

The Art And Science of Composting: Cultivation of Wealth From Waste

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Abstract

Composting is an ancient practice that has gained recognition for its significant environmental benefits. The article studies the vital role of compost and explores the art and science of compost by focusing on the cultivation of wealth from waste. Individuals and Communities can unlock the potential of organic waste to enrich soil and promote sustainable agriculture by properly understanding the process and principles behind composting. In this article, various techniques of composting and the factors that lead to the success of the process and further highlights the economic benefits such as its role in enhancing the crop yield, reducing fertilizer use and cost and creating great market opportunities for compost products. Eventually, the article's primary aim is to inspire the readers to include composting as a powerful means of transforming waste into meaningful and valuable resource.

Key Words: Composting, Organic waste, Sustainable Agriculture, Economic benefits.

Introduction

Composting may seem a science, but it's achieved through an effective, natural dance of microbiological activity. Composting is a natural process that transforms organic materials into nutrient-rich soil conditioner, often referred to as compost. Composting is an effective and sustainable method. It is considered an art form as it requires proper techniques and practices to effectively break down organic materials into a valuable resource. This process occurs through the decomposition of organic matter by microorganisms, such as bacteria, fungi, and earthworms.

Composting is an eco-friendly way to recycle kitchen scraps, yard waste, and other organic materials, reducing the volume of waste sent to landfills and enriching soil fertility. Composting involves a delicate balance of "green" organic materials—which are rich in nitrogen, like vegetable peels, coffee grounds, or fresh grass clippings and "brown" organic materials—which are rich in carbon, like dry leaves, paper, or straw. In composting terms, an approximate ratio of 3:1 of browns to greens is generally optimal. Compost bins or piles are strategically designed to foster this organic decomposition. Composting is not limited to large-scale operations; it can be done in various settings, including home composting bins, community gardens, and agricultural facilities. It involves balancing the carbon-to-nitrogen ratio, ensuring proper aeration, and maintaining appropriate moisture levels. Through regular monitoring and turning of the compost pile, the process can be accelerated, resulting in quicker decomposition.

By composting, we can reduce waste from landfills and can also reduce greenhouse gas emissions. The process involves creating an ideal environment for microorganisms to break down the organic matter, resulting in a dark, crumbly substance called compost. This compost can then be used as a natural fertilizer for plants, enriching the soil with essential nutrients and improving its structure.

Aside from the environmental benefits, composting offers economic advantages as well. It reduces the need for chemical fertilizers, saving money for gardeners, farmers, and landscapers. Composting also creates job opportunities in waste management, organic gardening, and soil restoration industries.

Overall, composting is a sustainable practice that not only helps manage and reduce waste but also supports healthy plant growth and soil fertility. By harnessing the art of composting, we can transform waste into wealth, promoting a more environmentally friendly and self-sustaining future.

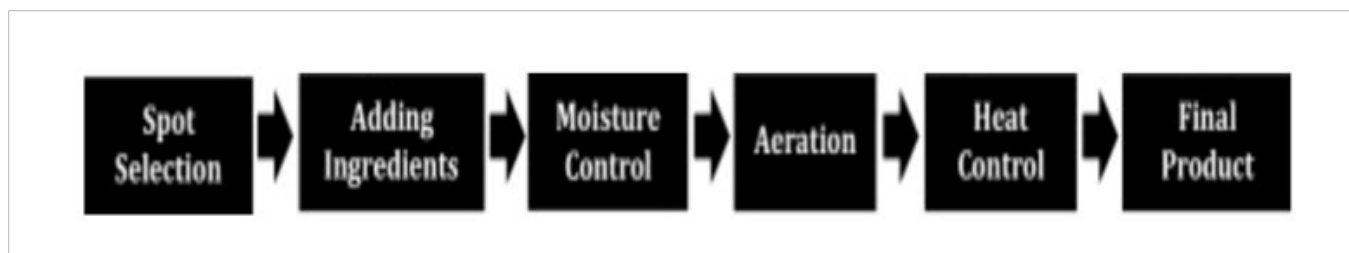


Fig. - Basic steps of Composting Process.

