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Larm as a Necessity during Composting and/or Vermicomposting of Kitchen Refuses

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Abstract:

Kitchen refuses are an array of discarded stuffs that originate in the kitchen of urban category and find disposal problems at large. With the mushrooming of multy-story apartments, the space of the backyard of the yester years is nothing but a dream. Although an immense effort is put in, in clearance of garbage yet cleanliness and time accuracy is still a wanting scenario under Indian circumstances. Usefulness of kitchen refuse as composting was an old world scenario wherein a backyard with an orchard, a flower garden and kitchen garden was made use of the thrown kitchen refuse. Currently many urbanites certainly want to make use of kitchen refuse into utilizable manure from the point of eco-friendly, pollution-free zone; however a method although exist the problem of leachate, smell and fly menace limits the technology of aerobic composting and vermicomposting. In the present paper a simple use of LARM either as cocopith, bagasse and or jute waste has solved the problem of leachate, fly menace and obnoxious odor at one go and result in complete aerobic compost /vermicompost. The study reveals the avoidance of energy oriented engineering models are not a mandatory. The simpler composting/vermicomposting can be an act by use of LARM.

Keywords: Kitchen refuse, compost earthworms, aerobicity, LARM use.

1.0 Introduction:

Kitchen refuses are the source of organic pollution in Indian urban areas. 60% of the populace being vegetarians, the output of decomposable refuses accounts for av.65%. Simple option to decompose kitchen refuse (Fig: 1) is composting and with an extended activity of vermicomposting for stabilization of the process to obtain complete transformed product that lacks further anaerobic degradation and can be kept for any length of time as processed material. The existing works in line of kitchen refuses are many (Kale and Sunitha, 1993; Kale, 1998; Chaudhuri et al., 2000; Adhikari, 2005; Sutar and Singh, 2008; Chitravadivu et al., 2009), yet a noticeable members practice and end with an unsustainable activity under the composting or vermicomposting due to the problems faced as leachate, odor and fly menace. The present work shows simple use of LARM (Fig: 2) of cocopith/bagasse/jute waste to overcome the problems that calls for a sustainable practice by a kitchen worker at ease.

2.0 Materials and Methods:

A shallow container with less depth and more surface area as shown in Fig: 3 and 4 of 1.5ft diameter (from outer rim) and with 0.75ft depth was filled with kitchen refuse of vegetable waste, fruit waste, leftover food waste in layer wise manner filled in between with LARM (Leachate Absorbing Raw Material) of either cocopith/bagasse/jute waste in proportion of 10:10:5:2 ratio. The container was filled up in 7 – 10days and was left in a cool and shady place either in the corner of the kitchen or in the utility area. The absence of fermented smell of typical garbage nature of putrefied odor was nullified within 24hrs and the absence of fly menace, lack of leachate was observed during the decomposition time. Once the container was filled up with respective wastes, the top layer ended up with a layer of LARM was a must. Optimum moisture of wet conditions was maintained by the feel of coolness and that was indicative of av. 60% moisture. Enhancement of aerobic degradation was observed by the smell of the fruity odor/earthy smell, which happened by natural means. Decomposition of the contents was unnoticeable due to the presence of LARM. The change in the texture and appearance of the contents in the container was noticed on 20th day (as shown in fig.5). Compost earthworms (*Eudrilus eugeniae)* of 100-150g were inoculated on the 21st day. Feeding and excreting activity took place in av. 35 days. The container was turned upside down with the contents of fed material and the compost earthworms for 20mts. Compost earthworms settled at the bottom of the small heap of the contents and transferred to another container with 20days old decomposed materials. The study shown revealed use of 3 – 4 containers were suffice for the composting of kitchen refuse on a regular annual cycle.

3.0 Results and Discussion:

Several scientific advancement has been undergone for the solving of urban waste in terms of composting and vermicomposting keeping in mind of leachate, odor and fly menace (Hameler, 1992; Ali, 2004; Tuladhar, 2004; Koff et al., 2007; Lekamudiyanse et al., 2009). Engineering innovations are at large in safe-guarding the decomposition for proper utilization (Picciet et al., 1978; Cecchi et al., 1992; Finslein et al., 1992; Lu 1995; Shin et al., 2001). However none of the research work specifies the use of leachate absorbing natural organic material (Fig: 2). In the present research work by use of LARM – Leachate Absorbing Raw Material of cocopith/bagasse/jute waste has solved the problem of leachate, fly menace and odor for proper aerobic decomposition that easily followed up by vermicomposting without any external necessity of aerators or decomposition enhancers or aerobic microbes or agitators. Currently this methodology is the easiest way to tackle refuses of kitchen. Table 1, 2 and 3 provides the detailed facts of kitchen refuse, necessities during 20day decomposition period and use of kitchen refuse vermicompost as soil food and plant food.

Fig 1: Typical kitchen refuse of vegetable waste

Fig 2: Cocopith from coir industry as LARM source

Fig 3: Simple procedure of piling up of kitchen refuses with a layer of LARM

Fig 4: Day-to-day piling up of kitchen refuse in a simple scientific manner using LARM

Fig 5: Appearance of the partially decomposed contents on 20th day

Table 1: Facts about kitchen refuse

1. Of organic, wet and decomposable in nature
2. Mainly of vegetable and fruit waste of nothing but enriched live plant stuff
3. Under the process of decomposition following nautre's laws
4. Oozes of juices a common factor due to death of the stuff at cellular level
5. Decay a process of aerobic and anaerobic at the initiation level
6. Ready source of moisture of av.90%, a source for filthy smell, an attraction for an array of flies and due cause for anaerobic decomposition

