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CHARACTERIZATION AND OCCURRENCE OF BACTERIAL POPULATION FROM VERMICOMPOST PRODUCED FROM THE TENDU LEAF LITTER WASTE OF SOLAPUR CITY.

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ABSTRACT

Earthworms play an important role in soil process by its habit of burrowing and conditioning the substrate through its biological activity. Vermicomposting is an efficient method of converting organic waste into eco-friendly useful, nutrient rich manure than traditional composting process. Vermicompost is a rich source of microfauna. The present study focuses on the study of microbial population of bacteria in the tendu leaf litter vermicompost .The colony characters and count in different dilutions of vermicompost samples are noted.

KEYWORDS- *tendu leaf litter, vermicompost, bacteria, colony characters, bacterial count etc.*

INTRODUCTION :

Vermicomposting is a profitable technology with large potential because of its organic application in the agricultural fields. Various species of earthworms are used for recycling the organic waste and c Vermicomposting is a non-thermophilic, boioxidative process that involves earthworms and associated microbes. This biological organic waste decomposition process yields the biofertilizer namely the vermicompost. Earthworms form one of the major soil macro fauna to maintain dynamic equilibrium and regulate soil fertility. The soil volume affected by earthworm activities is called the drilosphere (Lavelle, 2002).They are the soil engineers. (Anderson, 1995).

Epigeic earthworms remain active throughout the year under favourable conditions. There is a constant monitoring of moisture levels, temperature and food for their survival and biomass production. For vermicomposting process temperature below 35 degree centigrade moisture level between 40% and 60% are ideal for earthworm activity.(Rajendran et al.,2008).Vermicompost is a finely divided, peat like material with high porosity, good aeration, drainage, water holding capacity, microbial activity, excellent nutrient status and buffering capacity thereby resulting the required physiochemical characters congenial for soil fertility and plant growth. Vermicompost enhances soil biodiversity by promoting the beneficial microbes which in turn enhances

plant growth directly by production of plant growth-regulating hormones and enzymes and indirectly by controlling plant pathogens, nematodes and other pests, thereby enhancing plant health and minimizing the yield loss (Subbarao et al., 2007).

In Solapur, there are about 30 large beedi factories, which have around115 units of 20 small branches spread all over the city. They are mostly concentrated in the eastern part of the city (Solapur Action plan, 2004).Bidi making is a method in which approximately 40- 45 % of leaf part is utilized for beedi preparation and remaining 50-60 % of the leaf is discarded as solid waste. In the absence of proper scientific method, the leaf waste is thrown on the streets and the improper disposal of leaf garbage leads to various environmental hazards. To resolve this problem in an ecofriendly method of tendu leaf waste management was recommended to convert the waste into vermicompost using vermibiotechnology (Kadam et al, 2005; Khatavkar et al., 2008: Mushan, 2010).

Hence, this study is taken to clean the environment from organic wastes by converting the tendu leaf litter waste into vermicompost and its bacterial count is elucidated in the present study.

MATERIAL AND METHOD:

Raised Bed method for vermicomposting

Three raised vermicomposting beds of 2.0x1.0x0.5 m size containing partially decomposed tendu leaf (ORM) (one hundred kilogram in each bed) as an earthworm feed were prepared in 6 feet x 3 feet size vermicomposting shade under natural aerobic conditions at Karamba, in a private farm house. The beds were watered and 5000 adult earthworms of Eudrilus eugeniae were released separately in each bed. The beds were protected from natural enemies. Bed temperature and humidity were maintained at 28 ± 4 °C and 35-40% respectively by sprinkling water on the bed (Parlekar and Pharanade,2005).

On tenth day 90% of ORM feed was removed from each bed by hand as vermicompost with heaping and fresh partially decomposed feed of tendu leaf litter was added in the bed for the next replications. This vermicompost thus obtained is analyzed for bacterial population at various dilutions.

Enumeration of Microbial Population (Bacteria) in decomposed tendu leaf litter and tendu leaf litter vermicompost:

1g of representative samples taken from each of the systems mounted for study was weighed into 9ml of 0.1% peptone water contained in 4 different McCartney bottles and incubated at 37ºC for 15minutes.They were mixed well and 1ml of the supernatant was drawn from each of the bottles and diluted using 10-fold dilution into 4 other McCartney bottles each containing 9ml of sterile 0.1% blank peptone water. Different pipettes were used for each of the dilution. 1ml of the diluents taken from various dilution factors .The loopful of culture was streaked evenly over the surface of a prepared agar by sufficiently raising the lid of the Petri- dish loaded with nutrient agar media. Pour plate method (Dubey and Maheswari,1999).The mean number of colony forming units(cfu) of bacteria, collected from different dilutions was calculated.

RESULT AND DISCUSSION:

Table: 1

Bacterial count of decomposed tendu leaf litter and tendu leaf litter vermicompost in different dilutions:

Different dilutions	Mean no. of CFUs in decomposed tendu leaf litter	Mean no. of CFUs in tendu leaf litter vermicompost
10^3	540 ± 1.08	780± 0.09
10^4	420 ± 1.05	730±0.55
10^5	350 ± 0.99	501±0.32
10^6	270 ± 1.28	490±0.74
10^7	100 ±1.60	350±0.21
10^8	90 ± 0.09	250±0.11
10^9	40 ±0 .70	140±1.02

In the present study 40percent of the bacterial colony were circular, half white with smooth margin 20 percent were light yellow with smooth and irregular margin. Morphologically, the bacterium was rod-shaped. It was Gram-positive, sporulating and motile.