Types of Composting Methods

There are several types of composting methods, including:

1. **Backyard Composting:** This is the most common method for households. It involves creating a compost pile or using a compost bin in your backyard to decompose kitchen scraps (e.g., fruit and vegetable peels), yard waste (e.g., leaves and grass clippings), and other organic materials.
2. **Vermicomposting:** This method uses special composting worms, such as red wigglers, to break down organic matter. It's typically done in bins specifically designed for vermicomposting. Worms help accelerate the decomposition process and produce nutrient-rich worm castings (worm poop).
3. **Aerated or Turned Windrow Composting:** Large-scale composting operations often use this method. Organic materials are piled in long rows or windrows and are regularly turned or aerated to provide oxygen to microorganisms, speeding up decomposition.
4. **Bokashi Composting:** Bokashi is a Japanese method that involves fermenting organic waste with a special mixture of microorganisms. It's often used for food scraps and can be done indoors in airtight containers. After fermentation, the waste is buried in soil to complete the composting process.
5. **Trench Composting:** This is a simple method where organic waste is buried directly in trenches dug in the ground. Over time, the waste decomposes, enriching the soil.
6. **Industrial Composting:** Large-scale composting facilities use controlled environments and machinery to compost organic materials efficiently. These facilities can handle vast quantities of waste and produce high-quality compost for various applications.

The choice of composting method depends on the scale of composting, available space, and the types of materials you want to compost. Each method has its advantages and can result in valuable compost that can be used to improve soil health and promote plant growth.

Backyard Composting

There are two main types of backyard composting:

Cold (also known as Passive Composting) and Hot (also called Active Composting).

Cold Composting is basically anything organic which decomposes eventually on its own. It breaks down the organic matter slowly, but it takes the least efforts and maintenance.

Hot Composting is a faster method, but requires more efforts and maintenance. This method requires proper attention to keep carbon and nitrogen in the optimum ratio to decompose organic waste. It also requires the right balance of air and water to attract the organisms that thrive in an oxygen-rich environment. We can get the final compost in about four weeks to 12 months under favourable conditions.

It is the simplest and easiest to care for, its procedure is described below.

Materials:

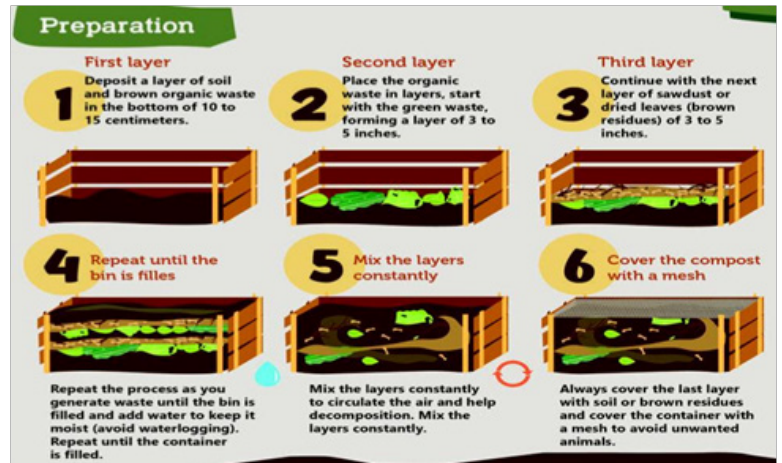
- Plastic bin or box that allows drainage.
- Soil and water.
- Garden waste (grass clippings, fallen leaves, etc.).
- Garden watering can.
- Spade
- Cover with mosquito net.
- Organic waste (see chart).

Greens / Kitchen -

- Green Leaves
- Tea leaves remains
- Fruits and vegetables remains
- Browns / Garden -
- Straw
- Dried leaves

Waste to avoid -

- Faeces of carnivorous animals
- Diseased plants
- Oils, fats and dairy products
- Grass and chopped trees
- Meat, bones or fish remains



Benefits of Composting

Composting offers numerous benefits in terms of environmental sustainability and financial savings. Here are some of the key advantages:

Reduces waste: Composting diverts organic waste from landfills, where it would otherwise produce harmful methane gas. By composting, this waste becomes a valuable resource for enhancing soil health.

Soil enrichment: Compost acts as a nutrient-rich fertilizer, improving soil structure, moisture retention, and overall fertility. It enhances plant growth, reduces the need for synthetic fertilizers, and promotes healthier ecosystems.

Carbon sequestration: Composting helps capture and store carbon dioxide from the atmosphere in the soil. By utilizing compost, we contribute to mitigating climate change and reducing greenhouse gas emissions.

