and contains no inorganic chemicals. EM is a microbial inoculant that works as a bio-control measure in suppressing and/or controlling pests through the introduction of beneficial micro-organisms to soils and plants. Pests and pathogens are suppressed or controlled through natural processes by enhancing the competitive and antagonistic activities of the microorganisms in the EM inoculants.

How much does EM cost?

EM inoculants are now being formulated in many different countries; the cost is based on cost of production within each country. The aim and philosophy is to make the product available as cheaply as possible, so that cost is not a barrier to use.



5