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Studies on Composting Technology of Palmyrah Pith

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Abstract: Palmyrah palm (Borassus flabellifer.L) belongs to family Arecaceae and is native of tropical Africa. In India, it is grown naturally throughout the country. It is monocotyledonous, dioecious plant almost all parts viz., root leaves, seed and fruit of the palm is used in different ways. It is underutilized palm and grown naturally in forest and barren lands. The importance of the palm is not still recognized by the people. Among the different treatment, treatment T_8 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg) highest N content 0.78 %, P content 0.09% and K content 0.97 % and all the micronutrients like Fe, Cu, Mn & Zn , followed by treatment T_7. The lowest macro and micronutrients content was recorded in the treatment T_1.

INTRODUCTION

PALMYRAH Palm (Borassus flabellifer.L) is also known as toddy palm, tal,panai,ect. It is third important palm next to coconut and date palm. The centre of orgin of Palmyrah palm is Tropical Africa and distributed from India through South- East Asia to New Guinea. According to Literature, it is believed that B. flabellifer is a selection from the more diverse Borassus aethiopum Mart. Of Africa . Globally, it is grown in Sri Lanka, India, Myanmar, Cambodia, Indonesia , ect., In India is found naturally in forest and community land of Tamil Nadu, Andhrapradesh, OdishaWest Bengal, Bihar , Karnataka, Gujarat and Maharastra. It is a large tree up to 30m high and the trunk may have a circumference of 1.7 m at the base. It is also recognized as the state tree of Tamil Nadu in 197. It is multipurpose, evergreen plant. All the plant parts of this palm are useful for the welfare of human in different ways. It is good source of nutrition especially tribal peoples. It also provide good opportunity for employment and source of income for resource poor people of panchmahal tribes. Recently it is grown in orchard form as sole, mixed with fruit crops, boundary plantation and multistory cropping systems.

COMPOSTING TECHNOLOGY OF PALMYRAH PITH

MATERIALS AND METHODS

To evaluate different methods of composting of palmyrah pith and analysis of composted pith for nutrients and microbial population**.** The treatments were imposed for composting of coir pith. Initial analysis of palmyrah pith was carried out before composting. Physico - chemical characteristics of palmyrah pith, (pH, EC, Organic carbon (Major nutrients (NPK), micronutrients (Fe, Cu, Mn, Zn) and microbial characterization of composted palmyrah pith were analyzed. The above analysis will be carried out during 75 days and 90 days of imposing the treatment. The Experiment was started during the month of October, 2016. Analysis of

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the palmyrah pith sample before imposing the treatments was done and the results are given in the following table.

To evaluate different methods of composting of palmyrah pith and analysis of composted pith for nutrients and microbial population**.** Both pit method and heap method was done.

T_1-	Palmyrah pith (100 kg) + Urea (1 kg)
T_2- T_3-	Palmyrah pith (100 kg) + Pleurotus fungus 2 bottles (1 kg) Palmyrah pith (100 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg)
T_4-	Palmyrah pith (100 kg) + Urea (1 kg) + *Trichoderma viride* (1 kg) (Palmyrah pith + Urea, turning at 15 days interval up to 45 days. Application of *Trichoderma viride* on 46th day and again turning at 15 days interval.)
T_5-	Palmyrah pith (100 kg) + Pleurotus fungus 2 bottles (1 kg) + *Trichoderma viride* (1 kg). (Palmyrah pith + Pleurotus fungus 2 bottles (1 kg) and turning for 15 days interval up to 45 days. Application of *Trichoderma viride* on 46th day and again turning at 15 days interval)
T_6	Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + *Trichoderma viride* (1 kg) (Palmyrah pith + Poultry manure + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) and turning for 15 days interval up to 45 days. Application of *Trichoderma viride* on 46th day and again turning at 15 days interval)
T_7	Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Bio mineralizer (0.2kg). (Palmyrah pith + Poultry manure + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) and turning for 15 days interval up to 45 days.
T_8	Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg) . (Palmyrah pith + Poultry manure + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) and turning for 15 days interval up to 45 days. Application of *Trichoderma viride* on 46th day and again turning at 15 days interval.)

Table 1: Initial evaluation of the palmyrah pith.

N	0.48%
P	0.035%
K	0.38 %
Fe	0.21 ppm
Zn	0.42 ppm

Cu	0.14 ppm
Bacteria	1.79×10^4 cfu/g
Fungi	2.39×10^4 cfu/g
Actinomycetes	0.45×10^4 cfu/g

After imposition of the treatments turning of the palmyrah pith was done at every 15 days interval. To the treatments T_5, T_6 and T_7, *Trichoderma viride* was applied at 46th day from the day of starting the experiment and turning of the pith was continued. The treatment T_8 application of Pleurotus fungus and biomineralizer on 16 th day after turning was done. The decomposition process in the treatment T_8 &T_7 is rapid and all other treatments slow. The samples from all the treatments were collected and analysed for the content of important major and micro nutrients as well as the microbial load and the results are given in the following tables.

RESULT AND DISCUSSION

There was no influence of the treatment was observed as all the treatment ,recorded lower values in terms of major and micronutrient contents. Among the different treatment, treatment T_8 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg) highest N content 0.78 %, P content 0.09% and K content 0.97 % and all the micronutrients like Fe, Cu, Mn & Zn , followed by treatment T_7. The lowest macro and micronutrients content was recorded in the treatment T_1.

