

PREPARATION OF COMPOST MANURE

WHAT IS COMPOST?

- Compost is the product resulting from decay or digestion of organic matter by organisms (bacteria, worms and insects).
- It has the ability to improve the chemical, physical, and biological characteristics of soils.
- It also contains plant nutrients that can be used by crops.

THE COMPOSTING PROCESS

- As indicated earlier, the composting process happens due to the activity of micro-organisms (bacteria) and other larger organisms like worms and insects. These need certain conditions to live. These include moisture and air.
- Compost is made when the micro-organisms work in good conditions. Therefore, to get good compost the following 4 factors: **type of organic material, air, moisture, and temperature** are combined to the best advantage. Below is an explanation of the role each plays in production of compost.

ROLE OF 4 IMPORTANT FACTORS IN COMPOST MAKING

1. Materials Needed to Make Compost

Green stuff

- Green stuff (high in nitrogen) activates the heat process in the compost.
- These materials include: young weeds (before they develop seeds); chicken, rabbit or pigeon manure; grass cuttings; etc.
- Other green items that compost well include fruit and vegetables; fruit and vegetable scraps; vegetable plant remains; plants.

Brown stuff

- Brown stuff (high in carbon) to serve as the "fiber" for your compost. Brown stuff includes dry leaves; dead plants and weeds (avoid weeds with seed); sawdust straw; old flowers; and hay.

2. Air

- The micro-organisms in the heap require oxygen to survive and to do their work converting the organic material. The carbon dioxide which is produced by the micro-organisms as a result of their activity needs to be blown out by a flow of air. If there is not enough air in the heap, the useful micro-organisms will not survive. Other micro-organisms that do not need oxygen will thrive and decomposition of the organic material will slow down.
- When building up the heap put a layer of rough material (twigs) at the bottom, so air can enter the heap.

- It is possible to compost without air (anaerobically), but the process employs different bacteria and an anaerobic compost pile will take on a sour smell like vinegar.
- In case you believe your compost pile needs more air, turn it, and try adding more dry or brown stuff to open up the structure.

3. Water

- The micro-organisms need moisture to live and to spread through the heap. The activity of the organisms will slow down if the heap is too dry. But if the heap becomes too wet, then there will not be enough air and the composting organisms will die. This will cause the heap to ferment rather than compost. Judging the right amount of water requires a little experience. Your pile should be about as damp as a sponge that has been wrung out.
- Depending on your climate, you can add water directly or rely on the moisture that comes in with "green" items.

4. Temperature

- The temperature of the compost pile is very important and is an indication of the microbial activity of the decomposition process.
- If it is warm or hot, everything is decomposing as it should, but if it is the same temperature as the surrounding air, the microbial activity has slowed down and you need to add more materials that are high in nitrogen to the bin.
- The simplest way to track the temperature inside the heap is by feeling it with your hand.

5. Soil or starter compost

- This is not strictly necessary, but a light sprinkling of garden soil or recently finished compost between layers can help to introduce the correct bacteria to start the compost cycle a little more quickly.
- If you are pulling weeds, the soil left on the roots may be sufficient to serve this purpose.

SELECTION OF LOCATION TO PREPARE COMPOST

- A good location should be under shade and sheltered from rain, sun and runoff.
- In rainy places, it is best to make the compost pile above the ground. In drier areas, the pit method is recommended.
- We shall describe the pit method in this leaflet.

PROCESS OF BUILDING UP THE COMPOST HEAP

1. Preparing the compost pits

- Measure and dig 3 rectangular pits 150 cm (4.5 feet) wide, 30 cm deep and 150 cm (5 feet) long or more depending on how much composting material you have.
- Do not make the rectangle wider than 150 cm, to make it easy to work on without stepping on it.

2. At the bottom of the pit, place about 10cm thick of fibrous materials which are difficult to decompose (twigs, straw, hay, maize stalks etc.). This will help air to easily enter the heap and any excess water to flow away more quickly. Sprinkle water evenly on this layer.
3. Next put a layer of dry vegetation material such as grass, banana leaves, tree leaves as the second layer about 10cm thick. Sprinkle this layer with water too.
4. Next put a layer of fresh or semi-decomposed animal dung or slurry to a thickness of 2cm. The function of this layer is to add Nitrogen so as to enable the micro-organisms to function well and to add phosphate and other plant nutrients.
5. The above layer is sprinkled with ash enough to just cover it. The ash contains calcium and potassium that help in regulating the pH.
6. The next layer is of green vegetation such as green plants (preferably leguminous) and kitchen waste that decompose easily to a thickness of 15 – 20cm.
7. On top of this sprinkle top-soil to a thickness of 2cm. The soil not only prevents ammonia produced from escaping but also keeps heat in the heap.
8. Sprinkle water on the whole heap.
9. Repeat the process of piling up layers starting with the dry vegetation material to the green vegetation until the pile is about 1.5m high.
10. Put a final layer of top-soil 5cm thick and cover the whole pile with dry vegetation or banana leaves to avoid evaporation.
11. Take a dry sharp stick about 2m long into the pile at an angle. This stick assists in showing whether the pile is dry or wet and also acts as a thermometer.

