Spraying of ready to use EM solution: Spray the solution on the ground where compost is to be made at a rate of 2 litres per square metre. The procedure is as follows:

- Mix all composting materials (dry plan material, green plant material and animal manure).
- Make a layer of dry plant materials (20 cm thick) in the pit or above the ground, and spray the diluted activated EM solution on the heap to bring the moisture content to 70-80%.
- Add another similar layer on top of the first one; spray it again with diluted EM solution. The layers can then be made, up to a maximum height of about 1.5 meters.
- Cover the heap/pit with straw, sacks or banana leaves. Do not cover it with plastic sheets.

Turning: Two weeks later, the whole heap or pit is mixed to boost aerobic decomposition. The compost should ready for use within 30 – 45 days. The EM solution functioning as accelerator reduces the composting period from three months to one month.

Production: If the dimension of the pit are; 2m (width) X 4m (length) and 1m (depth) it can accommodate 8 m^3 of materials for composting . At the end of the month, a total amount of 8x460 kg= 3680 kg compost will have been produced. The product can be packed in a 50 kg plastic bag and stored.

For purchasing of EM solution contact:

Ato Gedion Shone

Woljeejii Agricultural Industry PLC. (WAI)
P.O. Box 1892, Debre Zeit (Bishoftu)
Mobile: 0911930006
Landline: 0114339406
E-mail: gedion.shone@gmail.com

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SUSTAINABLE LAND MANAGEMENT PROGRAM (SLMP)

RAPID COMPOSTING

Using Effective Micro-Organisms

SLM ETHIOPIA
german cooperation
DEUTSCHE ZUSAMMENARBEIT
Implemented by: giz

Introduction

While traditional composting procedures take as long as 4-8 months to produce finished compost, rapid composting methods offer possibilities for reducing the processing period up to three weeks. Use of Effective Microorganisms (EM) and vermicomposting are the two common methods of rapid composting in Ethiopia.

Effective Micro-organisms and composting

Use of Effective Micro-organisms (EM) for composting is recent development. The technology was developed in Japan by Professor Teruo Higa, at the University of Ryukyus, Okinawa, Japan, in the early 1980s, currently the technology is used successfully in over 90 countries.

Compost is decomposed organic matter (humus) which has been rotted down by the action of bacteria and other micro-organisms, over a period of time.

Composting is a natural process (made faster and more effective by mixing various types of waste and adjusting moisture, temperature and aeration).

At present, the fundamental challenge for successful composting is the proper aeration of the piles. When using conventional composting methods, heap or pit must be turned frequently or they risk becoming anaerobic and start putrefying. When this happens, foul smelling gases such as ammonia and mercaptans are produced, and harmful bacteria proliferate.

The problem with continually turning the heap or pit to prevent putrefaction is two-fold. One, it is very labour intensive and therefore expensive. Two, even frequent turning is not 100% efficient and anaerobic pockets inevitably begin to putrefy in the piles. EM can help to overcome these challenges.

EM is a brown colour liquid concentrate containing a mixture of beneficial microbes. It is produced from cultivation of over 80 strains of beneficial micro-organisms, which are collected from the natural environment. They are usually described as a multi-culture of coexisting anaerobic and aerobic beneficial microorganisms. The major microbes contained in EM include: Lactic acid bacteria, Photosynthetic bacteria, Yeasts and to a limited extent Acitinomycetes and Fermenting fungi (Diver 2001).

These essential micro organisms produce various organic acids which can suppress harmful micro-organisms and encourage quick breakdown of organic substances. In addition, they can suppress the reproduction of Fusarium, a harmful fungus.

The addition of EM into the composting process can stop odour problems and establish beneficial microbial growth by preventing the anaerobic pockets from putrefying. When carefully managed, EM has the potential to reduce the frequency of turning the piles, saving time and money.

Preparation and Application of EM solution

EM solutions can be purchased from Woljeejii Agricultural Industry PLC in Debre Zeit (for contact details see back). The commercially available EM is usually in a dormant state and cannot be directly utilized. Activation and dilution are necessary before use. The procedure is described below:

Preparation of activated EM solution: This is prepared by mixing the EM stock purchased from local source with molasses and water. Mix well in the ratio of 16 litres of chlorine free water with 3 litres of Molasses and 1 litre of EM. Pour the mixture into a clean plastic container or drum and seal it airtight, so that little or no air is left in the container. During preparation, no glass container should be used. Prepare the activated EM only after washing a plastic container properly and sterilizing it under sunlight for one day.

Keep the container in the shade and at an ambient temperature of 24 – 26 °C for 21-30 days. After this period a white layer of Actinomycetes will have been formed on the top of the solution accompanied by a pleasant smell. The appearance of these properties indicates that the activated EM solution is ready and should be used within 30 days, unless it is poured into smaller containers. There should be no air contact with the EM. Don't use activated EM if it smells bad.

Preparation of ready to use EM solution: This is prepared by diluting the activated EM solution. First mix the activated EM solution, water and molasses in the following ratio: Add two litres of solution to two litres of molasses and 96 litres of water to obtain 100 litres of ready-to-use EM solution. This amount is enough for three heaps or pits