Table 2: Physico-chemical characteristic of palmyrah pith

Treatments	*pH*	*EC (dS m^{-1})*	*N (%)*	*P (%)*	*K (%)*	*Fe (ppm)*	*Cu (ppm)*	*Mn (ppm)*	*Zn (ppm)*
T_1	6.1	0.009	0.49	0.03	0.69	0.37	3.8	15.79	10.78
T_2	6.1	0.008	0.51	0.05	0.74	0.49	3.9	16.89	11.99
T_3	6.2	0.008	0.52	0.04	0.80	0.54	4.1	16.92	12.36
T_4	6.4	0.007	0.54	0.06	0.84	0.59	4.7	17.71	12.84
T_5	6.3	0.006	0.57	0.06	0.89	0.61	4.9	17.79	13.12
T_6	6.5	0.003	0.59	0.07	0.91	0.64	5.1	19.10	13.89
T_7	6.4	0.004	0.64	0.04	0.94	0.69	5.3	19.28	14.29
T_8	6.5	0.004	0.78	0.08	0.97	0.74	5.6	19.75	14.87
SEd	0.10	0.0006	0.12	0.012	0.009	0.004	0.16	0.012	0.035
CD (0.05)	0.29	0.0016	NS	NS	NS	0.0045	0.20	0.058	0.042
CV %	0.4	4.43	0.35	0.03	0.25	8.56	2.56	0.29	0.38

Table 3: Microbial characterization of composted palmyrah ith

Treatments	*Bacteria*	*Fungi*	*Actinomycetes*
T_1	4.76	2.65	7.31
T_2	5.50	2.78	9.47
T_3	6.17	2.98	10.32
T_4	6.54	3.12	11.76
T_5	6.76	3.46	12.19
T_6	7.21	4.73	12.74
T_7	7.98	4.87	12.98
T_8	8.51	4.94	13.09
SEd	3.14	2.65	4.6
CD (0.05)	6.5	4.35	2.5
CV %	8.8	6.37	5.36

Among the different treatments, the treatment T_8 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg) recorded highest bacterial content of 8.51 x 10^4 cfu g^{-1}, fungi 4.94 x 10^4 cfu g^{-1} and actinomycetes 13.09 x 10^4 cfu g^{-1}. The lowest microbial load has been recorded in treatment T_1 i.e., application of palmyrah pith (100 kg) alone.

Temperature of Composting At Different Intervals

Treatments	*November 2016*	*December 2016*	*January 2017*	*February 2017*	*March 2017*
T_1	15.12	25.67	45.15	47.12	47.89
T_2	15.21	25.67	45.92	46.39	47.34
T_3	15.27	25.67	46.14	46.77	47.31
T_4	15.79	25.69	46.69	46.69	47.29
T_5	15.79	25.76	46.82	47.26	47.31
T_6	15.94	25.91	47.75	49.77	48.52
T_7	15.81	25.76	47.21	45.14	37.26
T_8	15.89	25.82	47.19	44.31	37.21
SEd	6.5	8.25	1.62	12.25	7.96
CD (0.05)	2.35	3.26	4.84	10.65	6.26
CV %	6.35	4.56	5.18	14.18	9.61

Much temperature variation has been observed in different months. During the month of march 2017, the treatment T_6 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + *Trichoderma viride* (1 kg) has recorded the highest temperature of 48.52 (° C), followed by treatment T1 Palmyrah pith (100 kg) + Urea (1 kg) has recorded the temperature of 47.89 (° C). The lowest temperature of 37.21 (°C) was recorded in the treatment T_8 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1 kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg).

Temperature of composting at different intervals

Much temperature variation has been observed in different months .During the month of January 2018, the treatment T_6 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea(1 kg) + Pleurotus fungus 2 bottles (1 kg) + *Trichoderma viride* (1 kg) has recorded the highest temperature of 45.72 (° C) , followed by treatment T1 Palmyrah pith (100 kg) + Urea (1 kg) has recorded the temperature of 45.52 (° C). The lowest temperature of 27.29 (°C) was recorded in the treatment T_8 Palmyrah pith (100 kg) + Poultry manure (10 kg) + Urea (1kg) + Pleurotus fungus 2 bottles (1 kg) + Ligno Cellulolytic Fungi 2 bottles (1 kg) + *Trichoderma viride* (1 kg).

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References

Bolan, N.,Adriano, D., Mani, S. and Khan, A. (2003). Adsorption, complexation, and phytoavailability of copper as influenced by organic manure. Environmental Toxicology and Chemistry, 22, 450–456.

Tamoutsidis, E., Papadopoulos, I., Tokatlidis, L., Zotis, S. and Mavropoulos, T. (2002).Wet sewage sludge application effect on soil properties and element content of leaf and root vegetables. Journal of Plant Nutrition, 25, 1941–1955.

Untersuchung und-Forschung A – Food Research and Technology, 206, 417–419.

tersuchung und-Forschung A – Food Research and Technology, 206, 417–419.

Wen, G., Bates, T. E., Inanaga, S., Voroney, R. P., HAMAMURA,K. and CURTIN, D. (2002). A yield control approach to assess hytoavailability of Zn and Cu in irradiated, composted sewage sludges and composted manure in field experiments: II.

Copper. Plant and Soil,246, 241–248