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BIOCONVERSION OF *FICUS RELIGIOSA* INTO ECO – FRIENDLY MANURE BY USING EPIGEIC EARTHWORM *EISENIA FETIDA*

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Abstract:-Vermibeds were prepared in three different concentrations. *E.fetida* worms were inoculated into the *F.religiosa* vermibed in all the concentration except control. The conversion ratio of F.religiosa into vermicompost was found to be more or less similar in all the concentration. The reproductive potential and physico-chemical parameters were analyzed in the vermicompost. The results of the present study reveals that the equal proportion of *F.religiosa* leaf litter with cured cowdung can be used for highest value added vermicompost production by using *E.fetida*.

Keywords:F.religiosa, E.fetida, Nutrient status .

INTRODUCTION

Vermicompost is an easy and effective way of recycling agriculture waste, city garbage waste and kitchen waste along with bioconversion of garden waste materials into nutrient rich vermicompost by using earthworm. In majority of the previous studies, *E.fetida* was used as a candidate species for vermicomposting operation, because it can tolerate wide range of pH, temperature, moisture and highest reproductive potential worms. *F. religiosa* is a large dry season deciduous or semi-evergreen tree. The tree grows up to 30 meters tall and with a trunk diameter up to 3 meters. The leaves are cordate in shape with a distinctive extended drip tip they are 10-17 cm long and 8-12cm broad, with a 6-10cm petiole. This plant is used for treating many diseases but it is not used in vermicomposting process. The main objective of the study, the composting performance and interference activity of *F.religiosa* by using an epigeic earthworm and analyze the nutrient status of vermicompost.

MATERIALS AND METHODS

Dry leaves of *F.religiosa* were collected from the college campus Seethalakshmi Ramaswami College, Tiruchirappalli. Pre-digestion is the essential for the process of composting. *F.religiosa* leaf litter was cut into tiny bits, sundried for 15 days because to remove the odour and shade dried for 15 days because to reduce the heat. Simultaneously cowdung also predigested. F.religiosa mixed with cured cowdung in three different concentration viz., 50:50, 60:40 and70:30. Sprinkled water twice in a day in order to maintain the moisture. Adult healthy 30 *E.fetida* worms were inoculated into the vermibed. Worm un-worked experiment was also maintained. After harvest the vermicompost was collected, sieved, air dried and weighed separately. Physico chemical parameters were estimated by the following standard procedure (Murugesa boopathi *et al*., 1999).

TABLE-1 Composition of predigested *F.religiosa* leaf litter and its conversion into vermicompost by *E.fetida*

PARTICULARS	50:50#	60:40#	70:30#
Weight of *F.r* (g)	500	600	700
Weight of CD (g)	500	400	300
Weight of Predigested mixture (g)	1000	1000	1000
No. of worms introduced	30	30	30
Mean no. of days taken for bioconversion	40	43	47
Harvesting vermicompost(g)	829	748	652
Cocoons	114	98	73
Youngworms	56	42	39

#Experiments were conducted in triplicate in each concentration.

TABLE-1I Quantity of Nutrient status of Control and Vermicompost produced by *E.fetida* in 50:50, 60:40 and 70:30 concentrations

PARTICULARS	50:50 VC	CONTROL	60:40 VC	CONTROL	70:30 VC	CONTROL
pH	7.0	6.98	7.2	6.99	7.1	6.99
TN	1.94	0.99	1.76	0.77	1.28	0.69
TP	3.45	1.52	2.63	1.28	1.87	1.09
TK	0.96	0.53	0.87	0.44	0.79	0.38

