COMPOST

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(Modified by Jaison J. Jerome)

Manuring in general should aim at the production of permanent humus in the soil. This is the purpose and result of using well-made compost. Compost has two uses: as an immediate source of nutrients for a current year's crop, and in the longer term as a soil conditioner, the effects of which will last 5 years or more.

"The real success in Organic farming lies mainly in the quantity and quality of the compost produced and used in the farm"

There are two stages in the decomposition process. Firstly with heat there is a relatively active and quick initial breaking down of the material, and secondly a slower stable humus formation stage under the action of earthworms and bacteria. Earthworms have a vital role in the ripening of the compost. Also, their castings are richer in calcium, potash, nitrogen and phosphorus than the surrounding medium, soil or compost.

Where immediate manuring of a heavy feeding crop is required, compost can be used before the earthworms have finished the maturing process. For improvement or maintenance of soil structure, however, the compost is more suitably used in a mature state, for instance in the manuring of a vineyard or a farm pasture.

Compost materials can be loosely classified into four groups.

1. **Protienaceous**: having a high nitrogen composition such as:
   - All fresh animal manures from cow, sheep, pig, horse, fowl
   - Fish wastes
   - All green plant materials; eg lawn clippings, green weeds, old crops and silage
   - Seaweed meal
   - Blood and bone meal
   - Fresh seaweed

2. **Carbonaceous**: which tend to be more stable and having a higher proportion of carbon in their composition, such as:
   - Hay/ Straw
   - Saw dust and wood chips (untreated)
   - Bark chips/ shredded wood
   - Seaweed dried (as found on the beach)
   - Dry crops such as corn or maize stalks
   - All slashed dried weeds

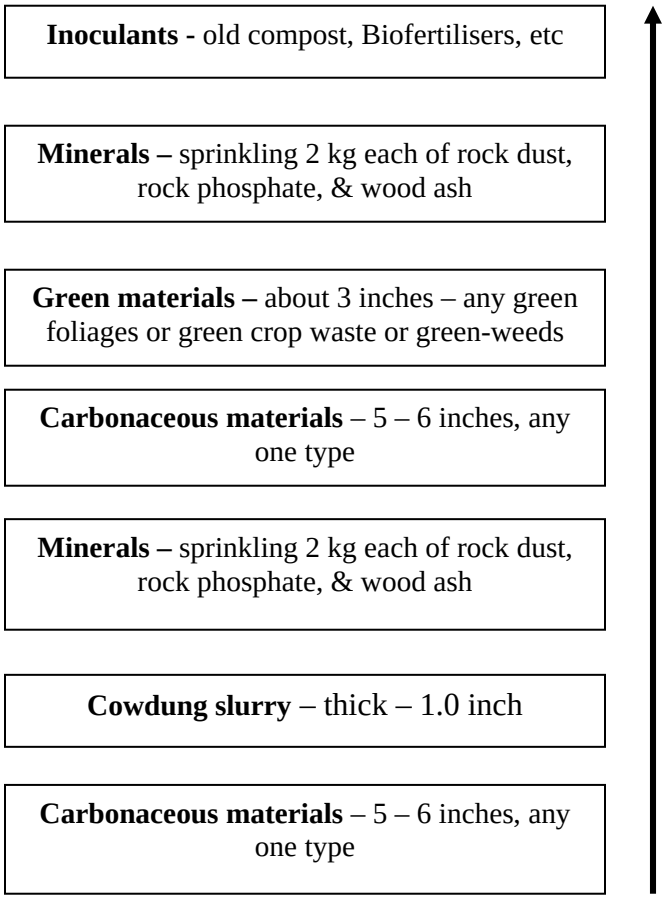
3. **Minerals:** materials from natural mineral orgin and others, such as
   - Lime (hydrated lime)
   - Rock dust,
   - Rock phosphate,
   - Bore well soil,
   - Wood ash
4. **Inoculants:** all microbial cultures
   - Old compost,
   - Vermicompost
   - Biofertilisers,
   - Bio-control agents,

On their own, protienaceous materials tend to putrify, while carbonaceous materials tend to remain in a relatively stable state. The aim of the composting process is to create an environment where an even decomposition of the constituent materials is achieved with a minimal loss of nutrients and the stimulation of a host of beneficial soil organisms.

