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Integration of Biofertilizers to Chemical Fertilizer for Yield Optimization in Niger

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A B S T R A C T

The data on the trial on targeted yield maximization are presented on seed yield, NMR and B:C ratio in Table 3.5.3 It is clear from the data that the maximum seed yield of 756 kg/ha recorded in T_{12} (100% RDF + FYM + Vermicompost + oil cake (30:30:30 % N respectively) + Azotobactor + PSB) was at par to 735kg/ha in T_{11} (100% RDF + 100 % N through FYM (34%) + Vermicompost (33%) + oil cake (33%)]. The seed yield 648 kg/ha was significantly less than earlier treatment than T_6 (100% RDF + 50 % N through FYM). The minimum seed yield of 544 kg/ha in T_1 (100% RDF), was followed by 558 kg/ha in T4 (100% RDF + PSB + Azotobactor and 772 kg /ha in T2 (125% RDF). The maximum NMR of Rs 12397 /ha in T5 (150 % RDF + PSB + Azotobactor) was followed and at par to Rs 12311/ha in T_{12} and Rs 11846/ha in T7 (100% RDF + 50% N Through Vermicompost) with the minimum Rs 7648/ha in T8 (100% RDF + 50% N Through oil cake) and Rs 8870/ha in T_9 (100%RDF + 50% N through [FYM(17%) + Vermicompost (17%) + Oil cake (16%)]. The maximum B: C ratio of 1.80 noted in T4 was at par to 1.74 in T_2 T_4 and T_7. The minimum B: C Ratio of 1.38 was noted in T8 and 1.45 in T10 (100% RDF + 75% N through FYM (25%) + Vermicompost (25%) + Oil cake (25%).

Introduction

Niger [*Guizotia abyssnica* (L.f) Cass] is important oilseed crop of the tribal areas in the country and Madhya Pradesh, Niger seeds contain a considerable quantity of oil (38 to 43%), protein (20%), Sugar (12%) and minerals for human and animal meals (Gentinet and Teklewod, 1995), Its cake obtained after extraction of oil is used for cattle feed and the low grade oil cake is used as organic manure in agricultural lands. The crop has tolerance to streams of weather fluctuations with less susceptibility to damages caused by animals, birds, insects and diseases etc. (Sharma and Kewat, 1998). These features lure the farmers for its cultivation in different part of the country. In spite of these peculiarities, the cultivation of this crop is still confined on marginal and sub marginal lands with the use of negligible agro inputs which results in low productivity. This

crop has potential to produce seed yields upto 800 kg/ha on the research farms with adoption of improved agroproduction technologies. It responds well to considerably higher quantity of chemical fertilizer integrating with organic sources in balanced manner. The information pertaining to nutrient management of nutrients in proper and balanced manner in Niger for Chhindwara region is not available. Keeping these facts in view a field experiments was conducted during kharif season of 2014 to evaluate suitable INM for remunerative productivity of rainfed Niger.

Materials and Methods

A field experiment was conducted on Niger cv JNC-6 at Niger research station Chhindwara (MP) during kharif season of 2014. The soil of the experiment field was clay loam in texture, neutral in reaction (PH 7.40), low in OC (0.44%) content with normal EC (0.43 ds/m) and analyzing low in available N (220 kg/ha), medium in available P (19 kg/ha) and high in available K(323 kg/ha) contents. Twelve treatments consisting with different nutrient management (Table 1) were tested in a RBD by replicating thrice. The full quantity of Vermicompost FYM, phosphorus, potassium, Azotobactor, oil cake and PSB along with one third quantity of nitrogen was applied as basal dose as per treatment. Remaining two third quantity of nitrogen was top dressed at 30 DAS. The treated seed of with thiram @ 3g/kg seed were sown on August 20, 2014 in rows 30cm apart by drilling 5kg seeds /ha at about 3 cm depth in all plots/ The plant population was maintained by thinning at 12 DAS. The crop was kept weed free by hand weeding twice at 20 and 40 DAS. The crop was harvested on November 30, 2014. Data on seed yields were recorded and economic was calculated using the prevailing prices of the inputs and produce dressing that period of time. Finally data were statistically analysed for interpretation of results.

