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RESIDUAL EFFECTS OF INTEGRATED NUTRIENT MANAGEMENT WITH FARMYARD MANURE, COIRPITH AND PRESSMUD COMPOST ON CLUSTER BEAN (*Cyamopsis tetragonoloba* L.)

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ABSTRACT
An experiment was conducted on sandy clay loam soil to study the effect of coirpith, pressmud and farmyard manure on the vegetative and yield parameters of cluster bean (*Cyamopsis tetragonoloba* L. (taub) var. Pusa Navbahar). On the 25th day a significant increase in root length and shoot length was observed in T11 (FYM + 25%NPK) treatment. An increase in plant fresh weight was observed in T6 (composted coirpith + 50% NPK), number of nodules in T8 (FYM + 50% NPK), plant dry weight in T12 (composted coirpith + composted pressmud +FYM) treatment. On the 45th day an increase in root length was observed and shoot length was observed in T11 (FYM + 25% NPK) treatment. Number of nodules was increase in T9 (composted coirpith + 25% NPK) and dry weight in T2 (composted coirpith) On the 55th day the root length was increase in T5 (100% NPK) and shoot length, number of nodules, plant fresh weight and plant dry weight in T11 (FYM + 25% NPK) treatment. An significant increase in number of fruits was observed in T12 (composted coirpith + composted pressmud + FYM). The yield parameters such as weight of pods, pods fresh weight, pods dry weight and length of pods was increased in T11 (FYM + 25% NPK) treatment, number of seed per pod was increased in T6 (composted coirpith + 50% NPK) and weight of seeds per pod was increase in T7 (composted pressmud + 50% NPK) treatment. The use of composted coirpith, composted pressmud and farmyard manure showed increasing trend in respect of biometric and yield parameters.

KEY WORDS: Cluster bean, composted pressmud, composted coirpith, farmyard manure, *Pleurotus sajor- caju.*

INTRODUCTION

Cluster bean [*Cyamopsis tetragonoloba* L. (taub) Var. Pusa Navbahar] is a vegetative crop of Indian origin belonging to the family fabaceae. Cluster bean has many health benefits so it is globally permitted as food additive up to a maximum of two percent of final product. FYM, pressmud and coirpith have vast potential of recycling in agriculture. Organic wastes are considered as a rich source of macro and micro nutrient (Shah and Anwar, 2003). The present investigation therefore was undertaken to study the effect of FYM, coirpith and pressmud on growth and yield characteristics of cluster bean.

MATERIAL AND METHODS

Collection of agro industrial wastes

The agroindustrial waste such as pressmud was collected from Bannari Sugars Private Limited Sathyamangalam and coirpith from Pollachi. Seeds of cluster bean and FYM were collected from Tamil Nadu Agricultural University, Coimbatore. Using *Pleurotus sajor - caju* the compost was prepared.

Pot culture experiment

The pots were filled with 7kg of sandy clay loam soil. The composts was applied to the respective pots and mixed thoroughly. Viable seeds were selected and about five seeds were sown in each pot with three replications. After germination three healthy plants were maintained per pots. In this experiment composted coirpith, composted pressmud and FYM were incorporated in different concentration - T1- Control, T2- Composted coirpith (12.5t ha $^{-1}$), T3- Composted pressmud (12.5t ha^{-1}), T4- Farmyard manure (12.5t ha^{-1}), T5- NPK (100%),T6- Composted coirpith (12.5t ha^{-1}) + 50% NPK, T7- Composted pressmud (12.5t ha^{-1}) + 50% NPK, T8- Farmyard manure (12.5t ha^{-1}) + 50% NPK, T9- Composted coirpith (12.5t ha^{-1}) + 25% NPK, T10- Composted pressmud (12.5t ha^{-1}) + 25% NPK, T11- Farmyard manure (12.5t ha^{-1}) + 25 % NPK, T12- Composted coirpith (6.5t ha^{-1}) + Composted pressmud (6.5t ha^{-1}) + Farmyard manure(6.5t ha^{-1}).

Statistical Analysis

The data obtained on 25 DAS, 45 DAS and 55DAS on vegetative biometric observations(root length, shoot length, petiole length, number of leaves, number of nodules, number of lateral roots, fresh weight and dry weight.) and on 75DAS yield parameters (number of pods per plants, length of pods, weight of pods, number of seeds per pod, weight of seeds per pod, pod's fresh weight and pod's dry weight.) were subjected to the statistical analysis and based on the results inference were drawn.

