Journal of Young Scientist, Volume VIII, 2021
ISSN 2344 - 1283; ISSN CD-ROM 2344 - 1291; ISSN Online 2344 - 1305; ISSN-L 2344 – 1283

SHORT REVIEW OF CAPITALIZING ORGANIC WASTE

Anca ȘIPOȘ

Scientific Coordinator: Lect. PhD Eng. Alexandru Ioan CĂLIN

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăşti Blvd, District 1, 011464, Bucharest, Romania, Phone: +4021.318.25.64, Fax: + 4021.318.25.67

Corresponding author email: pinkyblu12@yahoo.com

Abstract

This article is an overview of the reducing the impact of wasted food by feeding the soil and composting based on information from studies made on this topic. The research includes the improvements composting has made in the agriculture, by reduces and in some cases eliminates the need for chemical fertilizers. Another thing about compost, it can help aid reforestation, wetlands restoration, and habitat revitalization efforts by improving contaminated, compacted, and marginal soils. The subject of this research is the benefits of composting in Romania and where is this possible. As a conclusion, it is mandatory to reduce the landfilled quantity of biodegradable waste generated in Romania

Key words*: biodegradable, composting, environment, waste.*

INTRODUCTION

Compost is more than a healing agent for the deteriorated or polluted soil, here in the moist and mouldy pile, spins the wheel of life. Nature created compost, the dead grass, left on the lawn, froze during the winter being transformed into compost due to the humidity in the soil underneath. Birds, insects and animals they all contribute with their bodies to the vast and continuous cycle of rejuvenation. The nature is sovereign.

Waste generation increases with population expansion and economic development. To eliminate the impact on the environment and the populations' health because of improper waste management, the local authorities for each county tried to implement an Integrated Waste Management System (IWMC). Recycling, waste prevention, composting and disposal programmes should give cleaner and safer cities, better resource use efficiency, resource augmentation, saving in waste management costs due to reduced levels of final waste disposal.

MATERIALS AND METHODS

In Romania, one of the counties that implemented this system successfully is Covasna. They build an Integrated Waste Management Centre, that is basically a small factory that has a waste sorting plant, compost plant and sanitary landfill. The project that started over 10 years ago became operational in 2017.

By building the composting plant, they wanted to ensure the adequate treatment of the organic biodegradable waste separately collected from Covasna County. The composting plant has a capacity of 12.000 t/year and collects the organic waste from 89.622 people in urban area and 108.072 from the rural area. The compost station has 1.304 ha and 4 areas. The reception area is the place where the daily fresh incoming waste comes and where it is sorted. The composting area consists of a 13.040 m^2 concrete platform on which the main phases of composting process happen, 2 warehouses measuring 651 m^2 and 625 m^2 for storage and compost processing.

RESULTS AND DISCUSSIONS

Compost is the result of micro-biological fermentation, deodorization and maturity of different organic waste such as grass, branches and leaves from public parks, hay, livestock manure, cake feeds. The benefits of compost include reviving poor soil and plant grow, maintaining the soil moisture, reducing watering

up to 34%, helping to recycle organic waste and helping to neutralize pH soils.
The technological process has several stages. Some are simple like chopping and mechanical sorting and some are more complex involving laboratory testing.
The biological treatment has also three stages. First stages are represented by the mesophilic fermentation, characterized by temperatures between 25°-40°C. The second stage is the thermophilic stage where the aerobic degradation is intense, organic matter decomposes at temperatures up to 50°- 70°C under the action of bacteria. Due to high temperatures the material pasteurizes and the microbes die. During the last stage, maturation, temperatures stabilize at 35°-45°C, some fermentation continues, transforming the degraded material in humus.
The time for the fermentation process is 3 months in the summer season and 4-5 months in the winter season. With a comb-like machine, the windrows are reshuffled for ventilation. The frequency with which these turns are made is given by the moisture content and the type of material. If the moisture percentage is high, the turns will by more often, but if the percentage is low, under 40%, the windrows will need some addition of water.

Figure 1. Compost piles in 1st phase

Aeration is necessary in high temperature aerobic composting for rapid odour-free decomposition and also the aerobic organisms need air to survive. It's important to ensure that the material on the outside of the pile is turned towards the centre, where it will be subject to high temperatures.
It's important to monitor the levels of different parameters to get the optimal conditions in the process of decomposition.
These parameters are:

- -the environment, it needs an aerobic environment,
- -the frequency of turning the piles,
- -temperature should not reach values above 70°C
- -humidity
- -level of rotting
- -water content between 40-70%
- -pH value between 7-11 a little alkaline
- -C:N ratio.

Figure 2. Compost tuner aerating compost piles

Once the temperature is stable at 40°C, the total volume of material is significantly reduced and the piles smell like rich forest soil, then the transformation process is over.
At this stage the material goes through a screening machine, that sorts in one side the coarse materials like strain fragments that are not decomposed, chunks of wood and on the other side the fine powders. The coarse particles will be put in another pile and go through the decomposition process once again.
Once the compost is obtained, it will be packed in bags of different sizes and ready to be sold.

Figure 3. Compost screening with rotating drum

Figure 4. Final compost packaging

CONCLUSIONS

In 2020 the Integrated Waste Management Centre from Covasna County sold at least 1000 tones of compost out of biodegradable waste.
Composting, as a treatment of organic waste, has been proven to significantly reduce the volume of the landfill waste in the county. In addition, composting can also provide nutrients that are suitable for agriculture and can be used as fertilizer to replace chemical fertilizers.
The Integrated Waste Management Centre from Covasna County is a success story. From 32 projects around the country, the one from Covasna, is one a the few fully operational. If more counties will be able to implement this integrated waste management system and make it functional, maybe Romania will come closer to the goal of recycling 50% of its waste. The success of recycling is not only in these systems, but also in the responsibility of the citizens to take part in the selective collecting of the waste.
It is mandatory to reduce the landfilled quantity of biodegradable waste generated in Romania, therefore composting plants provide a viable solution to classical waste management systems, as proven in Covasna County.
In order to reach the national targets set by the Accession Treaty, we have to be aware that only us, as citizens, are responsible to separately collect biodegradable waste and treat it in a composting plant.
In our history, our grandparents living in rural areas used the same process as described in this paper for home composting, and I think we should take into consideration the provided information when we decide to throw away bio-waste to garbage bins.

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SECTION 02
WATER RESOURCES MANAGEMENT