

# Vermicomposting of Various Organic Components By Using *Eudrilus Eugeniae*

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**Abstract**—Vermicompost is the best and better alternative for the chemical fertilizers. Due to the addition of chemical fertilizers for long time cause drastic effect on the fertility of soil. The organic matters are used as decomposing materials and the compost have sufficient nutrients. With the addition of *Eudrilus eugeniae* the organic matters turns into valuable organic fertilizer and are undergone for physicochemical analysis. The vermicompost of organic matters have enriched macro (NPK) and micro-nutrients (Fe, Mn, Zn & Cu). It reflects on the plant growth.

**Key words**— Organic fertilizer, *Eudrilus eugeniae*, Macronutrient, Micronutrient.

## I. INTRODUCTION

The organic matters are non hazardous materials, even though the over dumping of the waste causes pollution and also act as breeding ground for harmful insects and microbes. To avoid such conditions we need alternatives for the betterment. Vermicompost is an organic fertilizer possesses rich macronutrients, micronutrients and soil beneficial microbes, Ansari *et al.*, 2010. Vermicast is the nutritive organic fertilizer which also called as “Black gold” which made from garbage, hence the name. It is the best alternative for chemical fertilizers, and also enriches the soil quality, plant growth. It also acts as a growth promoter. It also works as a soil conditioner. Earthworm composting, also known as vermicomposting, is a sustainable technology that optimizes the natural soil building biology and properties of earthworms to convert raw wastes into stable and much sought after commercial products called vermicompost and earthworm castings. Vasanthi *et al.*, 2012. Vermicomposting also saves land and waste transportation costs of Landfilling and incineration. It helps to avoid unsightly and hygienic conditions

that indiscriminate littering creates. Vermicompost is clean, odourless, organic material which possess high amount available nutrients such as carbon, nitrates, phosphates, potassium, calcium carbonate and magnesium which are derived from wastes and converted as useful nutrients by the activity of earthworm, Gupta *et al.*, 2015. The worm cast is said to be the yogurt of soil world which contains the package of bacteria, enzymes and actinomycetes. Vermicompost is also rich in metal ions and has the potential to produce electrolytes (Dr. S. Sathiyavathi and V. Pavithravedhavalli, 2021). The cast enhances plant growth, suppress the diseases in plants, increases the porosity, microbial activity and improves water retention capacity of soil. It benefits the environment by reducing the use of chemical fertilizers and also converts the polluted lands into viable and nutritious soil.

## II. MATERIALS AND METHODS

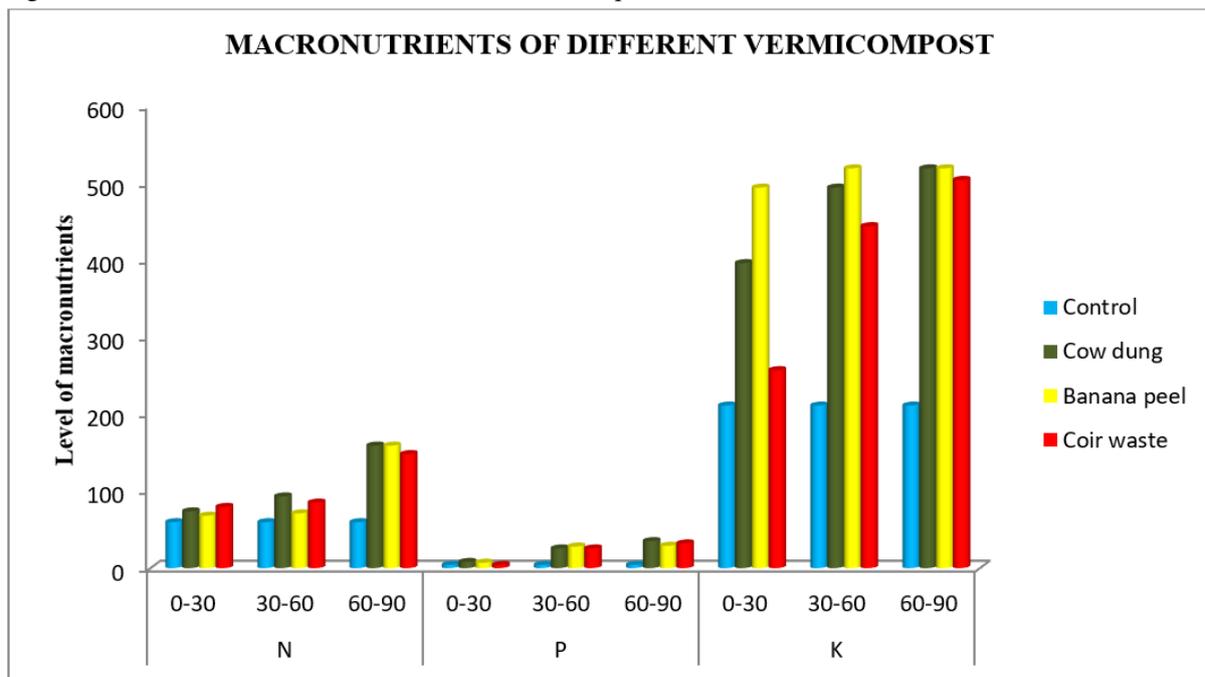
The compost was prepared with four different setups. For experimental purposes four plastic tubs were maintained namely A- Control soil; B- Cow dung; C- Banana peel; D- Coir waste. The organic materials were mixed with soil for decomposition up to 30days. After 30 days of pre decomposition earthworms were inoculated in the vermin bed for vermicomposting.

