Vol 4 Issue 4 Oct 2014 ISSN No :2231-5063

International Multidisciplinary Research Journal

Golden Research Thoughts

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RNI MAHMUL/2011/38595 **ISSN No.2231-5063**

Golden Research Thoughts Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial board.Readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

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Golden Research Thoughts
ISSN 2231-5063
Impact Factor : 2.2052(UIF)
Volume-4 | Issue-4 | Oct-2014
Available online at www.aygrt.isrj.org

VERMICOMPOSTING OF COUROUPITA GUIANENSIS BY USING TWO EPIGEIC EARTHWORMS *(EUDRILUS EUGENIAE AND EISENIA FETIDA)*

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Abstract:-Vermibeds were prepared in 1:1 ratio. The composting potential of two epigeic worms *Eudrilus eugeniae* and *Eisenia fetida* were inoculated into the *Couroupita guianensis* vermibed separately. The reproductive potential and nutrient status were estimated by both species produced vermicompost. The results of the present study reveals that the *C.guianensis* with cured cowdung can be used for converting into value added vermicompost by utilizing the both epigeic earthworms.

Keywords:*C.guianensis, E.eugeniae, E.fetida.*

INTRODUCTION

Earthworms play a major role in the recycling of dead and decayed plant materials by feeding on them. Use of earthworms to biodegradable various substrates for composting has proven to be successful. Both epigeic earthworm species of *Eudrilus eugeniae* and *Eisenia fetida* have very efficient species to maintain vermicomposting process in India (Edwards, 1998). These surface dwellers are capable of working hard on the litter layer and can convert all the organic waste into manure. *E. eugeniae* is a very efficient species for culture and *E.fetida* has a wide range of temperature tolerance and high reproductive potential species (Ismail,1997). Couroupita guianensis is a deciduous tree in the family *Lecythidaceae.* It is a tradition medicinal plant. It is native to south India and Malaysia and is commonly seen in temples rarely included in campus (Seethalakshmi Ramaswami College). It is otherwise called Jambolana tree, cannan ball tree and nagalinga tree. The tree grows up to 35m tall with big leaves and succulent flowers. The cultured leaves vary in length, generally from 8 to 35 meters, but reaching upto 57m. This plant is used for treating many diseases (Rajamanickam *et al.*,2009) but it is not used in vermicomposting process. The main objective of this study, the composting performance and interference activity of Couroupita guianensis by using an epigeic earthworms and analyse the nutrient status of vermicompost.

MATERIALS AND METHODS

The garden waste of the leaves *Couroupita guianensis* were collected, and cut into small species, cured both in the open and shade area for 15 days. Similar method was adopted for curing cow dung. Plastic trays of 45X15X30 cm size were used for the experiment. At the bottom of the tray a hole was made to drain the excess water in the experimental medium. The vermibeds were prepared by mixing the processed leaves of *C.guianensis* with cured cowdung in 50:50 concentration. A control experimental medium was also prepared in the same proportion and filled in the trays. After

10 days, 20 clitellate *E. eugeniae* and *E. fetida* were introduced into the vermibed separately. These trays were kept in undisturbed area. Watering was done regularly twice a day in order to maintain the temperature and moisture content of the medium during the entire composting period. The vermicompost were collected sieved airdried and weighed separately. The vermicompost was then analysed to quantify its chemical nutrients composition. Further, after the harvest the number of cocoons, and youngones were counted. Various chemical parameters such as pH, Organic carborn(OC), macronutrients such as Total Nitrogen, Total Phosphorous, Total Potassium and C:N ratio were estimated by (Murugesa boopathi et al.,2005).

TABLE:1
Composition of vermicomposting unit

Particulars	***E.eugeniae***	***E.fetida***
Total weight of *C.guanensis* (g)	1000	1000
Total weight of cowdung(g)	1000	1000
Total weight of predigested mixture(g)	2000	2000
No. of days required for predigestion	16	16
No. of earthworms introduced in each tray	20	20
No. of days required for composting	21	27
No. of cocoons generated	104	98
No. of youngworms hatchling	69	62
Total weight of vermicompost obtained(g)	1580	1320

TABLE:2
Nutrient composition of vermicompost

Parameters	**Control**	***E.eugeniae*** **Vermicompost**	***E.fetida*** **vermicompost**
pH	7.0	7.2	6.98
Oc(%)	16.29	14.83	15.12
N(%)	1.26	1.39	1.33
P(%)	1.63	5.87	4.83
K(%)	1.52	4.56	3.87
C:N Ratio	12:1	10:1	11:1

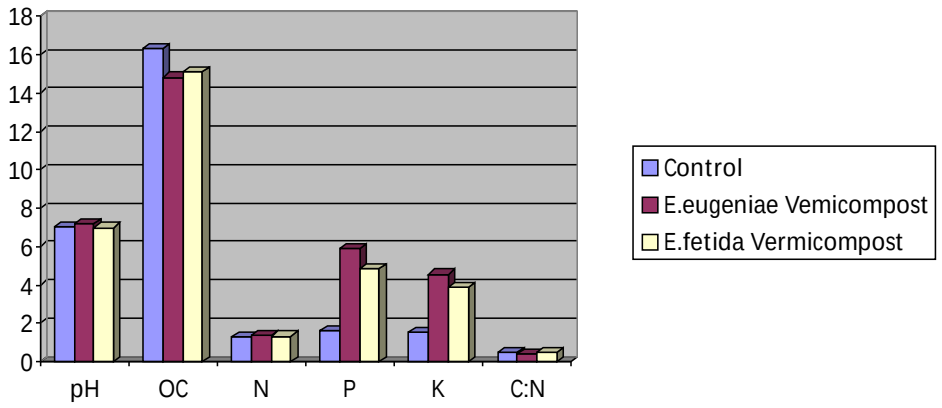

Fig: Nutrient status of vermicompost

RESULTS AND DISCUSSION

Table 1 indicates the results of composition of vermicomposting process. The predigestion and composting period of *E.eugeniae* was 16 & 21days. 104 Cocoons and 69 Youngworms were produced. The predigestion and composting period of *E. fetida* was 16 & 27 days. 98 Cocoons and 62 youngworms were produced.

