

STUDIES ON PREPARATION OF ORGANIC COMPOST AND BIOFERTILIZERS FROM KITCHEN WASTE

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Abstract: This paper study is on preparation of organic composting fertilizers from kitchen waste. India produces around 3000 million tons of organic waste annually. There are various types of waste that is solid, liquid and gases, which are needed to be handled and the solid waste management covers a vast field. A large amount of peel waste is produced from fruit peel, vegetable Peel and household Kitchen. Composting is a good source idea to reduce the amount of solid waste in landfill. Composting is the transformation of the raw organic material into biologically stable, humic substance suitable for a variety of soils and plants uses. The main product of composting is the compost which is rich in plant nutrients. Organic fertilizers are the end products of composting. Organic fertilizers are the natural fertilizer which are made from vegetables, fruit, animals & many more. Organic liquid fertilizer increases bio-organic fertility of crop. Utilization of this waste material for productivity process is important for both economic and environmental reasons. Thus, compost and biofertilizers plays important role in growth and development of plants.

Keywords: Biofertilizer, Compost, Soil, Kitchen Waste.

1. INTRODUCTION

Solid waste management is becoming critically important in modern days. Many countries are trying to find alternatives for traditional land filling and incinerations. (M. Ahsanur Rahman *et.al.*, 2012). Conversion of waste into valuable organic compost or biofertilizer is the best solution of this problem. Soil conditions and its health status are vital for the growth of plants. Therefore, an integrated nutrient management in which both organic compost and biofertilizers are used simultaneously has been the most effective method to maintain a healthy and sustainable soil system. Composting is one of the best technologies to treat waste in a more sustainable way. From many decades composting has been used as a recycling method for solid organic matter as it improves the soil fertility, soil structure and also it maintains the moisture content of the soil. Composting is a natural process that turns organic material into a valuable humus like substance and this substance is called compost. (Taaib Anjum *et.al.*, 2019)

Application of any organic residue whether from plant or animal origins has direct and indirect effects on the physical, chemical and biological properties of the soil. Deliberate composting of organic materials aimed at providing favorable conditions to encourage microbial activity towards a speedy decomposition requires certain conditions, which favour the growth of the microorganisms under aerobic condition. Composts made from organic wastes; when applied on land; increase soil organic matter and supply plant nutrients in a slowly available form. (Oladapo T. Okareh *et.al.*, 2015).

This process is considered to be the most efficient, environmentally safe and most agronomically sound, where compost can be used as a soil conditioner, organic fertilizer as well as containing high nutrients for the soil. The compost can contribute to the improvement of soil contents and nutrients required for harvesting plants, and will significantly reduce the use of synthetic fertilizers. (Aeslina Abdul Kadir *et.al.*, 2016). The microorganisms decompose the substrate, breaking it down from complex to simpler compounds.

Organic fertilizers are natural fertilizer which are made from vegetables, fruits, flowers and many more. Organic fertilizers are important because they have positive effect on soil without damaging ground water and plants. (Hazren A. Hamid *et.al.*, 2019) Both compost and biofertilizers have a vital role in growth and development of plants.

2. MATERIAL AND METHOD

D) Compost from kitchen waste:

Composting is simply the process of breaking down the complex to simpler compounds in the presence of air and water, using microorganisms and small insects present in nature. The end product is called compost which is rich in readily usable plant nutrients forming a part of healthy soil which helps in growth and development of plants.

Material:

Khamba/compost bin/garden pot

Kitchen waste (vegetable peels, fruit peels, small amounts of wasted cooked food, etc.)

Dry waste (dried leaves, sawdust)

Curd / compost medium

Garden soil

Method:

Step I: Select a container - it can be anything like khamba or compost bin or a garden pot. Make around 8-10 small holes around the container at different levels for the aeration and 2-3 holes at the bottom for drainage of excess liquid from the pot.

Step II: Next, add kitchen waste in the container - it can be both cooked and non-cooked (except - lemon, chillies or non veg that is acidic material which slows the process of decomposition). Kitchen waste contains Nitrogen.

Step III: Add dry waste in the container - it can be dried leaves, flowers or saw dust. Dried leaves contain Carbon.

It is necessary to maintain the Carbon Nitrogen ratio (C: N = 1:2) for functioning of microbes to prepare the compost. Fresh kitchen waste contains maximum amount of Nitrogen and dried leaves and sawdust contains maximum amount of Carbon. The proportion of kitchen waste and dried leaves should be 2:1 respectively.

