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KITCHEN WASTE COMPOSTING: A SUSTAINABLE WASTE MANAGEMENT TECHNIQUE

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***Abstract*- Population explosion, rapid industrialization and trend of urbanization have resulted in massive migration of people from rural to urban areas. As a result, thousands of tons of waste are being generated. Municipal solid waste (MSW) includes industrial, commercial, institutional agricultural wastes etc. MSW contain higher percentage of organic waste. More than 90% of these wastes were sent for unscientific land fillings, creating problems to public health and environment. Kitchen waste is organic in nature that decomposes quickly, producing foul odours and attracts rodents and insects. Management of kitchen waste reduces or eliminates adverse impacts on land, contamination of the atmosphere, soil and water. The aim of the present study is to convert kitchen waste into useful product for better growth and quality of crops so as to promote sustainable waste management.**

***Keywords*: Municipal solid waste, kitchen waste, composting**

I. INTRODUCTION

Improper handling of solid waste is health hazard and cause damage to the environment. The main risk to human health arises from the breeding of disease vectors like flies, mosquitoes and rodents. Solid wastes are ideal breeding places for pathogens. Improper disposal of solid waste has resulted contamination. The environmental damage cause by wastes is mostly aesthetic in nature. Uncontrolled dumping destroys the beauty of country. There is a danger of water pollution when the leachate from a refuse dump enters surface or ground water resources. Uncontrolled burning of open dumps can cause air pollution. The rest of the paper is organized as follows. Food waste or kitchen waste is explained in section II. Kitchen waste composting and its role in sustainable development is explained in section III. Experiment & results are presented in section IV. Concluding remarks are given in section V.

II. FOOD WASTE OR KITCHEN WASTE

Food waste is a growing area of concern with many costs to our community in terms of waste collection, disposal and greenhouse gases. When rotting food ends up in landfill it turns into methane, a greenhouse gas that is particularly damaging to the environment.

III. KITCHEN WASTE COMPOSTING & ITS ROLE IN SUSTAINABLE DEVELOPMENT

Composting is biochemical process in which organic materials are biologically degraded, resulting in the production of organic by products and energy in the form of heat [1]. Heat is trapped within the composting mass, leading to the phenomenon of self-heating that is characteristics process [2]. It is an ideal way to recycle organic wastes from our home and community. Properly managed compost pile will kill pathogens. Compost will provide nutrients to the plants not only nitrogen, potassium and phosphorus, but also the secondary and trace elements. Compost also improves the physical properties of the soil, such as drainage, aeration, ability to retain nutrients and water, both on sandy and clay soils. Composting is environment friendly economical procedure of organic waste disposal. Moreover, in comparison with mineral fertilizers, compost produces significantly greater increases in soil organic carbon and some plant nutrients [3-5]. Sustainable agriculture can be defined as a set of practices that conserve resources and the environment without compromising human needs and the use of organic fertilizers such as animal manure has

been indicated as one of its main pillars [6]. This review assesses the potential end uses and sustainable market for this organic residue.

Processing of kitchen waste material through composting, reduces the environmental risk by transforming the material into safer and more stable product suitable for application to soil [7], and also reduces the transportation costs. Composted materials are therefore gaining acceptance as organic fertilizers in sustainable agriculture, and there has been a considerable increase in research dedicated to the study of the effects of compost on soil properties and plant growth.

On many farms, the basic composting ingredients are animal manure generated on the farm and bedding. Straw and sawdust are common bedding materials. Non-traditional bedding materials are also used, including newspaper and chopped cardboard. Cattle manure possesses good qualities for composting [8].

IV. EXPERIMENT & RESULTS

Kitchen Waste was collected and segregated from the hostel mess of IIS University, Jaipur. The kitchen Waste collected was tested and also used for the preparation of the compost. Three pots were taken having 1 kg kitchen waste in each along with cow dung. The experiment was carried out in triplicates.

Table I shows the average values of tested physico- chemical parameters of kitchen waste and compost. Available Phosphorous, magnesium and total nitrogen are found high in compost and calcium, exchangeable potassium and organic carbon are found high in kitchen waste.