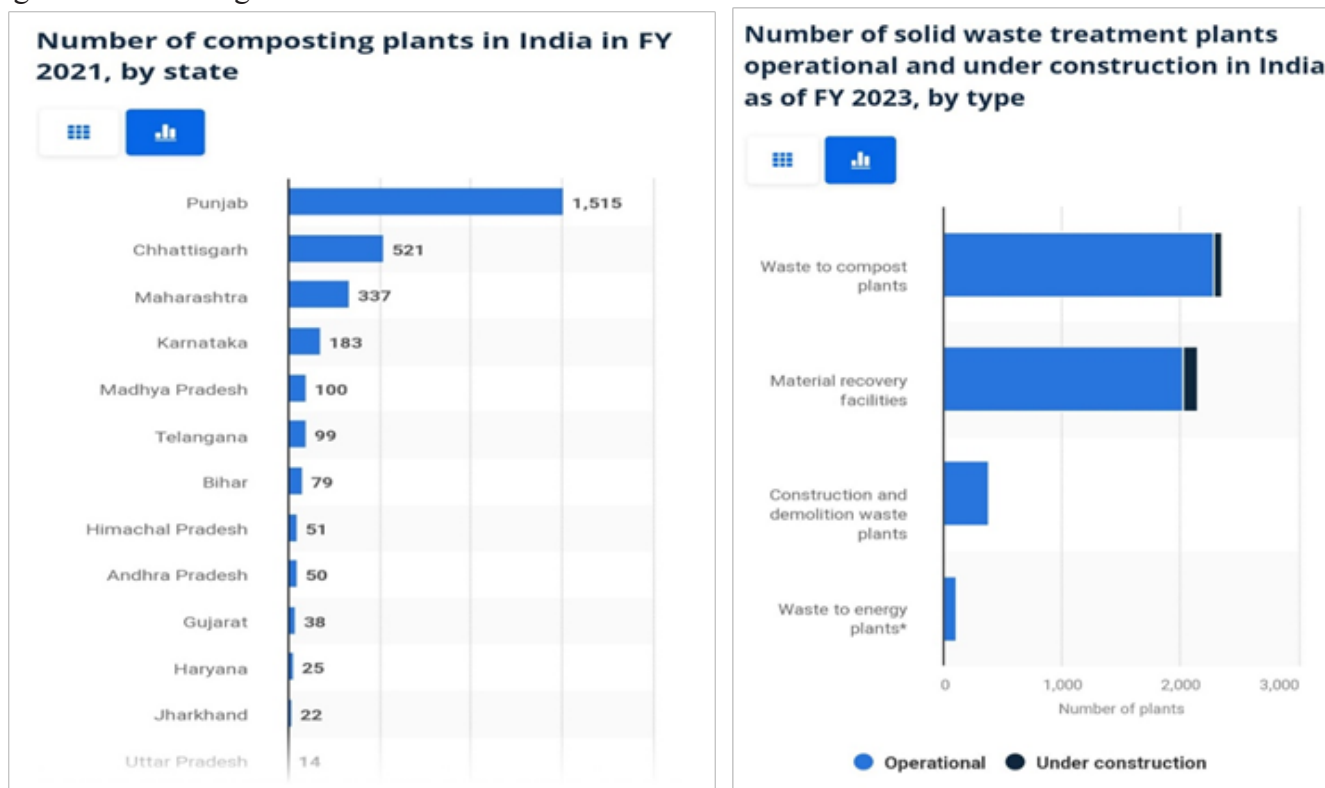
Water conservation: Compost-amended soils have better water-holding capacity, reducing water runoff and the need for irrigation. This supports water conservation efforts and helps mitigate drought conditions.

Reduced soil erosion: Compost improves soil structure and stability, reducing erosion caused by wind or water. This, in turn, helps maintain soil productivity and prevent sediment runoff into water bodies.

Cost savings: Composting saves money by reducing waste management fees and the need to purchase chemical fertilizers or soil amendments. It can also lower water bills due to improved water retention.

Economic opportunities: Composting operations can create jobs and stimulate local economies, especially when implemented on a larger scale. It offers potential for agricultural or horticultural businesses focused on organic produce.

Overall, composting aligns with sustainable practices, promotes environmental health, and contributes to long-term cost savings.



Current Status of Composting in India:

In Financial year of 2021, Punjab had the highest number of composting plants i.e., 1515 in total. Followed by Chhattisgarh, 521 of these treatment facilities, contributing to a total of over 3100 composting plants in FY 2021.

Conclusion

In conclusion, composting stands as a natural process which transforms the waste into wealth. It not only reduces the kitchen household waste but also the landfills. The finished compost product adds the beneficial humus and nutrients to the soil. It also stands as a waste management technique.

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