Decomposition

- Decomposition will start within 2 - 3 days and the pile will heat up significantly.
- At this time, the stick should feel warm and moist. This is a necessary stage in composting, as the temperature will kill many weed seeds and harmful organisms. The stick should be removed every 7 days to monitor warmth and moisture.
- If the pile fails to heat, there may be insufficient Nitrogen or water in the pile, and more should be added.
- The pile will decrease in size after a few weeks if it is composting properly.

Turning over the pile

Importance of turning over compost

- Compost can be made without turning, but material left at the edge of the heap may not compost properly.
- Weed seeds and any diseased plant material present in this may not be killed. These materials should be separated from the finished compost and used in the next compost heap.

How to turn the compost

- After 2-3 weeks, the pile is ready to be turned over. The pile is turned over into pit 2.

- Turn the pile if the “thermometer-stick” is cold when you pull it out, or if it has a white substance on it, as this shows that decomposition has stopped.
- Turning the pile is important because it mixes the different layers, making the decomposition faster and more complete.
- After another 2 – 3 weeks, all the contents of pit 2 should be turned over into pit 3.
- As the decomposing material from pit 1 is turned into pit 2, a new pile can be prepared and put into pit 1, thus creating a process of continual compost making.
- When turning the pile over, do not add any fresh materials except water.

The process of turning over:

- The layers are mixed and the heap is, as it were, turned upside down and inside out.
- Again, a foundation of coarse plant material is made first. Then the drier and outer, less decomposed part of the old heap is placed in the central part of the new heap. The drier material will have to be watered before the heap can be built up further.
- This core is covered with the rest of the material. The original layered structure is lost.
- Repeat the moisture test and the temperature test a few days after each turning over operation.
- If the stick feels warm when you pull it out, the pile is still decomposing and the compost is not ready.
- Finished compost should have a fresh, earthy smell and should contain no grass, leaves, or animal manure.
- Continue monitoring every 3 days. The compost is ready when the stick finally feels cool when you pull it out.

HOW TO STORE FINISHED COMPOST

- Compost can be stored for a long time. Compost is at its best for 3 – 4 months after it is completed. However, the longer it is stored the more nutrients it loses.
- Nutrients in the compost are lost in the following way:
 - Nutrients in the compost break down further to other forms that escape as gases.
 - Excess water or moisture that collects deep in the pile can cause the compost to rot.
 - Nutrients are lost through exposure to the sun and rain.
 - Nutrients can also be washed away by run-off.
- If compost is ready before the planting season it should be stored proper so that it does not spoil.
 - Compost should be stored in a shade covered with a layer of top-soil, banana leaves or polythene.
 - Stored compost should be covered as above to prevent runoff and leaching.
 - Divert upslope surface runoff around the compost heap.

METHODS OF APPLYING COMPOST

1. For perennial crops such as coffee, bananas, and fruit trees such as mangoes and oranges, apply approximately a tin-full or two per hole at plating. A similar amount should be applied yearly at the bases of the plants.
2. For annual crops such as grains and legumes, compost manure should be spread over the entire planting area at the time of land preparation. It is then dug into the soil. One bucket of the manure is adequate for one square meter.
3. It could be put used at planting time in holes, furrows or rows. Placing in holes is tedious but very useful especially when availability of manure is limited to 1 or 2 hand-full are put in each hole.

It is important to note that the larger the amount of compost applied, the higher the yields and the longer the soil remains productive.

BENEFITS OF USING COMPOST

1. It improves the soil structure, porosity (aeration) and density, thus creating a better plant root environment.
2. Increases infiltration and permeability of heavy soils, thus reducing erosion and runoff.
3. Improves water holding capacity, thus reducing water loss and leaching in sandy soils.
4. It supplies a variety of macro and micro-nutrients. (However, the exact amounts are not easy to be known).
5. It may control or suppress certain soil-borne plant diseases.
6. It adds large quantities of organic matter into the soil.
7. Improves the ability of soil to hold nutrients for plant use.
8. It supplies beneficial micro-organisms to the soils.
9. Improves and stabilizes soil pH.