The making of good compost is not difficult, but regular success is a matter of practice and observation. The following are broad guidelines, which in practice can be used and adapted in the light of experience.

Heaping method

The heap should be made in a specific manner in such way to create proper mixing of all the above said materials. The layering can follow a set pattern as described below:



The set layer with seven layers can be repeated till we reach five feet. While doing so the width and length should be slightly reduced in every layer in such a way that there is a slope on all four sides.

Size, Shape and Situation of the Heap

The heap should not be wider than 2 metres or higher than 1.5 metres, but for convenience it is suggested to have a heap, which is 2 meters wide, 5 meter long and 1.5 meters high, but end the heap with the top as 1.2 meters wide and 4.2 meters long.

This optimal shape of the heap has been found to be sloping. Sloping sides allow for the run-off of water while still maintaining sufficient bulk and density within the heap to retain

warmth and moisture. Building a heap higher or wider than these dimensions can lead to the following problems:

- Tends to be unstable and if too narrow will not heat up sufficiently but dry out.
- Oversized and dense heaps tend to become compressed in the middle, excluding air, inhibiting decomposition at the center.

The site of the heap should be shaded from wind and direct sunlight by desirable trees and shrubs such as Glyricidia, *Sesbania grandiflora*, Giant bamboo, Cassia siamea (Kashid), Guavas alma, Pupil, Neem. Avoid setting the heap near trees with 'hungry' roots such as Pine, Nacrocarpa and Willow.

Resiting compost heaps in the same place will encourage the build-up in the soil beneath, of desirable organisms such as earthworms, bacteria, fungi and algae. These organisms will move quickly into the new heap from the soil and considerably speed up the process as a result.

Materials

A blend of proteinaceous or nitrogenous, carbonaceous materials, minerals and inoculants should be tried. Ideally, one should aim at a homogeneous mixture of ingredients, however in practice it is often easier to construct a heap in alternate layers.

Moisture

An even moisture content throughout the heap should be maintained. Where dry materials are used, they should be well watered, preferably before the heap is constructed, as watering of the heap itself can often lead to over-wetness, particularly at the base. A rough test for optimum moisture content is to firmly squeeze a handful of material. Its consistency should be that of a moist sponge when water can just be squeezed out. The exact amount of moisture in a heap is learned only by experience.

Air

An adequate supply of air throughout the heap is essential to encourage the right kind of bacterial activity. Again, the judgment of this is a matter of experience but the following should give some indications.

If the heap is loosely constructed or has too much air, it will tend to work vigorously for a short time giving off strong ammonia smells and then become rather dry and inactive. If too firmly constructed with insufficient air, the decomposition process will become anaerobic; the heap will smell putrid, sour or like coal tar. It is a good idea, when starting a heap to build a tunnel from the layers of a hay bale running along the length of the heap.

This allows air to flow through the base of the heap, thus avoiding the common experience of the center of the heap becoming wet, compressed and smelly – the first layer should be loose hay or straw (moistened as mentioned). Deep layers of material likely to settle or compress should be avoided e.g. sawdust, lawn clippings or chicken manure. When wet, this kind of material tends to compress into a completely airless mass, unable to break down and likely to become blue and smelly (anaerobic). Alternatively, deep layers of dry stable material will create layers or pockets through which the essential micro-organisms and worms cannot penetrate and do their work.

Warmth

The optimal temperature in a heap is the result of having the right amount of water, air and suitable materials. Heat is produced in the heap primarily by the breakdown of protienaceous, or nitrogenous materials. A heap with too much of these materials will tend to become over hot, and depending on the moisture and air content, will result in either nutrient loss to the air (strong ammonia smell) if airy and dry or, after a brief period of heat, putrid if wet and airless (smelling like coal tar).

Too wet a heap with insufficient proteinaceous material e.g. manure and green material, will tend to remain cold and leach out nutrients, while a too dry one may heat up vigorously for a short time and then become cold and inactive. A well-constructed heap will heat up vigorously within 2-3 days, then gradually cool down over a period of weeks. Subsequent turning will re-stimulate this process but less intensely and for a shorter period each time.

