



Vermitechnology: A Sustainable Approach to Manage Organic Waste in Urban Areas

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ABSTRACT: Vermicomposting is the natural process of compost formation by converting organic wastes into organic fertiliser utilising earth worms and cow dung. It is being widely used for solid waste management. Many species of earthworms are utilised in this process such as *Eisenia fetida*, *Eudrilus eugeniae*, *Eisenia andrei*, *Lampito rubellus* and *Drawida willis*. They feed on the organic waste to produce vermicompost, vermiwash and more earthworms as resultant products. Composting process with this technique takes around 28-120 days and it depends upon the type of worms and organic waste used. Kirori Mal College of the University of Delhi is pioneer in adopting the vermicomposting on a large scale. It has put 15 beds in place in its nursery. This set of fifteen composting beds is able to utilise about 1.7 tons of dry leaves in a single cycle and converts them into very nutritious fertilizer. As we could run four such cycles in a year, the Kirori Mal College has the potential of consuming about seven tons of dry leaves annually and put it to a better use, which otherwise, would have been a responsibility of the Municipal Corporation of Delhi. Along with the vermicompost, the process also produces vermiwash, a concentrated liquid fertilizer, which is stored and is being utilized after dilution. The vermicomposting also leads to rapid multiplication of earthworms, which can be sold in the market and the spare ones can be utilised for the next cycle. Vermicomposting for the disposal of the dry organic waste is very cost effective and energy efficient.

KEYWORDS: Cost effective, Eco-friendly, Energy saving, Solid waste disposal and management, Vermicompost, Vermiwash.

INTRODUCTION

Solid wastes generated due to various activities are a universal problem which is faced by most of the countries. These wastes are generated due to several human activities as well as natural adversity (Chalmin and Gaillochot, 2009). Different types of solid wastes in the educational institutions are generated in large scale and their collection and management are very challenging. Right approach towards Solid Waste management plays a significant role for eco-friendly institutions.

In order to adopt a sustainable approach towards environment, implementation of 3R programs (reduce, reuse and recycle) has been regarded as an alternative approach to old-style waste management practices (Shekdar, 2009). It is estimated that in India nearly 700 million tons of organic waste is generated annually that comprises leaves, husk, sawdust, steam bark, flowers etc. which is either burned or land filled (Kulkarni et al., 2020). When these are left as such on soil surface in excess quantity, they cause problems such as bad smell and are the breeding grounds of mosquitoes that eventually lead to fast spreading of the infectious diseases.

Vermicomposting is an environmental friendly process of using earthworms to transform organic, biodegradable waste into a nutrient-rich fertilizer (Vasanthi et al., 2013). Vermicompost contains many essential nutrients along with macro and micro nutrient (Aalok et al., 2010) which are more soluble and readily absorbed by the plants along with plant growth regulators and microbes (Bhojar and Bhide, 1996). It also contains beneficial soil microbes like nitrogen fixing bacteria and Mycorrhizal fungi which are excellent growth promoters (Gopi 2017). The main objective of Vermicomposting is to produce organic manure of exceptionally good quality for the organically starved soil by using the waste generated by institutions, and also contributing towards improvement of the environment as the process itself is eco- friendly. Vermicomposting has attracted a lot of interest in recent years due to increasing environmental concerns and use of sustainable fertilizers (Hosseinzadeh et al., 2018).

Earthworms consume various types of organic wastes such as sewage sludge, animal wastes, crop residues and industrial refuse and reduce its volume by 40-60% (Mitchell et al., 1980; Chan and Griaths, 1988; Hartenstein and Bisesi, 1989). More than 350 species of earthworms are used but *Eisenia fetida*, which is an epigeic (surface dwelling) species of earthworms (Edwards et al., 2010)