KITCHEN WASTE MANAGEMENT - A REVIEW

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ABSTRACT

This paper reviews the disposal of the organic waste and kitchen waste by different methods. India produces 1.5 lakh metric tonne waste per day out of which 50% is organic waste. This huge volume of waste comes from agriculture, urban and industrial sources and also from domestic activities. These wastes pollute the crucial components of the living environment like air, land and water globally. This problem has become more increasing in developing nations like in India compared to developed nations.

Organic waste mostly contains kitchen waste. Kitchen waste is full of nutrients and organic materials, and simply biodegradable. kitchen waste and organic wastes can be utilized with different methods like open dumping, landfilling, composting , etc.composting isone of the best method to treat the kitchen waste,organic waste. It reduces the volume of waste and generatenutritions to the plants.

Keywords: **- Organic waste, Organic Nutrition, Domestic waste, Nutrients, Biodegradable, Kitchen waste.**

1. INTRODUCTION

Now a days urbanization is increasing rapidly and so the population resulting into various pollution. With increasing urbanisation and population the kitchen waste management has become a big problem. The large amount of waste creates lots of problems in day to day life of living creatures and also in Environment. India produces around 3000 crore tones of organic waste annually. Kitchen waste comprises of vegetable peels,fruit peels,uneaten food items,grains,etc. kitchen waste are organic in nature and produces foul smells,desease causing bacterias and it attracts the insects, flies and mosquitoes which can spread various deseases .

Tourism and hotel industries aslo produces a huge amount of organic waste.Hotel industry, in recent years, has been a major reason behind the tremendous growth in Indian GDP. Hotels are the major consumers of resources and contribute heavily toward the waste generation, as compared to others.

2. RECOVERY AND RECYCLING

This is a most necessary step because sometimes many useful products may throw away by the human beings that can be collected in this process and also recycle and change into various useful products. glass, glass bottles, plastic, rubber, tin, tar,etc. are some recyclable products which humans use to throw in the garbage, these products can be easily recycled and reused.

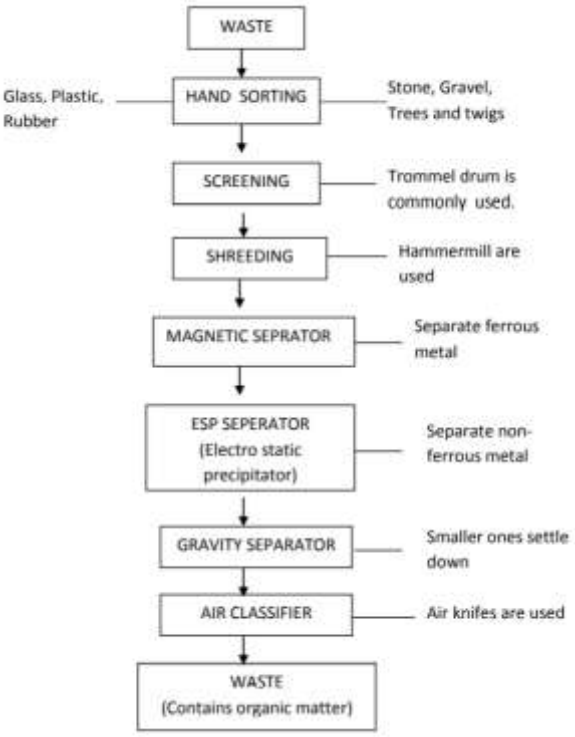

Fig -1: Flow chart for recycling of organic kitchen waste

3. METHODS

3.1 Open Dumping

This is done in low lying areas and outer side of cities and town. It is less cost effective and it is most commonly used method in India. This is not an efficient method of disposal of waste and has the following disadvantages:

1. It causes great environmental damages.
2. Contaminate ground water.
3. Support population of flies, mosquitoes, etc. causes health problem.
4. Causing air pollution due to toxic fumes and gases releases during decomposition of waste.

Fig -2: Open dumping site

3.2 Composting

This is the biological process where fresh organic waste are allowed to be decomposed into humus like substances. In this process aerobic microorganism fasten the decomposition of waste under aerobic condition (presence of oxygen). the end product of the compositing method converts the waste into compost which acts as good manure and increases the fertility of soil.

Fig -3: Natural process of decomposition by small microorganism and bacteria.

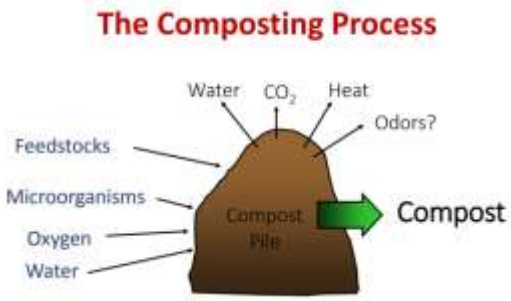

Fig -4: Composting process

3.3 Vermicomposting

Vermicomposting, where the earthworms feed on and degrade the organic waste and convert it into high grade, nutrient rich compost, which acts as a significant biofertilizer and soil conditioner.

