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A Review Study on Municipal Organic Waste Composting

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Abstract – *This paper reviews the utilization of municipal organic waste for composting. Production of municipal waste continues to rise, which causes loss of resources and increased environmental risks. By open dumping and land filling will cause environmental degradation and harmful disease. Composting is the most appropriate economical solution to overcome the problem due to municipal waste. The total waste generated in India is 1.54 lakh metric tonne per day in which 50% of total waste is organic wastes, composting has emerged as one of the best methods for treatment of wastes. Composting reduce the volume of waste generated as well as provide nutrients for plants, also helps in segregation of waste at source. In term of the factor affecting the composting process, temperature, pH, moisture contents and carbon nitrogen ratio are the main factors that contribute to the efficiency of the composting process. This paper shows information on the composting for treating waste as a means of pointing the environmental pollution concerns. Adding additives to the compost have also received much attention in recent years as they enhance the rate of degradation.*

Key Words: Municipal Organic Waste, Refuse Derived Fuel (RDF), Composting, Compost Manure, Environmental Pollution, chemical fertilizer, sustainable waste.

1.INTRODUCTION

As the population increases rapidly in India which causes high rate generation of Municipal Solid Waste. Municipal Solid Waste contains both domestic and commercial waste. The large amount of waste creates lots of problems in day to day life of living creatures and also in Environment. It requires application of some effective strategies for proper disposal of MSW/organic wastes.

Composting is one of the best technologies to treat waste in a more sustainable way, from many decades composting has been used as a recycling Solid waste Organic matter it improves the soil fertility, soil structure and it also maintain the moisture content of the soil. Composting is a natural process that turns organic material into a valuable humus substance, this substance called compost and the waste is composed with the help of worms is known as vermicomposting is a wonderful conditioner for soil, during composting microorganisms such as bacteria and fungi break down complex organic. There are various parameters of municipal waste which are to be considered on the bases of past research as shown in table 1

PARAMETERS	STD. VALUES
PH	5.5-8
MOISTURE	<50
ORGANIC MATTER	>20
NITROGEN	>0.6
CARBON	30-40
C/N RATIO	25-50:1
PHOSPHORUS	No SPECS
POTASIUM	NO SPECS

Table.1

2. LITERATURE REVIEW

Aeslina Abdul Kadir Based on extensive literature review, composting research of different types of organic wastes shown different performance on the effectiveness of the composting process. Composting, as a treatment of organic waste, had been proven to significantly reduce the volume of wastes in the country. In addition, composting can also provide nutrients that are suitable for agriculture and can be used as fertilizer to replace chemical fertilizer. Furthermore, compost can also be used as soil amendments as well as being eco-friendly, hygienic economical and toxic free. In conclusion, during the composting of agricultural wastes the addition of animal manure can enhance the degradation process, whilst in the composting of municipal solid waste and kitchen waste it is important to measure the heavy metal content because of its toxicity and different method of composting influenced the nutrient status of compost. Nevertheless, the compost provided must comply with the standard limit to ensure the quality of the compost [1]

Abira Mukherjee 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. The major challenges in bio-gas, H_2, organic acids etc. produced from wastes are their low yield rates. Large volumes of reactors are needed for producing them to overcome their low production rates. By selecting and applying more competent organisms, finding more proficient processing methods, optimizing the ecological conditions and stringent control of experimental parameters leads to improved yields and production rates [2]

ESTHER VANLALMAWII Due to the increase in the generation of municipal solid wastes, proper management has to be adopted in order to minimize the generation. Managing waste at source is more important than the conventional way of handling waste. Composting is one of the methods to manage the waste at source. Since a place like India has higher composition of organic wastes, composting has become a convenient and effective method to treat the municipal solid waste. It has been found throughout the world that the use of chemical fertilizers and other chemicals is harmful to soil productivity and also a cause of water and air pollution. On the other hand, compost causes no harm to environment and provides suitable nutrients to soil. Adding additives can also help to speed up the biodegradation of waste sand enhance the quality of the finished compost as well .Hence, more research has to be done on additive aided composting [3]

J.C. Hargreaves Composting of municipal solid waste has potential as a beneficial recycling tool. Its safe use in agriculture, however, depends on the production of good quality compost, specifically, compost that is mature and sufficiently low in metals and salt content. The best method of reducing metal content and improving the quality of MSW compost is early source separation, perhaps requiring separation to occur before or at curbside collection. Sewage sludge should not be added to the compost at any point since it will raise the metal content of the compost. [4]

K.R. Atalia In order to meet the challenges of municipal solid waste management there is a need to develop a better technology or method through which the waste can be converted into useful material. The biodegradable organic waste can be processed into ecofriendly organic manure. Organic manure nourishes the soil fertility, increases the soil aeration and also minimizes environmental pollution. Now, it has been realized throughout the world that the use of chemical fertilizers and other chemicals is harmful to soil productivity and also a cause of water and air pollution. Municipal solid waste is suitable for composting because of the presence of high percentage of biodegradable organic matter, acceptable moisture content and C/N ratio in the waste. Composting has a lot of benefits like: reduce landfill space, reduce surface and groundwater contamination, reduce methane emissions, reduce transportation costs , reduce air pollution from burning waste, provide more flexible overall waste management, enhance recycling of materials and can be carried out with little capital and operating costs. It is an environmental friendly, wealth creating and sustainable method rather than directly dumped into earth and is useful to convert organic waste to useful products [5]

Saleh Ali Tweib Composting is an environmentally friendly method rather than directly dumped into earth and it method is useful to convert organic waste to useful products and that would otherwise have been land filled. Compost has a lot of benefits like: reduce landfill space, reduce surface and groundwater contamination, reduce methane emissions, reduce transportation costs , reduce air pollution from burning waste, provide more flexible overall waste management, enhance recycling of materials and can be carried out with little capital and operating costs [6]

Tom L. Richard Separation, size reduction and mixing/ homogenization are all prerequisites to the biological process of composting. The individual physical processes described must be selected and linked together with biological processing technology to form a complete composting system. In evaluating a system design, several criteria stand out as particularly important to these physical processing steps, including cost (capital, operations and maintenance), market specifications for compost and recyclable by-products, and the flexibility of the system to respond to a changing MSW feedstock [7]

3. CONCLUSION

Based on the study it can be conclude that composting is the best way to reduced or recycle the municipal waste and it causes less pollution and more beneficial to the environment as well as to the economy when compared to current methods of waste disposal into open dumps. The compost has a lot of benefits like:, reduce surface and water leachates, minimise landfill space, methane emissions, air pollution from burning waste, transportation costs etc. Compost can be used as organic fertilizer in agriculture field in place of chemical fertilizer. However, the composting process and compost quality can be improved by adding poultry manure, cow manure, yard waste etc. Finally, it is concluded that composting is the best method to reduce or recycle the Municipal Waste and also helps in agricultural field where the compost is useful for growing crops and vegetables with the help of compost and it also increase the employment. It also decreases the rate of pollution from landfills and open dumping.

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