Results and Discussion

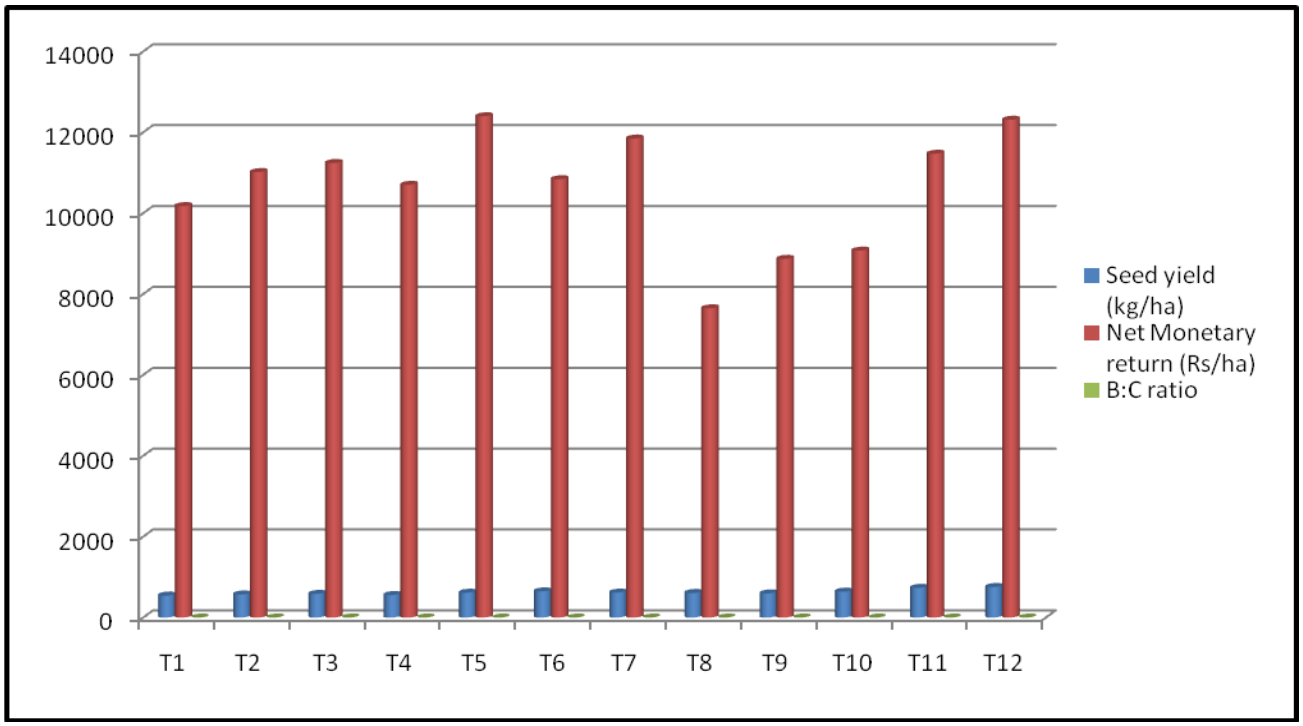
The data presented on seed yield, NMR and B: C ratio in table 1. It is clear from the result that the maximum seed yield of 756 kg/ha recorded in T_{12} [100 % RDF + FYM + Vermicompost + Oil cake (30:30:30 % N Respectively) + Azotobactor + PSB] was at per to 735 kg/ha in T_{11} [100 % RDF + 100 % N through FYM (34%) + Vermicompost (33%) Oil cake (33%)] this may be due to superiority in vegetative growth parameters and yield attributes which might have been resulted into production of higher seed yields. Similar result are also supported with the findings of other researcher from their studies on nutrient management from different locations of the country in resembling sesame crop (Preeti, 2010; Rana and Badiyala, 2014) The seed yield of 641 kg/ha in T_{10} [100 % RDF + 75 % N through FYM (25%) + Vermicompost (25%) Oil cake (25%)] was significantly less than earlier treatments than earlier treatments than T_6 [100% RDF + 50% N through FYM].

The minimum seed yield of 544 kg/ha in T_1 [100% RDF] was followed by 558 kg/ha in T_4 [100% RDF + PSB + Azotobactor], 575 kg/ha in T2 [125% RDF]. The maximum NMR of Rs 12397/ha in T_5 [150% RDF + PSB + Azotobactor] was followed and at par to Rs 12311/ha in T_{12} [100 % RDF + FYM + Vermicompost + Oil cake (30:30:30 % N Respectively) + Azotobactor + PSB] and Rs 11846/ha in T_7 [100% RDF + 50% N Through Vermicompost] with the minimum of Rs 7648/ha in T_8 [100% RDF + 50% N trough Oil cake] and Rs 8870/ha in T_9 [100 % RDF + 50 % N through FYM (17%) + Vermicompost (17%)]. The maximum B: C Ratio of 1.80 noted in T5 [150% RDF + PSB + Azotobactor] was at par to 1.74 in T2 [125% RDF], T_4 [100% RDF + PSB + Azotobactor] and T_7 [100% RDF + 50% N Through Vermicompost].

Table.1 Seed yield and economics influenced by nutrient management, Chhindwara

Date of Sowing: 20-08-2014 Variety: JNC -6

Treatment		Seed yield (kg/ha)	Net Monetary return (Rs/ha)	B:C ratio
T_1	100% RDF	544	10176	1.70
T_2	125% RDF	572	11017	1.74
T_3	150% RDF	586	11242	1.73
T_4	100% RDF + PSB + Azotobactor	558	10701	1.74
T_5	150% RDF + PSB + Azotobactor	614	12397	1.80
T_6	100% RDF + 50% N through FYM	648	10841	1.59
T_7	100% RDF + 50% N Through Vermicompost	617	11846	1.74
T_8	100% RDF + 50% N trough Oil cake	607	7648	1.38
T_9	100 % RDF + 50 % N through [FYM (17%) + Vermicompost (17%) Oil cake (16%)]	596	8870	1.49
T_{10}	100 % RDF + 75 % N through [FYM (25%) + Vermicompost (25%) Oil cake (25%)]	641	9075	1.45
T_{11}	100 % RDF + 100 % N through [FYM (34%) + Vermicompost (33%) Oil cake (33%)]	735	11471	1.52
T_{12}	100 % RDF + FYM + Vermicompost + Oil cake (30:30:30 % N Respectively) + Azotobactor + PSB	756	12311	1.56
	SEm±	21.46	965.78	0.06
	CD (P=0.05)	62.95	2832.53	0.17
	CV %	5.97	15.73	6.25



The minimum B: C ratio of 1.38 was noted in T_8 [100% RDF + 50% N trough Oil cake] and T_{10} [100 % RDF + 75 % N through FYM (25%) + Vermicompost (25%) Oil cake (25%)].

The NMR of Rs 11242/ha and B: C ratio 1.73 were highest in application of T3 [150% RDF]. Thus this system may be recommended for yield maximization and remunerative production.

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