Step IV: Add Curd in the container above the waste. Curd will help to introduce microbes in the container which helps to decompose the material present in the container into compost. The Lactobacillus present in curd will speed up decomposition rate and start to cycle the nutrients.

Step V: Add some garden soil on top of it to fasten the process of decomposition as soil will again introduce microbes in the container. Mix the material present in the container with the help of spatula. Cover the container with a lid to maintain the moisture and temperature inside the container for microbes.

Keep the container in the warm place to maintain the moisture. After every few days, use a rake to give the pile of waste a quick turn. This will provide enough aeration for the waste to decompose successfully. It will take two/ three months for the compost to be ready.



Compost from kitchen waste

II) Onion peel fertilizer:

Material: Container, Handful of onion peels, Some water, strainer, etc.

Method:

Step I: Fill the onion peels in a container.

Step II: Fill the container with water. Give a nice mixture and make sure all the peels are soaked.

Step III: Cover the container with the help of lid and keep the solution for 48-50 hours in the warm place.

Step IV: After 2 days, strain the solution in a different container.

Add the left-over peels to the compost bin for kitchen waste compost. Onion peel fertilizer is ready to use in the plants. Dilute the fertilizer in 1:2 ratio i.e., 1 liter fertilizer and 2-liter water. Total 3-liter fertilizer is ready to use. Spray the fertilizer on the leaves using sprayer helps in more flowering and better yield. Pour 1/2 cups (50 ml) directly to the soil for healthy roots. Repeat the dosage every 15 days.



Onion peel fertilizer

III) Banana peel fertilizer:

Material: 4-5 Banana peels, water, container, strainer, scissor, etc.

Method:

Step I: Take 4-5 peels of banana and cut them into smaller pieces with the help of scissor or knife.

Step II: Add the banana peels in the container and add some water to it. Give a nice mixture and make sure all the peels are soaked.

Step III: Cover the container with the help of lid and keep the solution for 48-50 hours in the warm place.

Step IV: After 2 days, strain the solution in a different container.

Add the left-over peels to the compost bin for kitchen waste compost. Dilute the solution in 1:3 ratio i.e., 1 liter fertilizer and 3-liter water, total 4-liter fertilizer is ready to use. Spray the fertilizer on the leaves using sprayer which helps in faster development and quick ripening. Pour 1/2 (50ml) of solution directly to the soil for healthy roots. Repeat the dosage every 15 days.



Banana peel fertilizer

IV) Egg shell fertilizer:

Material: Eggshells, water, container, mortar and pestle, etc.

Method

Step I: Wash the eggshells gently with the help of water to remove the left-out part and let it dry completely.

Step II: Crush the eggshells into finer powder with the help of mortar and pestle.

And it is ready to use in the plants. Add 1-2 spoons of eggshell fertilizer directly on the top of the soil. Egg shell fertilizer is rich in calcium which will help plants to grow healthy and strong.



Egg shell fertilizer

V) Used Tea Leaves Fertilizer:

Material: Used tea leaves, water, container, strainer, plate, etc.

Method:

Step I: Wash the used tea leaves thoroughly with running water to remove sugar, milk content.

Step II: Keep the leaves in the plate to dry completely. After it gets completely dry, it is ready to use. Apply 1-2 spoon directly on the top of the soil. Mix it in the compost for better productivity. Repeat the dosage every 10 days. Used tea leaves fertilizer is rich in nitrogen which is helpful for better growth of roots.



Used tea leaves fertilizer

3. RESULT AND DISCUSSION

- Addition of compost in plants helps in reducing the waste, improve the soil fertility and also helps in the growth and development of plants.
- Onion peel fertilizer and Banana peel fertilizer are rich in Potassium, Calcium, Iron, Magnesium, Phosphorous and Copper which increases the resistance of plants towards diseases and also helps in root development, stem growth and productivity.
- Egg shell fertilizer is rich in calcium and it also contains Magnesium, Phosphorous and Potassium which helps the plants to grow healthy and strong. Egg shell fertilizer can also help to control the acidity of the soil.
- Used tea leaves fertilizer is rich in nitrogen that improves the soil productivity and have direct positive effects on roots.

4. CONCLUSION

We can recycle the kitchen waste and yard waste. It is easy and cheaper to make and most importantly it is completely organic. When compared with chemical fertilizers, use of biofertilizers is better for all environmental aspects.

"Recycle the waste, reduce the waste".

"Grow more with little love and care".

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