Physicochemical parameters were analyzed to check the nutrient content, viability and nature of the soil. Physical parameters like Moisture (%), Temperature (°C) and chemical parameters like pH, Organic Carbon (%), Nitrogen (%), Potassium (%), Phosphorus (%), C:N ratio, Iron (ppm), Manganese (ppm), Zinc (ppm), Copper (ppm) and Electric Potential of soil.

Table: 1 shows macronutrients of different vermicompost

Compost/ Nutrients	N			P			K		
	0-30 DAYS	30-60 DAYS	60-90 DAYS	0-30 DAYS	30-60 DAYS	60-90 DAYS	0-30 DAYS	30-60 DAYS	60-90 DAYS
Control	59.6	59.6	59.6	4	4	4	211	211	211
Cow dung	73.6	93	159	8	25.5	35	396	494	519
Banana peel	68	71	159	7	28	29	494	519	519
Coir waste	79.4	85	148	4	25.5	32	257	444	504

Figure: 1 shows macronutrients of different of vermicompost



### III. ANALYSIS OF MICRONUTRIENTS

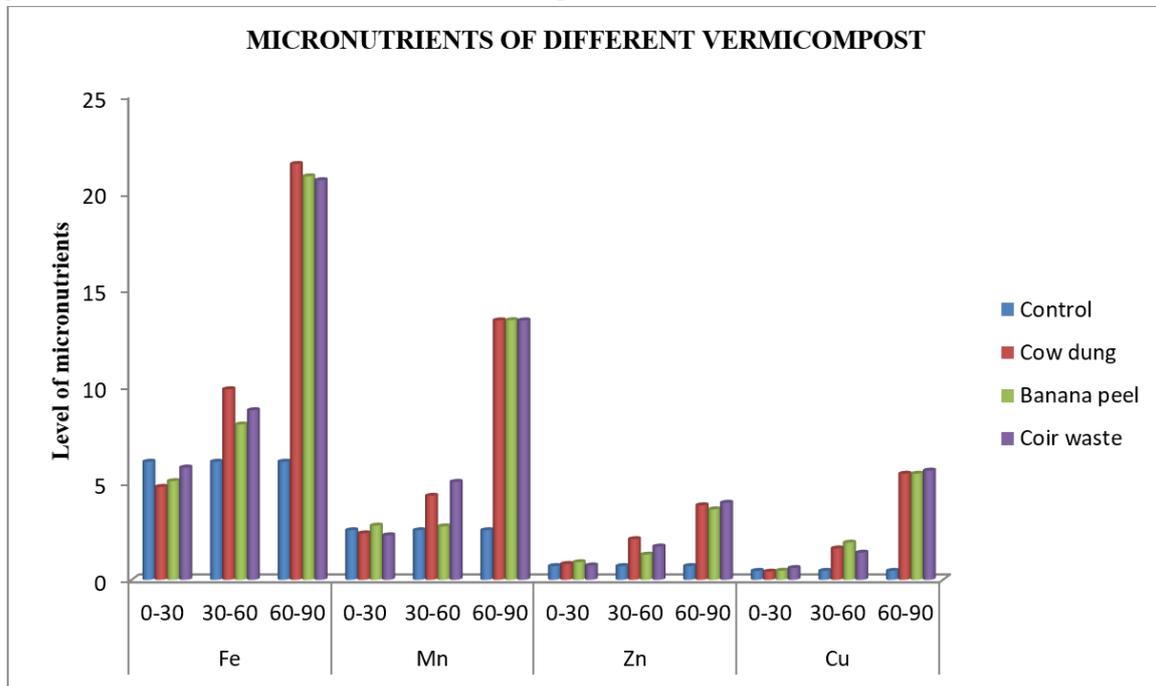
Table:2 shows micronutrients of different vermicompost

Compos t/ Nutrient s	Fe			Mn			Zn			Cu		
	0-30 DAY S	30-60 DAY S	60-90 DAY S									
Control	6.1	6.1	6.1	2.56	2.56	2.56	0.71	0.71	0.71	0.46	0.46	0.46
Cow dung	4.8	9.84	21.48	2.4	4.34	13.40	0.82	2.1	3.85	0.42	1.62	5.48
Banana peel	5.10	8.02	20.84	2.8	2.76	13.41	0.91	1.30	3.64	0.47	1.92	5.48
Coir waste	5.8	8.76	20.64	2.3	5.06	13.40	0.74	1.72	3.98	0.61	1.40	5.64

The micronutrients were increased triple the time during vermicomposting process. The above shows the level of micronutrients of different vermicompost. The control possess decreased

micronutrients than other vermicompost. Cow dung and coir waste vermicompost has high level of micronutrients followed by banana peel vermicompost.

