# PREPARATION AND PRESERVATION OF COMPOST AND FARMYARD MANURE

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## Compost

The word compost comes from the Latin word '*compostum*', that means "to bring together". Compost is one of the major organic manures derived from decomposed plant residues usually made by fermenting waste plant materials heaped or put in a pit usually in alternate layers with a view to bring the plant nutrients in a more readily available form. Using compost improves soil structure, texture, and aeration and increases the soil's water-holding capacity.

The process of decomposing organic wastes is called composting. Composting is essentially a microbiological decomposition of organic residues collected from rural area (rural compost) or urban area (urban compost).

## Composting materials

**Animal origin:** Dead animal or organs, meat or fish meals, blood meals, dung, urine etc.
**Plant origin:** Leaves, Fresh roots, twigs, crop residues, kitchen wastes, weeds, water hyacinth, sugarcane bagasse, rotten fruits, vegetables etc.

Nutrient content of some common compost

| Types of Compost | Nutrient (%) | | |
|---|---|---|---|
| | N | $P_2O_5$ | $K_2O$ |
| Rural compost | 0.4 – 0.8 | 0.3 – 0.6 | 0.7 – 1.0 |
| Urban compost | 1.0 – 2.0 | 1.0 | 1.5 |

## Composting methods

There are two methods of composting in Bangladesh viz. (1) Underground/Pit/Trench method and (2) Surface/Pile/heap method

**1. Underground/Pit/Trench method:** In this method, composting materials are allowed to decompose in a pit or trench. This method is suitable for dry or winter season because composting materials cannot dried out inside the pit. Generally, a trench of 3 m long, 1.2 m wide and 1.3 m deep are prepared for this process and the composting material are placed in layers. However, the size of the pit may vary depending of the amount of composting materials.

**Site selection**: High land above flood level but near the water source. A place under shade is better for composting.

**Placement procedure of composting materials to pit**:

- Before arranging layers some straw may be placed in the floor of the pit as absorbing materials of rice, wheat, jute, sugarcane, water hyacinth etc.
- A 30 cm thick layer is made by water hyacinths and other waste materials. If the water hyacinths are very long, there should be pieces into 15 cm long.
- About 200 g urea, 200 g TSP are broadcasted on the surface of the layer and then 2.5 cm thick layer of cow dung or clay is made above these materials.
- This procedure should be continued until the pit filled composting materials.
- The layers should not be too loose or to compact.
- When the height of the composting materials becomes 45 cm above the land level, a curved layer can be made by cowdung or clay soil above the composting materials.

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- After about 3 months these composting materials will become ready for using as organic manure.

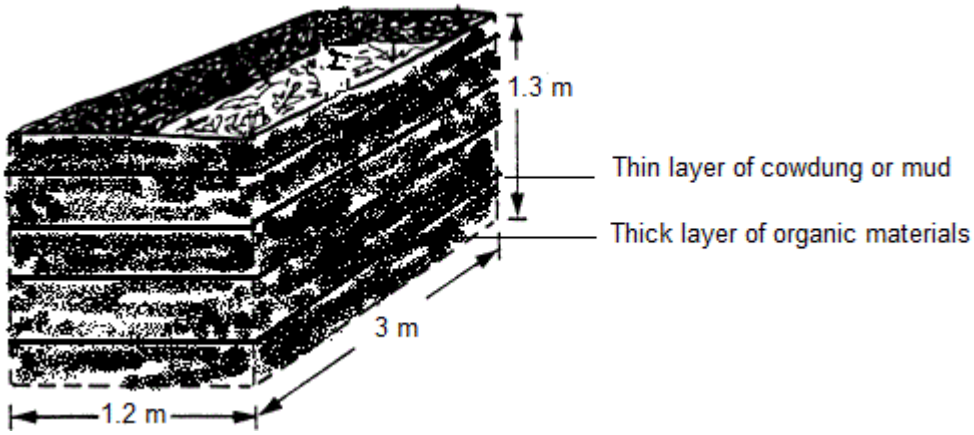



**Fig. A compost pit**

**2. Surface/Pile/heap method**

This method is suitable for excessive rainfall area or for rainy season. The procedure of compost preparation by heap method is mentioned below.

**Site selection**: High land above flood level but near the water source. A place under shade is better for composting.

**Placement procedure of composting materials to make heap**

- A 30 cm thick layer is made by water hyacinths and other waste materials. If the water hyacinths are very long, there should be pieces into 15 cm long.
- 200 g urea, 200 g TSP are broadcasted on the surface of the layer and then 2.5 cm thick layer is made above these materials by cow dung or clay.
- This procedure is repeated until the height of the heap become about 1.3 m.
- After the completion of heap preparation a curved soil layer should be made above the upper surface of the heap or a shade should be making above the heap. After about 4 months these composting materials will become ready for using as an organic fertilizer.