RESULT & DISCUSSION

The experimental result pertaining to the composting of agrowastes pressmud and coirpith, FYM, vegetative growth and yield parameters during the pot culture experiments on legume like cluster bean [*Cyamopsis tetragonoloba* L. (taub) Var. Pusa Navbahar were given in table I and II.

TABLE – I Effect of composted pressmud, composted coirpith and farmyard manure on vegetative stage of cluster bean
** - Significant at 1% (P<0.01).

Treatment	Root length(cm)			Shoot length(cm)			Number of nodules		
	25DAS	45DAS	55DAS	25DAS	45DAS	55DAS	25DAS	45DAS	55DAS
T1	5.00	5.31	31.89	31.67	35.59	3.22	0.44	1.00	0.44
T2	7.94	6.36	38.11	28.84	37.60	6.01	0.89	0.67	0.56
T3	5.00	6.88	44.33	31.11	47.88	8.41	0.78	1.33	1.33
T4	6.20	8.46	49.24	32.67	37.63	8.31	0.78	0.78	0.44
T5	8.28	5.62	65.44	37.56	42.08	10.56	1.00	1.11	1.56
T6	5.56	13.49	45.00	27.17	44.37	5.44	1.11	1.33	1.56
T7	7.44	12.72	60.56	36.94	45.23	14.78	0.89	1.11	1.89
T8	9.83	9.17	47.89	24.22	46.59	7.67	1.22	0.56	1.33
T9	10.72	5.31	42.22	32.56	38.40	9.33	1.00	1.22	1.67
T10	8.42	6.27	58.44	34.33	35.63	14.33	1.11	1.22	2.56
T11	13.08	13.60	34.33	36.78	47.86	18.24	0.89	1.11	4.89
T12	12.66	9.31	42.11	35.22	46.30	12.36	0.56	1.11	1.33
SED	0.96946			0.57544			0.45553		
CD(0.05)	1.93353			1.14767			0.90853		
CD(0.01)	2.56707 **			1.52372 **			1.20623 **		

TABLE - II Effect of composted pressmud, composted coirpith and farmyard manure on vegetative stage of cluster bean
** - Significant at 1% (P<0.01).

Treatment	Number of fruits	Fresh weight (gm.)			Dry weight (gm.)		
	55DAS	25DAS	45DAS	55DAS	25DAS	45DAS	55DAS
T1	1.00	2.31	3.42	16.73	0.23	0.75	0.73
T2	2.33	2.94	11.59	19.51	1.48	5.84	1.74
T3	3.33	2.96	10.21	92.63	0.64	4.03	9.58
T4	3.67	3.31	9.53	38.53	1.43	3.82	9.47
T5	4.00	4.75	4.87	41.79	1.40	1.72	13.76
T6	3.00	6.18	6.17	91.23	0.74	1.84	19.17
T7	2.67	2.60	8.15	106.43	0.92	3.26	18.20
T8	3.67	3.55	5.85	50.28	1.02	2.42	4.46
T9	3.00	3.86	4.90	54.00	1.52	1.33	8.56
T10	1.33	2.86	12.17	161.58	0.88	5.82	18.03
T11	2.00	5.46	9.81	253.86	1.82	3.27	26.85
T12	4.00	4.99	7.48	112.27	1.94	3.05	9.44
SED	0.5774	2.58288			0.27564		
CD(0.05)	1.1916	5.15141			0.54975		
CD (0.01)	1.6238 **	6.83933 **			0.72988 **		

POT (0.44)

CULTURE EXPERIMENT

1. Effect of composted pressmud, composted coirpith and FYM on vegetative characters of cluster bean

The treatments T11 (FYM + 25% NPK) showed increased in root length on all the three days, 25 (13.08cm). 45 (13.60cm) and T5 (100% NPK) on 55 (65.44cm) days after sowing. Lowest root length was observed in control T1 (5.00cm, 5.31cm and 31.89cm) on 25, 45 and 55 days after sowing. Lowest root length was observed in control T1 (5.00 cm, 5.31 cm and 31.89 cm) on 25th, 45th and 55th days after sowing. The shoot length differed significantly among the treatments. A significant increase in shoot length was obtained in T11 (FYM + 25% NPK) on all three days, 25 (36.78 cm), 45 (47.86 cm) and 55 (18.24 cm) days after sowing. This is accordance result of Amanullah *et al.* (2008) in wheat.