Table I
Experiment Results

Parameters	Phosphorous (%)	Calcium (mg/kg)	Exchangeable Potassium (mg/kg)	Magnesium (mg/kg)	Organic Carbon (%)	Total Nitrogen (%)
Kitchen waste	0.35	10600	28000	1500	65.91	0.000872
Compost	8.757	6226.66	6630	4006	16.53	0.11

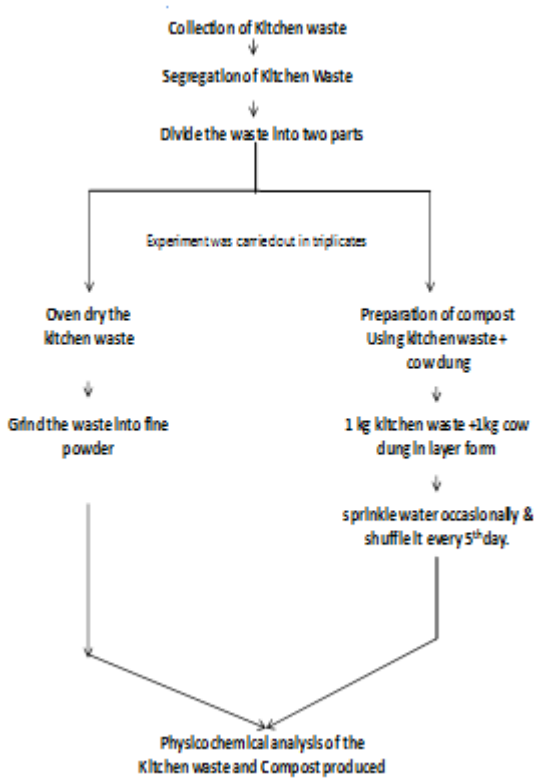

Fig.1 Schematic representation of methodology

V. CONCLUSION

Management of solid waste reduces or eliminates adverse impacts on the environment, human health and supports economical development for the better quality of life. The productivity of agricultural land and soil quality needs improvement. The poor farm management technique and improper use of agro-chemicals has also resulted in both soil quality and environmental degradation. Vegetable waste provides good amount of nutrients for inhabiting microbes, they are neither pathogens nor concerned with human health. However, they are prone to strong odors during decomposition.

The aim of the study is to convert kitchen waste into a useful product for better growth and quality of crops and thus this low cost technology has economic, environmental and societal relevance. No chemicals are used in the production process. Do not have any residual effect after application.

V. REFERENCES

[1] Semple K. T., B. J. Reid and T.R. Fermor (2001) Impact of composting strategies on the treatment of soils contaminated organic pollutants. *Environmental Pollution*, **112**, 269-283.

[2] Garcia-Gil, J.C., C. Plaza, P. Soler-Rovira, and A. Polo (2000) Long-term effects of municipal solid waste compost application on soil enzyme activities and microbial biomass. Soil Biology and Biochemistry 32 (13), 1907-1913.

[3] Nardi, S., F. Morari, A. Berti, M. Tosoni, and L. Giardini (2004) Soil organic matter properties after 40 years of different use of organic and mineral fertilisers. European Journal of Agronomy 21, 357-367.

[4] Weber, J., A. Karczewska, J. Drozd, M. Licznar, S. Licznar, E. Jamroz, and A. Kocowicz (2007) Agricultural and ecological aspects of a sandy soil as affected by the application of municipal solid waste composts. Soil Biology and Biochemistry, 39, 1294-1302.

[5] Sunkee Han, Hang-Sik Shin (2004) Performance of an innovative two stage process converting food waste to Hydrogen and Methane. Journal of the Air and Waste Management Association, 54, 242.

[6] Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R. And Polasky, S. (2002). Agricultural sustainability and intensive production practices. Nature, 418, 671-677.

[7] Lazcano, C., Arnold, J., Tato, A., Zaller, J. G. and Dominguez, J. (2009). Compost and vermicompost as nursery pot components: Effects on tomato plant growth and morphology. Spanish Journal of Agricultural Research 7, 944- 951.

[8] Dougherty, Mark. (1999), Field Guide to On-Farm Composting. Ithaca, New York: Natural Resource, Agriculture, and Engineering Service.

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