VERMICOMPOST PRODUCTION BY *Eiseniafetida* ON CASSAVA PEEL WASTE COMPOST (PERIDERM)

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Abstract: Salem and Namakkaldistricts ofTamilnadu have numerous cassava processing factories . They released lot of cassava tuber peel (periderm) waste. The objective of this study is cassava peel waste is composted by *Trichodermaviride* then it is evaluated, substrate for *Eiseneafetida* .Initially we introduced 50 numbers of worms in to cassava vermi bed. After 50 days we got eight folds in numbers (t-test $p \leq 0.01$) and 5000 folds increased in the body weight (t-test $p \leq 0.008$). Bioconversion of vermicomposting is also good (35.5%).Chemical analysis of vermicompost showed that pH 7.5 and E.C 0.5 dsm-1 are suitable for plant growth. The nutrient content of vermicompost are N: 1.4%; P: 0.2% and K: 4.43%. Result indicates that cassava peel waste (periderm) is found to be suitable substrate for*Eiseniafetida*.

Key words:*Eiseniafetida* , *Trichodermaviride* ,Cassava peel waste, Vermicomposting.

1.INTRODUCTION

Vermicomposting is a simple biological conversion, in which certain species of earthworms feeding the waste material and produced as vermicast.Earthworms are small , soft , cylindrical invertebrates that play a vital role in soil ecosystem. Vermicomposting is a mesophilic process. This process is faster than composting. Because the material process through the earthworm gut, whereby the resulting earthworm casting (worm manure) are best plant manure (Gandhi *etal.,* 1997).

Earthworms consume various organic wastes and reduce the volume by 40% to 60%. Each earthworm weighs about 0.5 to 0.6 g.It eats waste, equivalent to its body weight and produces cast equivalent to about 50% of the waste it consumes in a day.(Nagavallemma,*etal.*, 2006). Vermicomposting is a natural bioreactors for effective recycling of organic wastes to the soil is an environmentally acceptable for converting waste into nutritious composts for crop production. (Graff,1981; Edward *etal*.,1985; Bono *etal*.,1987).

Vermicompost has the nutrients such as nitrates , phosphates and exchangeable calcium and soluble potassium.(Orozco *etal* , 1996 cited in Rakesh josh , 2010).Various work was carried out on vermicomposting of various organic material such as animal drug , Agricultural waste , forestry wastes, city leaf litter and food waste (Hand *etal*., 1988;Loggdon,1994;Madan,*et al* 1988;Sing and sharma 2002.) Likewise industrial waste, such as distillery wastes have been vermicomposted and turned into nutrients rich manure.(Suthar,2006;Suthar, 2007). The most promising earthworm species used for vermicomposting are *Eiseniafetida, Eiseniaandrei, Eudriluseugeniae and Perioryx excavates,* have beenappeared as key sources to compact the problem of organic waste disposal on a low input basis(Garg and Kaushik,2005;Suthar,2007).

*Manicotutilissima*iswidely grown in soils for its large tuberous roots.The cassava peel of theroots, though rich in plant nutrients, forms toxic wastes lethal to soil invertebrate and can inhibit root growth. It has been reported that Eudriluseugeniae is capable of partially detoxifying the waste, proliferating on them and transforming them into valuable vermicomposting bio fertilizer.(Caroline,1996).

Due to the modern technologies in cassava processing industries they discharge periderm peel waste(outer brown skin only).Such peel wastes were unsuitable for cattle feed. Cassava peel has normally higher concentration of cyanogenicglucosidesthan the parenchyma. The composted cassava peel has low cyanogenic content. Composting is not only reduces toxicity but also the lignocellulose material is converted into a more digestible substrate. (Ubalua,2007)

In the present objective of this study was to investigate the composted cassava peel waste (periderm)by *Terchodermaviride* into vermicomposting by *Eiseniafetida*

2. MATERIALS AND METHODS

2.1.1 Methods of Cassava Peel Waste Composting

The dried cassava tuber peel waste (periderm) was collected and weighed about 60 kg and heaped on the shadow place.0.2% carried based (talk powder)*Trichodemaviride* was mixed with sterilized farmyard manure(250g) and 300 g urea were thoroughly mixed with entire cassava wastes. Optimum moisture was maintained (30%). The content had been mixed thoroughly on everyfortnight.

