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INFLUENCE OF PARTIALLY COMPOSTED COIRPITH ON THE YIELD ATTRIBUTES AND YIELD OF RICE (VAR. ADT 36)

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ABSTRACT

A field trial was conducted on a sandy clay loam soil (Typic Haplustalf) at the Agricultural College and Research Institute, Madurai to study the influence of raw, partially decomposed and fully decomposed coirpith on the yield attributes and yield of rice (var.ADT 36). Both panicle length and grains per panicle were significantly increased by coirpith application. Twenty to twentyfive-day-composted coirpith (CCP) plots were on par with 30- day-CCP plots. Upto 20 cm depth, 30-day CCP plots recorded highest root length density but was on par with 25-day-CCP plots. Highest grain yield of 3.82 t ha^{-1} recorded in 30-day CCP was on par with 25-and 20-day-CCP (3.79 and 3.75 t ha^{-1}).

KEY WORDS : Coir Pith, Partially Composted, Rice Yield

In Tamil Nadu alone, about 1.7 lakh t of coirpith is being produced annually. This amounts to about 26 per cent of India's annual coirpith production. The results of experiments conducted so far clearly showed the beneficial effect composted coirpith using *Pleurotus sojar-caju* in increasing crop yields (Sharma and Mitra, 1990). The pre-composting period of 30 days (Nagarajan *et al.*, 1986) was reported to be a long period by several farmers. Therefore, an evaluation of the efficiency of application of coirpith composted for different durations has to be made so that the farmer may apply such partially composted coirpith without any possible detrimental effect on the yield of crops. Having this in view this study was undertaken.

MATERIALS AND METHODS

A field experiment was laid out at the Central Farm, Agricultural College and Research Institute, Madurai, Tamil Nadu. The soil was sandy clay loam and belongs to Madukkur series '(Typic Haplustalf). The soil was near neutral in reaction (pH 7.9) having low soluble salts. The nutrient status of the field was medium in available nitrogen (326 kg ha^{-1}), P (12.9 kg ha^{-1}) and K (205 kg ha^{-1}) while the organic carbon was high (1.12%). The following eight treatments were tried with four replications in plots of 4 m x 5m size. The treatments were randomised under the randomised block design.

T_1 : Control (No coirpith)
T_2 : Raw coirpith (RCP) at 12.5 t ha^{-1}
T_3 : 5 days composted coirpith (CCP) at 12.5 t ha^{-1}
T_4 : 10 days composted coirpith (CCP) at 12.5 t ha^{-1}
T_5 : 15 days composted coirpith (CCP) at "
T_6 : 20 days composted coirpith (CCP) at "
T_7 : 25 days composted coirpith (CCP) at "
T_8 : 30 days composted coirpith (CCP) at "

Calculated quantities of raw coirpith were composted in pits using urea and *Pleurotus sojar-caju*. The compost pits were prepared at five day interval upto 30 days so as to get 30, 25, 20, 15, 10 and 5-day composted coirpith. These materials were applied to the respective plots at the rate of 12.5 t ha^{-1} and incorporated in the soil two days prior to planting.

All the plots received a common dose of 120 kg N ha^{-1} as urea, 60 kg P_2O_5 ha^{-1} as single super phosphate and 60 kg K_2O ha^{-1} as muriate of potash. Half the dose of N and full dose of P_2O_5 and K_2O were applied basally. Twenty-five-day old ADT 36 rice seedlings were transplanted adopting a spacing of 15x 10 cm. The remaining half dose of N was applied initiation stage. The grain and straw yield were recorded at harvest and expressed at 14 and 30 per cent moisture respectively.

Five plants were selected at random and tagged for observations. Plant height was recorded at four stages *viz.*, maximum tillering, panicle initiation flowering and maturity and expressed in

Table 1. Yield attributes and yield of rice (var. ADT 36) (Mean of four replications)

Treatments	Plant height (cm)	Panicle length (cm)	Grains per panicle (No.)	Yield t ha^{-1}	
				Grains	Straw
Control	40.5	19.9	86.0	3.31	6.74
RCP	39.5	20.4	102.7	3.43	7.07
5 days CCP	42.5	20.5	103.7	3.42	7.24
10 days CCP	43.2	21.4	103.2	3.57	7.31
15 days CCP	43.5	21.8	111.1	3.68	7.15
20 days CCP	43.5	22.6	116.2	3.75	7.37
25 days CCP	44.7	23.3	117.4	3.79	7.83
30 days CCP	44.7	23.4	115.5	3.82	7.91
CD (P = 0.05)	2.2	0.8	9.3	0.07	0.33

RCP : Raw Coirpith; CCP : Composted Coirpith

Table 2. Correlation coefficients between yield attributes and available N, P, K and yield of rice grain and straw