Table 2: Necessities during initial decomposition of 20 day period

1. Composting activity is something like baking a cake that require proper raise in temperature from within, that feels like mild steam-like when felt
2. Natural allowance of air must happen on its own into the composting container that happens by use of LARM
3. The composting material needs to be breathing constantly with air again ensured by the use of LARM
4. Aerobic microbes come into existence which feels by the smell of the material as that of fruity odor or earthy smell
5. Inactivity of anaerobic microbes noticed by the absence of obnoxious odor, lack of leachate and unnoticed of flies
6. Reduction or sinking of the material an indication of decomposition
7. If necessity arises sprinkling of water on the surface required to maintain moisture of 60% ensured by touch feeling of coolness and absence of surface drying

Table 3: Kitchen refuse a source of soil food and plant food

1.Kitchen refuse nothing but a plant source with complex organic stuff that gets simplified by breakdown into simple and soluble nutrients required for soil microbes as well as plants for sustenance
2. As vermicompost the product best suitable for kitchen gardening with prerequisite nutrients in balance form with the produces under the banner of "organic"
3. Best use for ornamentals of both indoor as well as outdoor with a dose of once in fortnight
4. Repotting is not mandatory as the microbes present in the vermicompost help in decay and transform into organic matter without any side effects to the root zone
5. As balanced food the root to shoot growth will be balanced such that roots remain under check limiting to repotting
6. As an organic sponge the soil retains moisture and minimized use of water is ensured.

4.0 Conclusion:

The study under semi-scientific manner revealed the following data:

1. Making use of LARM (biodegradable cocopith/jute waste/ bagasse) was a mandatory option to avoid abnoxious odor (typical of garbage smell), fly menace and leachate (also typical of garbage liquid) and it also enhanced faster aerobic degradation (composting) in 20days other wise needs av.60days time under usual conditions in absence of LARM.
2. Vermiprocesses hastened by use of LARM.
3. The study reveals the avoidance of energy oriented engineering models to over come the problems of odor, leachate in an eco-friendly way by use of biodegradable LARM.

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6.0 References:

1) Adhikari, K. (2005). Urban food waste composting. Thesis submitted to McGill University for the degree of Master of Science., Dept. of Bioresource Engineering, McGill University, Montreal.
2) Ali, M. (Editor) (2004). Sustainable composting case studies and guidelines for developing countries. Leicestershire: water engineering and development centre, Loughborough University, URL (Accessed).
3) Cecchi et al. (1992). Methane potential of food waste and anaerobic toxicity of leachate produced during food waste decomposition. Waste Management and Research 15, 149 – 167.
4) Chaudhuri, P.S., Pal, T.K., Bhattacharjee G. and Dey, S.K. (2000). Chemical changes during vermicomposting (Perionyx excavatus) of kitchen wastes. In Tropical Ecology 41(1): 107 – 110, 2000 ISSN 0564-3295 c. International Society for tropical ecology.
5) Chitravadivu, C., Balakrishnan, V., Manikandan, T. Elavazhagan and Jayakumar, S. (2009). Application of food waste compost on soil microbial population in groundnut cultivated soil, India. In Middle-East Journal of Scientific Research 4(2): 90 – 93, 2009.

6) Finstein, M.S. and Hogan, J.A. (1992). Integration of composting process microbiology facility structure and decision making in science and engineering of composting, design, environmental microbiological and utilization aspects. In : Hitink, H.A.J., and Keener, H.M)eds). Proceedings of an international composting research symposium, March 27 – 29. Hyatt regency at the Ohio Center, 350 North High Street Colombus, OH.
7) Hamelers, H.V.M. (1992). A theoretical model of composting kinetics. Science and engineering of composting. Design, environmental, microbiological and utilization aspects. In : Hitink, H.A.J., and Keener, H.M)eds). Proceedings of an international composting research symposium, March 27 – 29. Hyatt regency at the Ohio Center, 350 North High Street Colombus, OH.
8) Kale, R.D. and Sunitha N.S. (1993). Utilization of earthworms in recycling household refuces – a case study in Biogas Slurry Utilization, CORT, New Delhi, pp. 75 – 79.
9) Kale R.D. (1998). Earthworms: Nature's gift for utilization of organic wastes. pp. 355 – 376. In C.A. Edwards (ed.) Earthworm Ecology. CRC Press LLC, Florida.
10) Koff, J.P. de, Lee B.D. and Mickelbart, M.V. (2007). Household composting: Methods and uses for compost. Purdue: Purdue University. URL (Accessed).
11) Lekammudiyanse, L.M.M.U, Gunatilake, S.K. (2009). Efficiency of the household compost bin as a waste management technique in Sri Lanka. In : International Journal of Basic and Applied Sciences IJBAS-LIENS 10, 89 – 94. URL (Accessed).
12) Lu, C. (1995). A model of leaching behavior from MSW incinerator residue landfills. Waste Management and Research, 14, 51 – 70.
13) Picci et al (1978). In: Ferrari, G. (1986). Oxygen, water and temperature in the decomposition process of an organic substance during composting in compost: production, quality and use. In: Bertoldi, M. De, Ferranti, M.P., L'Hermite, P., & Zucconi, F., (eds). Proceedings of a symposium organized by the commission of the European communities, Directorate General Science, Research and Development,17-19 April. Udine Italy.
14) Suthar, S. and Singh, S. (2008). Vermicomposting of domestic waste by using two epigeic earthworms (Perionyx excavatus and Perionyx sansibaricus). In Int. J. Environ. Sci. Tech, 5(1), 99 – 106.
15) Tuladhar, B. (2004). User survey indicates the success of "saaga" home compost bins. In: ENPHO Magazine 2004. URL (Accessed).