Table 2 indicates the nutrient status of vermicompost. The nutritional quality of vermicompost is determined by the type of the substrates and species of earthworms used for composting. Both species produced vermicompost pH value was 7.0 & 6.98 respectively in *E.eugeniae* and *E.fetida*. Edwards and Bohlen (1996) reported that the pH range between 6-7 promotes the availability of plant nutrients like NPK, so the vermicompost should be applied in soil. Carbon is the energy source for composting process and a major component of organic molecules, which are the building blocks of all organisms (Ansari and Jaikishun,2010). The Organic carbon showed the results of 14.83% & 15.12%. A decrease in carbon is an indicator of enhanced decomposition (Agarwall *et al* . , 2011). The significant percentage change indicated that earthworms accelerated the decomposition of the organic matter. The vermicompost prepared by using both earthworm species shows a conciderable difference for total Nitrogen content. The Nitrogen content of the vermicompost was increased compared than *E.fetida* produced vermicompost (1.39% & 1.33%). It also suggested that the earthworms also enhances the nitrogen levels of the substrates by adding their excretory products, mucus, bodyfluid, enzymes and even through the decaying tissues of dead worms in vermicomposting subsystem (Suthar,2007). Both species produced the vermicompost in total phosphorus value was 5.87% & 4.83%. Lee (2002), suggested that the passage of organic matter through the gut of worm results in phosphorus(P) converted to forms which are most bioavailable to plants. Phosphorus is the second limiting nutrient next to nitrogen in majority of soils for crop production. The exchangeable K was also higher in the vermicomposted material by the end of the experiment. The potassium value was 4.56% & 3.87% respectively in E.eugeniae and E.fetida produced vermicompost. Earthworm activity reduced pH and C:N ratio in manure (Atiyeh *et al*.,2000). The C:N ratio is an indicator of the degree of decomposition, compost maturity as well as quality. In this study, the C:N ratio of the vermicompost was 10:1 and 11:1 respectively in *E.eugeniae* and *E.fetida* produced vermicompost. The low C:N ratio and makes nitrogen available to plants which in consequence adds to the soil fertility. Both species of *E.eugeniae* and *E.fetida* produced vermicompost NPK value was increased, pH and C:Nratio was decreased compared than worm unworked compost. This paper provides information on the comparative biology and composting efficiency of two commonly distributed epigeic earthworms, i.e. *E. eugeniae* and *E.fetida*. *E.fetida* is the most used worm in vermiculture (Tognett *et*

al., 2005). On the otherhand, *E.eugeniae* is a rapidly growing worm, prolific, but difficult to manage, since removal from the substrate is much more complex than that of *E .fetida* (Chottu,2008). *E.eugeniae* can be used for the production of high quality vermicompost from the meditional plant of *C.guianensis.*

REFERENCES

1.Agarwal, P.K., Choudhary, A. Prakash, A. and Johri, B.N.,(2011). "Bacterial biodiversity in a bagasse based compost prepared for the cultivation of edible mushrooms Agaricus bisporus" Journal of Agricultural Technology, vol. 7, no. 5, pp. 1303-1311.
2.Ansari, A.A. and S. Jaikishun, 2010. An investigation into the vermicomposting of sugarcane begasse and rice straw and its subsequent utilization into the cultivation of Phasiolus vulgaris L. in Guyana. Am. Eurasion J. Agric Environ.Sci., 8: 666-671.
3.Atiyeh, R.M., J. Dominguez, S. Sobler and C.A. Edwards, 2000. Changes in biochemical properties of cow manure during processing by earthworms (Eisenia andrei) and the effects on seedling growth; Pedobiologia, 44: 579-590.
4.Chhotu J (2008) Vermcomposting of vegetal waste: a biophysicochemical process based on hydro – operating reactor. African Journal of Biotecnology 7(20): 3723-3730. http://www.ajol .info/index.php/ajb/article/viewFile/59420/47714.
5.Edwards, C.A. and Bohlen, P.J., (1996). Biology and Ecology of Earthworms, Chapman and Hall, London, UK, 3rd edition.
6.Ismail, S.A., (1997). Vermicology: The Biology of Earthworms. Orient Longman, Hyderabad, Pages: 92.
7.Lee, K.E. , (2002). Earthworms : Their ecology and relationships wth soils and land use. Academic Press, Sydney, Australia. pp.411.
8.Murugesa Boopathi, P., Thiyageswari, S.,Natesan, R, and Govindasamy,M. 2005. Training manual on skill oriented practical training programme on soil water and plant analysis for KVK Soil scientists held during March to April, 2005 at Tamilnadu Agriculture university, Coimbatore, India.
9.Suthar, S., (2007). Vermicomposting potential of Perionyx sansibaricus (Perrier) in different waste materials. Bioresource Tech., 98, 1231-1237.
10.Tognetti , c., Laos, F., Mazzarino , M.J. and Hernandez., M.T. (2005) Composting vs Vermicomposting: A comparison of end product quality. Journal of compost science & Utilization,13(1),6-13.s

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