	I	II	III	IV
Plant height Vs Available N	0.565	0.277	0.264	0.299
Panicle length Vs "	0.887**	0.980**	0.805*	0.909**
Grains/Panicle "	0.692	0.854**	0.782*	0.865**
Plant height Vs Available P	0.748*	0.194	0.052	0.002
Panicle length Vs "	0.783	0.879**	0.954**	0.948**
Grains/Panicle "	0.647	0.754*	0.814*	0.759*
Plant height Vs Available K	0.850*	0.193	0.400	0.482
Panicle length Vs "	0.459	0.881*	0.825*	0.939**
Grains/Panicle "	0.657	0.930**	0.804*	0.952**
Plant height Vs Organic carbon	0.825*	0.162	0.324	0.700
Panicle length Vs "	0.661	0.748	0.675	0.400
Grains/Panicle "	0.892**	0.869**	0.665	0.670
Panicle Lenght Vs Grains/Panicl	-	-	-	0.906**
" Vs grain/yield	-	-	-	0.983**
" Vs straw/yield	-	-	-	0.927**
Grains/Panicle Vs Grain yield	-	-	-	0.930**
" Vs straw yield	-	-	-	0.838*

I Maximum tillering stage; II Panicle initiation stage; III Flowering stage; IV Harvest stage.

cm. Panicle length (in cm) and number of grains per panicle were recorded at harvest and the mean values were calculated. At the maximum tillering stage, plant samples were collected using standard procedures and the root length density was calculated. At harvest, grain and straw yields were recorded treatmentwise. The post-harvest soil samples were analysed for available N,P,K and organic carbon by standard procedures (Subbiah and Asija, 1956; Olsen *et al.*, 1954; Stanford and English, 1949; Walkley and Black, 1934).

The data thus obtained, were statistically scrutinised following the methods of Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Yield attributes of rice (panicle length and grains per panicle) are presented in Table 1. In the case of panicle length, the highest value (23.4 cm) was recorded in the 30-day CCP applied plot (T^8) which was on par with T_7 and T_6 and were significant higher than control. The lowest value (19.9 cm) was recorded in the control (T^1). Panicle length was significantly influenced by coirpith application. Both in raw coirpith as well as 5-day CCP plots, the panicle length was not significantly different from that of control while 20, 25, and 30 day composted plots recorded significantly larger panicles than the above three. There was close positive correlation between panicle length and the

Table 3. Influence of raw and partially composted coirpith on the available nutrients content at harvest (Mean of four replications)

Treatments	Available nutrients (kg ha^{-1})			Organic carbon (%)
	N	P	K	
Control	204	26.3	294	0.77
RCP	224	26.3	280	0.89
5 days CCP	227	27.4	288	0.93
10 days CCP	230	27.7	305	0.87
15 days CCP	232	27.9	297	0.89
20 days CCP	237	28.8	292	0.89
25 days CCP	246	31.5	299	0.93
30 days CCP	265	32.1	305	0.85
CD (P = 0.05)	21	2.6	15	NS

RCP : Raw Coirpith; CCP : Composted Coirpith

major and secondary nutrients and organic carbon content in the soil (Table 2) at all stages of crop growth. This is attributed to the beneficial effects derived from the addition of coirpith to the soil. The available nutrients (N,P, K) were found to increase with application of CCP (Table 3). Among the composted plots, 20 and 25 day CCP plots were similar to 30 day CCP plots.

The highest number of grains per panicle (117.4) was recorded in the plot applied with 25-day CCP which was on par with T_8, T_6 and T_5 and were significantly higher than control (86). Coirpith application either in raw state or in different stages of composting significantly increased the number of grains per panicle. Among the coirpith plots, 20 to 25-days CCP application exhibited the same effect as that of 30-days CCP in that the differences were non-significant. The favourable soil environment in terms of physical properties and nutrient availability might be the reasons for more number of grains per panicle.

The root length density (RLD) calculated for three depths (0-10, 10-20 and 20-30cm) is presented in Table 4. At 0-10 cm depth, 30-day CCP recorded significantly higher value of 0.87 cm cc^{-1}. The lowest value of 0-32 cm cc^{-1} was recorded in 15-day CCP (T_3) which was on par with T_1 and both were significantly lower than all others. At 10-20 cm depth, the highest RLD of 0.31 cm cc^{-1} was recorded in 30 day CCP and was on par with T_7. The lowest was recorded in T_3 (0.09 cm cc^{-1}) which was on par with T_1 and T_6. At

Table 4. Influence of decomposed coirpith on root length density (Mean of four replications)

Treatments	Root length density (cm cc^{-1})		
	0-10 cm	10-20 cm	20-30 cm
Control	0.35	0.11	0.04
RCP	0.64	0.18	0.09
5 days CCP	0.32	0.09	0.04
10 days CCP	0.62	0.21	0.08
15 days CCP	0.47	0.17	0.11
20 days CCP	0.43	0.11	0.06
25 days CCP	0.47	0.24	0.11
30 days CCP	0.87	0.31	0.07
CD (P = 0.05)	0.06	0.08	0.02

RCP : Raw Coirpith; CCP : Composted Coirpith

20-30 cm depth, the highest RLD of 0.11 cm cc^{-1} was recorded in T_5 and was on par with T_7 (0.11 cm cc^{-1}). The control recorded the lowest (0.04 cm cc^{-1}) which was on par with T_3 (0.04 cm cc^{-1}).

The grain yield of rice was the highest (3.82 t ha^{-}) in 30-day CCP plot (T_8) which was on par with T_7 and T_6 (3.79 and 3.75 t ha^{-1} respectively). They were found to be significantly higher than control - T_1 (3.39 to ha^{-1}). The straw yield ranged from 6.74 t ha^{-1} in control to 7.91 t ha^{-1} in 30-day CCP plot. The trend of result was similar to that of grain yield.

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