Fig -4: Vermicomposting

3.3.1 Collection of material

Kitchen waste material was collect from houses, then air dried and grinded into small pieces. This grinded waste material was mixed with cow dung in the ratio of 4:1 (w/w) and was subjected aerobic composting to initiate microbial activity. Moisture content of the was maintained to 60% to 70% and this mixture was then kept in plastic containers covered with paper having holes to facilitate aeration in order to get final composted material. This mixture was hand manipulated at regular time intervals and remoistened for sufficient microbial activity.

3.3.2 Collection of animals

When the temperature becomes constant and colour of the mixture turns brown to black, it was used as substrate for vermicomposting. For vermicomposting the earthworms (Eiseniafoetida) were obtained from vermicompost unit of Dept. of Botany and Microbiology, B.S.A College, Mathura.

3.3.3 Physico-chemcial analysis

During the composting process the material was analysed for different physico-chemical attributes such as pH, organic carbon, total nitrogen, available phosphorus, exchangeable potassium, C: N ratio and organic matter as per the methods suggested by other workers [4-6], as well as for earthworm number, biomass, cocoon production and weight loss of organic substrate [7-8]. During the course of investigation, the samples were examined at periodic intervals after 15, 45 and 75 days of vermicomposting.

RESULT AND DISCUSSION

It is evident from the data presented in Table 1. that kitchen waste material (control) characterized with high values of pH (9.32), organic carbon (7.25%) and organic matter (12.49%). However, other nutrients such as total nitrogen (0.214%), available phosphorus (0.11%) and exchangeable potassium (0.086%) were found in very trace amounts. The vermicomposting activity significantly modified the physical and chemical properties of kitchen waste material that can be an important tool for organic farming. It is indicated in Table-1 that during vermicomposting the pH declines (from 9.32 to 8.37) with the advancement of vermicomposting period (from 0 to 75 days). It might be on account of high mineralization of nitrogen and phosphorus into nitrates/nitrites and ortho-phosphate. Moreover, the organic carbon content, organic matter and C:N ratio of the kitchen waste material also showed the same pattern and decline gradually upto 75 days. The highest values of organic carbon, organic matter and C:N ratio were obtained in control (0 day) i.e. 7.25%, 12.49% and 30.08% respectively and lowest values were obtained after 75 days of vermicomposting i.e. 3.69%, 6.37% and 4.79% respectively. Moreover, after 75 days of vermicomposting, there is about 10.19% decline found in pH, 49.02% in organic carbon, 49.03% in organic matter and 84.08% in C: N ratio. These data are also supported by Elvira et al. [9], who observed 20 to 42% loss of carbon as CO2 during vermicomposting of paper mill and dairy sludge. Moreover, the increase in earthworm population might also be attributed to the C: N ratio decreasing with time [10]. It is clearly evident from the result of Table 1. that the values of total nitrogen, available phosphorus and exchangeable potassium increased over 75 days of vermicomposting. Lowest values of total nitrogen (0.214%), available phosphorus (0.11%) and exchangeable potassium (0.086%) were found in control (0 day). Moreover, as the time period increases during vermicomposting, these parameters also increases and their maximum values i.e. total nitrogen (0.771%), available phosphorus (0.11%) and exchangeable potassium (0.386%) were obtained after 75 days of vermicomposting. Gunadi et al. [11] also demonstrate that after six months of vermicomposting, the nitrogen content in the end product was high. The perusal of data as revealed in Table-2, that no mortality of earthworm was observed in vermicomposting of precomposted kitchen waste. Garg et al. [12], while working growth and reproduction of E. foetida in animal wastes also opined that precomposting is very essential to avoid the mortality of worms. Increased worm number and cocoon production was found to be maximum after 75 days of vermicomposting. Suthar [13] also noted the changes in biomass and cocoon production and attributed the cause of difference in substrate composting quality. It is clearly evident from Table-3, that earthworm biotechnology greatly reduces the waste amount, besides improving the nutrient pool status of converted biomass for its utilization for one or the other purposes in agricultural production. During vermicomposting of kitchen waste, the weight loss percentage was found to be 61.94%. From the present study, it can be concluded that earthworm biotechnology is the one more economic, ecofriendly waste management technology and resulting in the bioconversion from waste to wealth. Moreover, this waste management technology mediated by earthworm could also be utilized for self employment, resource generation in rural areas and a big income generation resource especially in urban cities.

CURRENT SCENARIO

More than 25% of the municipal solid waste is not collected at all. 70% Indian cities lack adequate capacity to transport it and there are no sanitary landfills to dispose of the waste. The existing landfills are neither well equipped nor well managed.

CONCLUSION

The present studies have given the different the different methods to deal with the organic waste, kitchen waste. Landfilling of the waste leads to the erosion of the soil, open dumping causes air pollution and water pollution when it meets to the ground water source.Composting and vermicomposting is one of the best method as it reduces the volume of waste and produce the humus like substance which is used as biofertilizes and soil conditioner. The vermicomposting activity significantly modifies the physical and chemical properties of kitchen waste material that can be an important tool for organic farming.The present studies suggest a comparative study of different approaches taken so far for kitchen waste management. Here different degradation techniques are highlighted where the parameters are controlled effectively in order to have a useful byproduct.

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