Figure: 2 shows micronutrients of different vermicompost



#### IV. DISCUSSION

Macronutrients of soil are Nitrogen (N), Phosphorus (P) and Potassium (K). In the present study, NPK levels were lower in control than the other heterogeneous vermicompost. Cow dung and banana peel vermicompost contains increased and equivalent level of nutrients than coir waste compost. Phosphorus level of coir waste was similar to cow dung compost. Current study showed high percentage of macronutrients. The study of M. Lakshmi Prabha *et al.*, 2013 and Lathika .M & Dr. M. Lakshmi Prabha, 2017 has a report of banana peel vermicompost by *Eudrilus eugeniae* possess significant decrease in N and K. Another study of W. Li *et al.*, 2020 showed increased level NPK in banana peel vermicompost, it is comparable to the present study. Micronutrients are Iron (Fe), Manganese (Mn), Zinc (Zn) and Copper (Cu). In the current study, control has lower amount of micronutrients than the other vermicomposts. The heterogeneous vermicompost showed immense increasing micronutrients. All the compost possess significant amount of micronutrients. In similar tune, Naveen Desai *et al.*, 2016 reported vermicomposting of *Eudrilus eugeniae* has high

percentage of micronutrients. It is compared in the study of Mehdi Zarei *et al.*, 2018 showed acceptable level of micronutrients.

#### V. CONCLUSION

The gut content of the earthworm promotes the biosynthesis process of natural compounds with remarkable degradable activity. It is the kind of locking up organic matter and organism within the soil. The consistent application of vermicompost gradually raises the level of nutrients in the soil. Composting of organic waste successfully achieved by epigeic earthworm *Eudrilus eugeniae*. It proves epigeic earthworms are better decomposers and they can grow and decomposed in any kind of organic matters. The macro and micronutrient increased thrice the amount than control was satisfactory. The compost of organic waste applied to the brinjal plant, shows significantly high yield. Our work led us to sum up, vermicompost of organic waste are applied to instead of application of raw organic matters to the plant.

REFERENCES

- [1] A. A. Ansari and K. Sukhraj. 2010. "Effect of vermiwash and vermicompost on soil parameters and productivity of okra (*Abelmoschus esculentus*) in Guyana". *Pakistan J. Agric Resources*, Vol 23:137-142.
- [2] Naveen Desai, Anuradha Tanksalia, Veena S. Soraganvi, 2015. Vermicomposting – Solution for Milk Sludge, *International Conference on Solid Waste Management, 5IconSWM, Procedia Environmental Sciences*, 2016, 35 , 441 – 449.
- [3] Mehdi Zarei, Vahid Alah Jahandideh Mahjen Abadi, Ameneh Moridi, 2018. Comparison of vermiwash and vermicompost tea properties produced from diferent organic beds under greenhouse conditions, *International Journal of Recycling of Organic Waste in Agriculture* ,7:25–32.
- [4] Lathika.M, Dr. M.Lakshmi Prabha, 2017. Generation of Electric Potential from Vermicomposted Fruit Waste, *International Journal of Research in Environmental Science (IJRES)*, Volume 3, Issue 1, PP 31-39
- [5] R.S.Achsah and M.Lakshmi Prabha, 2013. Potential Of Vermicompost Produced From Banana Waste (*Musa paradisiaca*) On The Growth Parameters Of *Solanum lycopersicum*. *International Journal of ChemTech Research*, Vol.5, No.5, pp 2141-2153.
- [6] Wenjiao Li, Sartaj Ahmad Bhat, Jiefeng Li, Guangyu Cui, Yongfen Wei, Toshiro Yamada, Fusheng Li, 2020. Effect of excess activated sludge on vermicomposting of fruit and vegetable waste by using novel vermireactor, *Bioresource Technology* 302, <https://doi.org/10.1016/j.biortech.2020.122816>.
- [7] S. Ganesh, Fahmida Khan, M. K. Ahmed, P. Velavendan, N. K. Pandey and U. Kamachi Mudali, 2012. Spectrophotometric determination of trace amounts of phosphate in water and soil, *Water Science & Technology*, 66.12
- [8] Sumathi S, Pawlin Vasanthi Joseph, 2018, Microbiological and Physico-Chemical Analysis of Vermicompost of Fruit Waste by *Eudrilus eugeniae*, *Ijsrm, Human*, Vol. 8 (4): 77-93.
- [9] Gupta, N., Yadav, K. K., & Kumar. V. 2015. A review on current status of municipal solid waste management in India. *Journal of Environmental Sciences*, 37(1), 206-217.
- [10] Dr. S. Sathiyavathi and V. Pavithravedhavalli, 2021. Vermicompost of Organic Wastes by Using Epigeic Earthworm, *World Wide Journal of Multidisciplinary Research and Development*, 7(4): 112-115