2.1.2 Method of preparation ofvermicompost

The three bottom portions of the wooden boxes were filled with gravels and covered with sand. Above that to prepare a cassava vermi bed. In each boxes cassava material were mixed thoroughly with cow dung (2:1) ratio and filled into the wooden boxes respectively. Straw materials were chopped and spread over the vermibed. Waterwas sprinkled over it and maintained 50% moisture. Then 50 numbers of worms were introduced in to bed. These boxes were kept under the shadow places. All three boxes were covered with moisturized gunny bags.

2.1.3 Vermicompost Harvesting

After two weeks the vermicompost was formed on the top of the bed. And to heap the vermicompost on the top of the bed. After leaving the vermicompost for an hour, collecting,sieving process have been carried out and finally stored in shadow places.

2.1.4 Analysis of PH and E.C In Vermicompost

pH and determination was performed by the samples collected from various parts were pooled together and suspended in water and it was shaken for 30 min on rotary shaken and the pH of the supernatant was determined using pH meter.

2.1.5 Nutritive analysis in Vermicompost

After collecting , vermicompost was analyzed for the nutrition such as Nitrogen , Phosphorous and Potassium at soil testing laboratory , Sandiyur , KVK.

2.1.6 Statistical Analysis

All the data is expressed as mean±SD.The obtained results were subjected to analysis of variance, testing the significance by t-testusing software version SPSS 20.Values of $p \leq 0.05$ were consider statistical significance.

4.RESULT AND DISCUSSION

4.1 Duration andbioconversion of Vermicomposting

Within 10 days of worm introduction we can collect the vermicompost from top of thevermibed. High rate of bioconversion is obtained(35.5%). Similar observation has been seen by Murali(2011),he used coir waste.

4.2*Eiseniafetida*Growth and Proliferation on Cassava Peel Waste

The *Eiseniafetida* growth and reproduction were significantly enhanced by cassava peel waste. The earthworm proliferation was eightfold time increased.(Table-1). At the end of the experiment, the mean value of three replicates of earthworm reproduction was significantly differing from initial level. (t-Test p value ≤ 0.01).The weight of the earthworm is also increased (p value 0.008).Similarly previous reports also have same reproduction and growth rate is observed in Suthar (2008), Garg(2005) and Murali (2010).For their work they used coir pith,domastic waste and various animal waste. Caroline (1996) used the cassava peel (not periderm) as a substrate for Eudriluseugeniae, the proliferation and worm weight were similar to this present work.

4.3Chemical Constituantof CassavaVermicompost

Table 2 shows the chemical constituent of vermicompost from cassava peel waste. The mean value of pH of vermicompost is 7.5±0.00 .The same result was observed in Suthar(2008) and Murali (2011).But they use domestic waste by epigeic earthworms and coir pith by *Eudriluseugeniae*respectively. The electrical conductivity of vermicompost also suitable for plant growth (.600±.200).The nitrogen and phosphorus were 1.4% and 0.2% respectively. The potassium content of cassava vermicompost was high(4.43%±.450).The same result was observed in Delgado *et al.*,(1995).He demonstrated higher potassium concentration in the end product of vermicompost prepared from sewage sludge. Basically cassava peel(periderm) waste has high potassium concentration. It expresses in vermicompostalso.Sudhirkumar,*et al.,(2010)* reported that 0.8 to 1.0 % of potassium by using municipal solid waste,coirpithvermicompost by *Eudriluseugeniae*alsohave low potassium content(Murali*et al.*, 2011).

Table-1: Biological Productivity of *Eiseniafetida* on Cassava Peel(Periderm) (Mean±Sd,N=3)

S.no	Parameter	Initial level	After 50 Days (Mean value of triplicates)	Increased percentage/Bioconversion	t- Test
1.	Worm proliferation	50±0.00 Number	462.6 ±53.7	825.2%	p-0.000
2.	Worm weight	.133mg ±.0152	676.6 mg ±176.1	508,62%	p-.008
3	Net weight of vermicompost production	12kg	4.266kg	35.5%	-

Table-2: **Chemical Constituentof Cassava VermicompostBy*EiseniaFetida***

S.no	Parameter	Physical/chemical constituents (mean±sd,n=3)
1.	pH	7.5±0.00
2.	E.C dsm-1	.600±.200
3.	Nitrogen(N)%	1.36±.205
4.	Phosphorus(P)%	.1933±.025
5.	Potassium(K)%	4.43±.450

CONCLUSION

Cassava tuber peel (periderm) was proved to be a potentially valuable nutritive material for *Eiseniafetida*. Biomass, Proliferation and Bioconversion of vermicompost production. The result obviously suggest that cassava peel (periderm) waste was found to be a better substrate for *Eiseniafetida*.

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