Influence of accelerator in composting using Institutional Garden waste

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***Abstract*—In our institution, a large amount of organic waste, including dry and wet leaves, twigs, grass clippings, and tree trimmings, is produced on campus daily. Composting is the most effective alternative for disposing of organic waste. In this study, we aimed to analyze the impact of different accelerators, such as sawdust, jaggery, and curd, on the composting process of garden waste. Our findings revealed that jaggery was the most effective accelerator, achieving decomposition in 25 days. Using jaggery as an accelerator for institutional garden waste produced excellent results. Additionally, incorporating cow dung as a nitrogen source enhanced both the speed of composting and the quality of the final compost product.**

***Keywords*—Accelerators, Compost, Composting**

I. INTRODUCTION

Composting is the process for biological stabilization of solid organic waste by transforming then into a safer and more stabilized material (compost), that can be used as a source of nutrients (manure) and soil conditioner in agricultural application. Composting is method of degradation of organic matter by a group of microbial population in the presence of moisture, heat, and oxygen. The major drawback of composting is that process taking long time for decomposition. This project is an initiative to accelerate the composting process with using different Accelerators like saw dust, jaggery and curd. That accelerators influence on microbial growth, enzymatic activities, organic matter degradation, bulk density, and quality of finished compost. The important parameters such as pH, electrical conductivity (EC), total carbon (TC) and total organic carbon (TOC) will be analysed to analyse the suitability of the compost for soil fertility.

II. MATERIALS & METHODS

A. Collection of accelerators

The saw dust used for this study was collected from the wood work industry located at Kottaiyur, Karaikudi, Sivagangai District, Tamil Nadu, India. The collected saw dust was dried and its powder form and stored. Thus, the stored saw dust was kept as stock material and used whenever required. The jaggery and curd are collected from market in Karaikudi, Sivagangai District, Tamil Nadu, India.

III. RESULT & DISCUSSION

A. Initial characterization of reactor material

SI. NO	PARAMETERS	REACTOR (1)	REACTOR (2)	REACTOR (3)	REACTOR (4)
1.	Ph	8.33	7.90	8.08	8.12
2.	Moisture Content	56	64	55	67
3.	Temperature (^{0}C)	28	27	28	30
4.	Organic Carbon (%)	4.10	3.48	4.46	3.75
5.	Nitrogen (%)	0.20	0.26	0.18	0.21
6.	Phosphorus (g/kg)	1.79	1.27	1.68	1.29
7.	Potassium (g/kg)	0.12	0.15	0.09	0.06
8.	C/N	23	17	27	20

Fig No 1 Garden Waste

SI. NO	PARAMETERS	REACTOR (1)	REACTOR (2)	REACTOR (3)	REACTOR (4)
1.	Ph	5.71	7.02	7.40	7.98
2.	Moisture Content	48	51	45	40
3.	Temperature (^{0}C)	24	25	26	23
4.	Organic Carbon (%)	4.5	4.5	7.4	3.5
5.	Nitrogen (%)	0.153	0.161	0.243	0.134
6.	Phosphorus (g/kg)	0.105	0.107	0.122	0.071
7.	Potassium (g/kg)	0.069	0.073	0.111	0.0.46
8.	C/N	28	27	29	23

B. Initial characterization of manure

IV. CONCLUSION

As we conclude this project, The composting process by: Improving pH, NPK, values; increasing the residual N product, the combined addition of Jaggery, Saw Dust, Curd and cow dung (Reactor-3) improved analysis of project concluded that it was highlighted that the maximum C:N ratio was 29 from the research study (Table-2). In our research, it was found that the best accelerator was a Mixture of Jaggery, Saw Dust, Curd, and cow dung (decompositionreaches 25 days).

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REFERENCES

[1] Bo Yue, Tong-Bin Chen, Ding Gao, Guo-Di Zheng, Bin Liu, Duu-Jong Lee., “Pile settlement and volume reduction measurement during forced- aeration static composting” (2008).

[2] Cotxarrera, M.I. Trillas Gay, C. Steinberg, C. Alabouvette., “Use of sewage sludge compost and Trichoderma asperellum isolates to suppress Fusarium wilt of Tomato” (2002).

[3] D. Elango, N. Thinakaran, P. Panneerselvam, S. Sivanesan “Thermophilic composting of municipal solid waste” (2008).

[4] Eswaran. N and Mari Selvi. S., “Efficacy of Vermicompost on growth and yield parameters of Lycopersicum esculentum” (2016).

[5] Faiz Hussain, Saeed A. Malik, Mohammad Athar, Nahidah Basher, Uzma Younis, Mahmood Ul-Hassan and Seema Mahmood., “Effect of tannery effluents on seed germination and growth of two sunflower cultivars” (2010).

[6] Gondek Krzysztof., “Chromium bioaccumulation from composts and vermicompost’s based on tannery sludges” (2007).

[7] IrsaShafique, SaiqaAndleeb, Malik SaimAftab, FarrukhNaeem, ShaukatAli, SummayaYahya, FayazAhmed, TauseefTabasum, TariqSultan, BeenishShahid, Abdul HameedKhan, Ghafoor ulIslam, Wajid ArshadAbbasI “Efficiency of cow dung based vermi-compost on seed germination and plant growth parametersof Tagetes erectus (Marigold)” (2021).

[8] Jagdish Gabhane, SPM. Prince William, Rajnikant Bidyadhar, Priya Bhilawe, Duraisamy Anand, Atul N. Vaidya, Satish R. Wate “Additives aided composting of green waste: Effects on organic matter degradation, compost maturity, and quality of the finished compost” (2012).