On 25 DAS the number of nodules was significantly increased in T8 (1.22) when compared to the control T1 and other treatments. On 45 DAS the number of nodules was increased T9 (1.22), T10 (1.22) when compared to the control T1 (1.00). On 55 DAS the increase in number of nodules was significant in the treatment T11 (4.89). Number of fruits was increased significantly in T12 (4.00), T5 (4.00), T4 (3.67), T8 (3.67) on 55 DAS when compared to the control T1 (1.00). Similar results were reported by Usharani (2011) in soyabean and green gram.

Plant fresh weight was increase in T6 (6.18 gm) on 25 DAS, T10 (12.17 gm) on 45 DAS and T11 (253.86 gm) on 55 DAS when compared to the control (2.31 gm, 3.42 gm, 16.73 gm) on 25, 45 and 55 days after sowing. Plant dry weight was high in T12 (1.94 gm), T11 (1.82 gm) on 25 DAS, T2 (5.84 gm), T10 (5.82 gm) on 45 DAS, T11 (26.85 gm) on 55 DAS when compared to the control T1 (0.23gm, 0.75 gm and 0.73 gm) on 25, 45 and 55 days after sowing. This result was also confirmed by the findings of Kumar *et al.* (2007) in rice.

TABLE – III Yield parameters of cluster bean by pressmud, coirpith and farmyard compost (75th day)

Treatment	Length of pods(cm)	Weight of pods(gm)	Number of seeds/pod	Weight of seed/pod(gm)	Pod's fresh weight	Pod's dry weight
T1	8.22	4.33	2.22	0.01	4.33	0.33
T2	8.33	9.64	4.33	1.61	9.67	0.36
T3	9.77	22.63	6.22	3.46	22.64	1.37
T4	9.22	7.24	5.77	2.86	7.27	1.24
T5	10.26	15.87	6.33	1.92	15.87	1.49
T6	9.55	14.10	7.33	0.63	14.12	0.53
T7	9.35	11.73	7.22	6.87	11.72	0.76
T8	11.21	9.73	5.66	0.42	9.72	0.84
T9	10.38	13.33	6.00	1.87	13.55	1.05
T10	10.77	19.87	6.33	1.51	19.87	1.73
T11	14.44	24.13	5.22	1.16	24.13	2.25
T12	10.48	15.50	5.86	1.55	15.52	1.27
SED	0.5073	0.0876	0.6782	0.0423	0.0655	0.0061
CD(0.05)	1.0521	0.1818	1.4065	0.0877	0.1359	0.0127
CD(0.01)	1.4301 **	0.2471 **	1.9118 **	0.1192 **	0.1848 **	0.0173 **

** - Significant at 1% (P<0.01).

II- Effect of composted pressmud, composted coirpith and FYM on yield parameters of cluster bean

The length of pods was increased in T11 (14.44 cm), T8 (11.21 cm), T10 (10.77 cm), T9 (10.38 cm) and T5 (10.26 cm) when compared to the control T1 (8.22 cm). The weight of pods increase significantly in T11 (24.13 gm) and T3 (22.63 gm) when compared to the control T1 (4.33 gm). Similar report was noted by Sneha *et al*. (2004) in soya bean. The number of seeds/pod was higher in T6 (7.33), T7 (7.22), T5 (6.33) and T10 (6.33) when compared to the control T1 (2.22). The weight of the seeds/pod was increase in T7 (6.87 gm) when compared to the control T1 (0.01 gm). The pods fresh weight was increase in T11 (24.13 gm) and T3 (22.64 gm) when compared to the control T1 (4.33 gm). The pods dry weight was highest in T11 (2.25 gm) when compared to the control T1 (0.33 gm). This result was in agreement with the findings of Pannu *et al.* (2007) in summer mash.

CONCLUSION

Waste agro products can be degraded by biological processes avoiding soil contamination. The utilization of such bio systems involving organic materials and improvement of crop productivity is believed to be important part of the concept of sustainable agriculture. From the present investigation, it has been evident that the composted pressmud, composted coirpith and FYM increases the biometric and yield characters of cluster bean. Hence, it was concluded that the coirpith and pressmud on composting can be effectively used as an organic manure substitute.

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