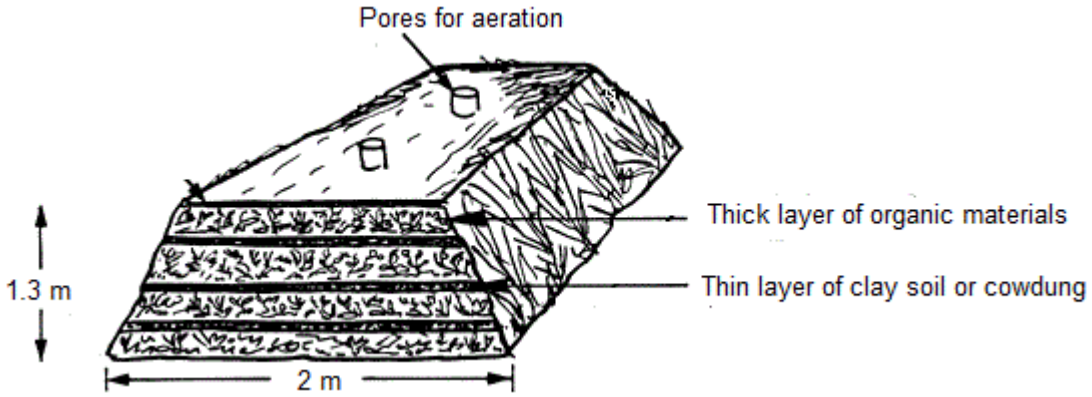



**Fig. A compost heap**

**Preservation of compost**

Certain chemical also takes place during preparation of compost as like as farmyard manure. We can reduce the losses and improve the quality of compost as follows:

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- About 7 days after the completion of heap making or pit filling, Pit or heap should be examined by a stick inserting the middle of the heap or pit containing composting materials.
- If the composting materials of the pit/heap seem excessive wet, several holes should be made on the heap/pit for enhancing drying. After 3-4 days these wholes should be filled with soil.
- If the heap/pit becomes excessive dry, water or urine should be applied of the heap/pit by making some holes.
- To enhance the decomposition, the layer should be inverted two times with 1 month intervals.
- The pit or heap should be shaded by making a shed above the pit/heap.
- Complete composting required 2 to 6 months depending on raw materials and the composting methods.

**Causes of variability of nutrient content in Compost**

The composition of compost is variable as like as farmyard manure. Such as-

1) Composting materials which are used preparing compost
2) Class of animals of which are used to stock the composting materials during compost preparation
3) Types of feed
4) Methods of collecting, making and storage
5) Stage of decomposition

**Farm yard manures**

Farmyard manure (FYM) is a decomposed mixture of dung and urine of farm animals along with wastes feeds, fodder, litter etc. and the bedding materials. The composition of FYM depends on kind of animal, feed and fodder used, age and condition of the animal, nature of litter and method of storage.

**Material required**

**Animal excreta:** Cow dung, urine
**Bedding materials:** Straw, peat soil, sawdust, dry leaves etc

**Preparation of FYM**

Farmyard manure may be prepared by the following methods viz. pit or sub-surface method and heap or surface method.

**1. Spreading of litter**

The litter is the bedding material, which is spread on the floor of the cattle shed, straw, peat soil, sawdust, dry leaves etc. All or any one or more are spread on the floor of the cattle shed.

**2. Collection of manuring materials**

**i. Collection of urine:** After spreading the litter on the cattle shed floor, the cattle are tied on the bedding materials. The cattle excreta urine which soaks the litter cattle urine contains considerable quantities of nitrogen and potash and for that reason litters are used to absorbed the urine.

**ii. Collection of dung:** All the dung voided by cattle is collected with urine soaked litter everyday. For a single cattle, the size of the pit or heap where materials are to be stored is 4.5 m in length, 2 m in breadth and 1 m in depth. Sometimes, the pit or heap are divided into 3 chambers.

**Decomposition process**

The collected urine soaked litters along cowdung are stored in manure pit or heap where former is better when a manure pit/heap has been filled to its capacity. Then it is covered with a thin layer of

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soil 3 to 5 cm thick. Within about 3-4 months these manuring materials becomes ready for using as an organic fertilizer.

**Reinforcement of farmyard manures**

Farmyard manures contain lesser P compared to N and K. In such case K should be applied to make it balanced. The rate of P to be applied is 7.25 kg $P_2O_5$ $t^{-1}$ of FYM.

**Preservation of farmyard manure**

Certain chemical changes/ loses take place in the farmyard manure during preparation and storage some losses are inevitable and considerable the losses are due to-

1) A large urine soaked surface is expected to the atmosphere and the urine is converted to ammonia and later to ammonium carbonate. The loss of ammonia can be reduced by providing suitable litter.
2) The pit should have impervious floor and sides to prevent the nitrogen and potassium from leaching. For that it should made by concrete or clay soil.
3) The manure pit requires some protection against sun and rain.
4) If the upper surface of the manure becomes dry, then pit /heap should be wetted by water or urine to prevent the loss of N by high temperature as well as to make the manure easily mixable to soil.
5) The chemical substances like super phosphate, phosphoric acid etc, can be used in the manure easily mixable to soil pit to prevent the N from loosing.

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