The increase in the microbial population count from the vermicompost produced from tendu leaf litter compared to decomposed tendu leaf litter is significant for all the dilutions. The increased bacterial count in the vermicompost might have enhanced the biological activities of the cast (Rao and Mushan,2016). Nagavellemma et al (2004) have recorded higher microbial population in vermicompost than compost. It can also be stated that the microbial community in the vermicompost will promote the vermicomposting process.

CONCLUSION:

The present study can be concluded that the vermicomposting of tendu leaf litter waste can be a viable method for converting the solid waste into useful manure as it is rich in bacteria. The vermicompost produced from beedi waste has rich bacterial count than the decomposed tendu leaf litter.

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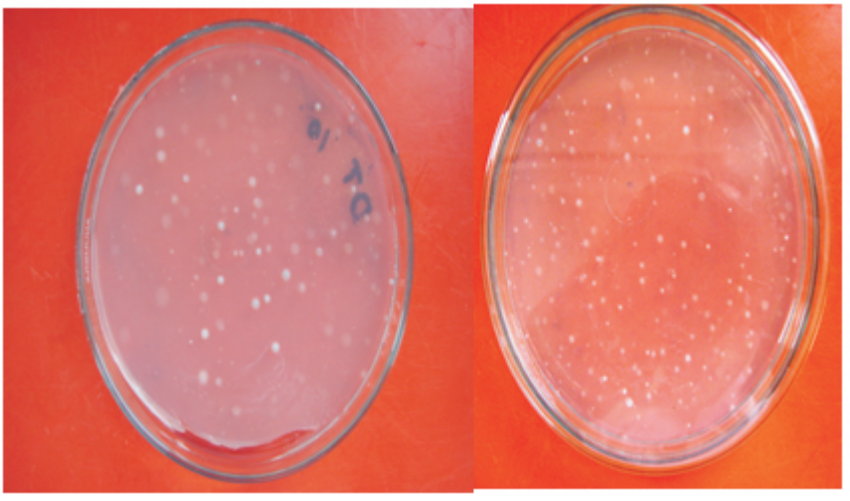
REFERENCES:

1. Anderson, J. M., Soil organisms as engineers: microsite modulation of macroscale processes. In Linking Species and Ecosystems (eds Im Joies, C. G. and Lawton, J. H.), Chapman and Hall, London,
2. Dubey, R.C. and Maheshwari, D.K.(1999) A Text Book of Microbiology, Chand & Company Ltd, New Delhi pp.1-300
3. Kadam, D. G., Pathade, G.R., and Goel , P. K. (2005) Optimum concentration of supplementary feed for vermicomposting of tendu (Diospyros melanoxylon, Roxb.)Leaf refuse by Eudrilus eugeniae (Kinberg) Poll Res. 24 : 259 – 262.995, pp. 94–106.
4. Khatavkar, R.S., Shah, N. V., Rao, K. R., Chavan, M. D., and Mushan, L. C. (2008) Vermicomposting of beedi (Indian Cigarette) leaf litter and its bioadsorbant utility. Eco.Env.and Cons. 14 (4) : 613-616.
5. Lavelle, P., Functional domains in soils. Ecol. Res., (2002) 17, 441–450.
6. Mushan (2010) A thesis on Vermicomposting in agriculture: Studies with Leaf litter of tendu (Diospyros melanoxylonRoxb.) used in the beedi industry with Different species of earthworms. Shivaji university, Kolhapur
7. Nagavallemma, K.P., Wani, S.P., StephaneLacroix, Padmaja, V.V., Vineela, C., BabuRao, M. and Sahrawat. K.L. (2004) Vermicomposting : Recycling wastes into valuable organic fertilizer. Global Theme on Agrecosystems Report no. 8. Patancheru 502 324, Andhra Pradesh, India : International Crops Research Institute for the Semi-Arid Tropics.pp.20 .
8.Parlekar, G.Y.and Pharande,A.L.(2005) Low cost vermicompost production technology : A viable farming system component .Souvenir Agricultural science congress Feb.16-18,2005,Puna .
9.Rajendran, P., Jayakumar, E., Kandula, S. and Gunasekaran, P.,(2008) Vermiculture and vermitechnology for organic farming and rural economic development. Green pages,; http://www.eco-web.com/editorial/080211.html
10. Rao.K.R and Mushan.L.C(2016). Fungal diversity of vermicompost produced from the major Municipal Solid waste -Tendu (Diospyros melanoxylon) leaf litter generated from Solapur city.IJPRBS.
11. Solapur Action Plan – (2004) Maharashtra Pollution control Board. Revised action plan for control of air pollution in Solapur.
12.SubbaRao,N.S. (2007) Soil microbiology(Fourth edition of soil microorganisms and plant growth)published by Oxford and IBH publishing Co.Pvt.Ltd.

Figure:1.Bacteria cultured for its count onNutrient Agar media from decomposed tendu leaf litter and tendu leaf litter vermicompost.



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