OPEN ACCESS Freely available online

ISSN: 2252-5211
International Journal of Waste Resources

Perspective

Evaluation Changes of Vermicomposting and Thermophilic Compost in Industrial Waste

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DESCRIPTION

Composting is an accelerated bio-oxidation of organic matter passing through a thermophilic stage (45°to 65°C) where microorganisms (mainly bacteria, fungi and actinomycetes) liberate heat, carbon dioxide and water. The heterogeneous organic material is transformed into homogeneous and stabilized by the humus product through turning or aeration. Vermicomposting is also a bio-oxidation and stabilization process of organic material that, in contrast to composting, involves the joint action of earthworms and microorganisms and does not involve a thermophilic stage.

The earthworms are agents of turning, fragmentation and aeration. Most of the vermicomposting studies have been utilized by a qualitative rather than a quantitative approach to addressing the issue of C:N ratio in the substrates. The organic wastes can be broken down and fragmented rapidly by earthworms, resulting in a stable nontoxic material with good structure which has a potentially high economic value as soil conditioner for plant growth.

The compost worms are not subject to these diseases which are caused by micro-organisms that are subject to predation by certain animals and insects (red mites are the worst) and that disease known as "Sour crop" which is caused by environmental conditions. The industrial wastes remain largely unutilized and often it causes many environmental problems like ground and surface water pollution, foul odors, occupying vast land areas etc. the non-toxic and organic industrial wastes could be potential raw material for vermitechnology.

One of the main advantages of conventional composting over vermicomposting is the former which does not require workers to be separated from the product. The aerobic bacteria mostly work in the compost pile which can be safely ignored when the finished product is spread in the field or sorted and bagged. As not all worms take too long to reproduce (compared to bacteria), some give up an entire batch product. The batch systems such as windrow require the product to run through one of the worm harvesters.

Thermocomposting comprises a short period of high temperature treatment followed by a period of lower temperature, facilitating mass reduction, waste stabilization and pathogen reduction. In last two decades, the vermitechnology has been applied for management of industrial wastes and sludges inorder to convert them into vermicompost for the land restoration practices.

The success for which the process depends upon several process parameters like quality of raw material, pH, temperature, moisture, aeration etc., type of vermicomposting system and earthworm species used. Home composting (also known as backyard composting) presents some potential benefits for the industrial treatment of the organic fraction of municipal solid waste or bio-waste.

The applications of composting and vermicomposting processes to waste management have sought generally to obtain products which are commercially valuable. The changes in hydrolytic enzymes and overall microbial activities during the vermicomposting process indicated the biodegradation of the winery wastes. The microbial decomposition is known to be occurring simultaneously with deliberate vermicomposting. The consortium of earthworms, microflora living in their intestines, and those in the growth medium, enhance for the decomposition process of the substrate.

CONCLUSION

It's efficiency was determined based upon the nutrient compost content (N, P) and was highest for industrial waste, followed by institutional waste, agricultural waste, and kitchen waste. Various physical, chemical, and microbiological processes are currently used to dispose of solid organic waste. However, the disadvantages are long process times, frequent aeration, loss of nutrients (such as nitrogen outgassing), and uneven end products. These procedures are time consuming and expensive. It is a suitable technology for converting various types of organic waste (domestic and industrial) into recyclables.

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Received: 06-Sep-2022, Manuscript No. IJWR-22-18845; **Editor assigned:** 09-Sep-2022, PreQC No. IJWR-22-18845 (PQ); **Reviewed:** 30-Sep-2022, QC No. IJWR-22-18845; **Revised:** 07-Oct-2022, Manuscript No. IJWR-22-18845 (R); **Published:** 14-Oct-2022, DOI: 10.35248/ 2252-5211.22.12.493.

Citation: Eynde S (2022) Evaluation Changes of Vermicomposting and Thermophilic Compost in Industrial Waste. Int J Waste Resour. 12:493.