TN-Total Nitrogen, TP-Total Phosphorous, TK-Total Potassium

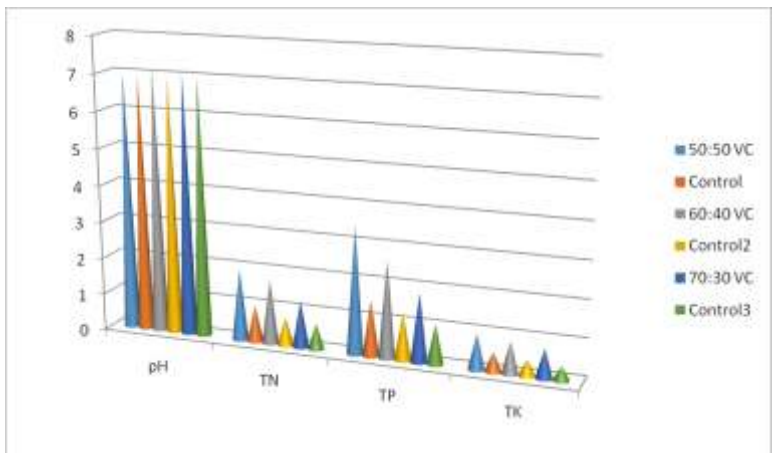

Figure 1. Graphical representation of Quantity of Nutrient status of Control and Vermicompost produced by *E.fetida* in 50:50, 60:40 and 70:30 concentrations

RESULTS AND DISCUSSION

Table 1 shows the composition of predigested *F.religiosa* leaf litter and its conversion into vermicompost by using *E.fetida. E.fetida* releases fine, powdery, dark brown material. The mean total weights of the vermicompost obtained from F. religiosa were 829g (50:50), 748g (60:40), and 652g (70:30). The maximum vermicompost recovered from 50:50 concentration compared than others. Earthworms feed more waste and released highest vermicompost. The mean number of cocoons and youngones produced by *E.fetida* was found to be 114 and 56 (50:50); 98 and 42 (60:40); 73 and 39 (70:30) respectively during the composting period. The cocoons and youngones production was found to be higher in 50:50 proportion than the other two proportions.

The physico-chemical quality of the worm-processed material was analyzed during this study. Table II shows the nutrient status of control and vermicompost was analyzed in all the parameters. The pH was measured using a digital pH meter. The observation of the pH value is 7.0 (50:50), 7.2 (60:40), and 7.4 (70:30). Vermicompost improves the pH of soil and make available the nutrient for the crop yield reported by Kale et al.,(1992). The total nitrogen was estimated by kjeldahl method described by Jackson. The nitrogen range in vermicompost was 1.94g (50:50), 1.76g (60:40) and 1.28g (70:30). Availability of nitrogen increases growth and leaf area index of plant which in turn increases absorption of light leading to more dry matter and yield (Nanda *et al.*, 1995, Ravi *et al.*, 2008, Taleshi *et al*., 2011). The total phosphorous was measured by using gravimetric Quinoline molybdate method described by Anderson and Ingram. The total phosphorous value was 3.45g (50:50), 2.63g (60:40) and 1.87g (70:30). Researchers have reported that available phosphorus in earthworm casting is usually greater than in surrounding soil (Lunt and Jacobson, 1944; Tiwari *et al*., 1989). The levels of phosphorous in vermicompost are routinely 5-10 times greater than surface soils (Lee, 1985). Increased availability of phosphorous in vermicompost compared with surrounding soil is proposed to be attributable to enhanced phosphatase activity in the vermicompost (Satchell and Martin, 1984). The total potassium was estimated by using flame photometric method. The total potassium value was 0.96g (50:50), 0.87g (60:40) and 0.79g (70:30). Lee (1985) showed that exchangeable potassium (K) was over 95% higher in vermicompost. The NPK level is high in 50:50 concentration compared than other two concentrations and control. The total NPK level is good for plant growth and improvement of soil fertility. F.religiosa is not only medicinal uses always used as a vermicompost production.

CONCLUSION

The process of vermiculture helps in improving soil fertility and minimizes the use of chemical fertilizers. This eco-friendly vermiculture-agriculture-ecoengineering makes organic recycling much more active and enhances plant growth. This technology also provides opportunities for self employment by utilizing the available agricultural resources to the rural people.

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