Turning the heap:

The heap should be turned after about 6 weeks at which stage a check can be made on the progress, and corrective measures taken should they be necessary. In a well-made heap, there should be evidence of an even breakdown process throughout with materials being of a brown colour, moist and sweet smelling. Even in the best heaps however, there will be a tendency for the outside to be somewhat drier and less decomposed and the center remains perhaps too moist. The turning process should aim then at bringing the outside to the center and vice-versa so that an even breakdown is achieved throughout.

After the turning the width and height of the compost heaps should be retained like the initial dimensions, but the length of the heaps must be reduced. Moreover it is very critical to watch/ observe the heaps while doing the first turning process. While doing the first turning the following conditions can be observed: -

1, Presence of white fungal growth: -

This is the clear indication of **lack of moisture** after the heaps are made. This fungal growth will spoil the **Nitrogen content** of the materials used. If this condition is observed while turning, sprinkle water and turn in such a way all the material should become wet.

2, No change in the appearance of carbonaceous materials used: -

If there is no change in the colour / appearance of the carbon material, it is the clear indication of **inadequate quantity of protienaceous material.** For this condition, prepare a cowdung slurry and sprinkle it over all the material while turning.

3, Ammonia smell: -

If there is an ammonia smell, it indicates the **excess use of protein materials.** To avoid this condition adequate quantity of shredded carbonaceous materials should be spreaded over the heap and then mixed properly while turning.

Biodynamic Preparations

The Biodynamic compost preparations, which are inserted into the heap at the rate of one set for every five cubic meter of freshly made compost, bring about an order and balance in the decomposition of the compost heap material and likewise, when used on the soil bring about a balance in plant growth.

With good Biodynamic compost, we are able to add a much varied and richer microbiological life to the soil, which can help combat soil-borne pathogens. In a dry pile or one so wet as to exclude air, these preps cannot function to their best effectiveness.

The 502 to 506 are humus-like materials, the 507 is a liquid. All are made from plants. Each must go in its own separate hole – no mixing. Make 6 crowbar holes scattered evenly over the pile, deep enough so that a preparation dropped to the bottom will be about half way down the pile. Make five capsules of BD 502 to BD 506 with the help of good old compost into your hand, one at a time, and drop each into its hole.

This can be performed in a different way be keeping the capsules of BD 502 to BD 506 in the center of the heap while reaching half of the determined height, say 0.75 meters and then building the rest of the heap above this. The 507 liquid is emptied into 5.0 lt of lukewarm water (preferably rain water, at least not water containing chemicals) and stirred vigorously for 15 full minutes, first in one direction, then in the other, alternating rhythmically every few seconds. Make three holes from the top of the heap at equi-distance. Pour one liter into each of the three holes. Then fill up all the holes with old compost or good soil, or ram them shut so that no air pocket is left. The other portions of liquid is sprayed/ sprinkled over the whole pile.

The 502 and 507 will give maximum effect if used promptly on raw, fresh manure or newly piled compost. It is even better to lay them on a half finished pile so as to begin getting their effect sooner, provided there is ample material to cover them well at once and avoid any danger of drying.

Other instructions

Do not fail to watch your pile, digging into the side occasionally. It should not get hot. A temperature of about 120°F is best; over 150°F is harmful. Moisture conditions are very important. For either too much or too little moisture, a crowbar helps. Make crowbar holes all over the pile. This lets in air and dries it out. Grey mold indicates too much heat and resulting dryness. For this, turn the hose into the holes for a while. Close the holes after a few days. A pile that has gotten thoroughly dry, must be remade. Turn it over, wetting it thoroughly as it is turned. Earthworms are a sign of good progress, but they disappear when decay is complete, leaving their capsules behind.

With either manure or compost there are 3 stages of fermentation towards humus:

1. The original smell disappears and the material takes on a woody odor. This may take only a few days.
2. The color becomes uniform dark brown.
3. The original texture disappears and it looks like rich soil.

For best results do not use until the end of this process, when the humus will keep indefinitely with protection from sun and drying winds and with sufficient moisture. A second pile on the same foundation will generally do better than the first and have even more earthworms.