



**NATIONAL AGRICULTURAL RESEARCH
AND EXTENSION INSTITUTE**

IMPORTANCE OF USING COMPOST

- Mulch
- Increase water holding capacity
- Phyto amelioration
- Eliminate or reduce the use of inorganic fertilizer.
- Helps suppress plant pests and diseases.
- Increases soil nutrient content and water retention in both clay and sandy soils.
- Restores soil structure after reduction of natural soil microbes by inorganic fertilizer.

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Improve Soil Aeration and Reduce Compaction



Thermophilic compost is used in sweet potato production.

THERMOPHILIC COMPOSTING

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Composting of organic waste is an aerobic biotransformation process by which complex organic matter is converted by the action of some microorganisms under controlled conditions (Aeration, moisture, temperature) into a hygienic humus-rich product (compost) for use as a soil conditioner and organic fertilizer.

Compost has high organic matter content. By incorporating compost into the soil, Soil Organic Matter (SOM) is increased, making the soil healthier. Compost can be used directly in crop production as an organic amendment to enhance soil tilth and fertility.

MATERIALS

- Animal manure (cow, sheep, goat, pig)
- Grass [Green (freshly cut) and dry]
- Farm waste (unmarketable produce, skins, and plant residues).
- Water
- Selective household organic waste

MIXING OF COMPOST

- Materials are sorted (items such as plastics, metals and bricks are removed).
- Materials are then mixed.
- Water is then added to the mixture.
- The mixture is then incorporated and piled into a cone-like structure.

TEMPERATURE

Composting essentially takes place within the two ranges known as mesophilic (10-40°C) and thermophilic (over 40 °C). The thermophilic temperatures are desirable because they destroy more pathogens, weed seeds and fly larvae in the composting materials. Regulations set the critical temperature for killing human pathogens at 55°C temperature should destroy most plant pathogens as well. The critical temperature for destroying most weed seeds is 63°C. Hence the composting temperature ranges between 40 to 65°C.

TURNING OF COMPOST

For the first three weeks, the compost pile is turned thrice per week and after the third week it is turned once per week to incorporate oxygen into the piles. In the first three weeks, the compost piles tend to go above the recommended heat capacity for the piles (Above 165°F). To release some of the heat the compost is turned. After the third week the temperature tends to become consistent.

It is only turned when the temperature of the piles begins to decrease.



CURING AND PHYTOTOXICITY

Curing occurs at low, mesophilic temperatures. The oxygen consumption, heat generation, and moisture evaporation are much lower than in the active composting stage. Curing furthers the aerobic decomposition of resistant compounds, organic acids, large particles, and clumps of material that remain after active composting. As a result, the pH shifts toward neutral, the C:N ratio decreases, the exchange capacity increases, and the concentration of the humus increases.



BENEFITS OF COMPOSTING

- Food waste reduction
- Environmentally friendly
- Improve the aesthetic of the farm
- Income generator

MOISTURE CONTENT

Moisture is necessary to support the metabolic processes of the microbes. Water provides the medium for chemical reactions, transports nutrients, and allows the microorganisms to move about.

In theory, biological activity is optimal when the materials are saturated. It ceases entirely below a 15% moisture content.

In practice, however, composting materials should be maintained within a much narrower moisture content range, generally between 40% and 65%.

