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Effect of soil application of bi- fertilizer on yield and quality of banana Cv. Grand Naine

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Abstract

A field experiment was conducted during 2016-17 at banana Research Station, Nanded to study the effect of Soil application of bio-fertilizer on yield and quality of banana. Bio-fertilizers Viz. *Trichoderma harzianum*, *Azospirillum lipoferum* and *Phosphate solubilizing bacteria* (PSB) were applied through soil at 25g per plant in split doses soil application of bio-fertilizer is applied with 100 percent recommended dose of fertilizer considering the effectiveness of soil application of bio-fertilizer along with 100 percent and 75 percent dose of recommended dose of fertilizer. Treatment T₉ i.e. 100 % RDF + *Trichoderma harzianum* + *Azospirillum* + PSB @ 25gper plant recorded significantly maximum yield (114.20 Mt/ ha) Reducing sugar (11.37) non-reducing sugar (4.67) and total sugar (16.21).

Keywords: soil application, bi- fertilizer, banana, Grand Naine

Introduction

Banana (*Musa spp*) is one of the important fruit crop of the tropics. The fruits are rich source of carbohydrate India is the largest producer of banana contributing 27% of the world production. Integrated nutrient management is found beneficial for maintenance of soil fertility and plant nutrient supply to an optimum level sustaining crop productivity through optimization of benefits from all possible sources of plant nutrient is an integrated manner. It was found that early vegetative phase of growth of banana especially upto to 3rd and 6th month after planting and bunch development stage are the critical stages of banana at which yield is affected (Prameela 2010) [4]. Combine application of 100 per cent recommended dose of fertilizer (RDF) along with FYM 10 kg per plant and phosphate solablizing bacteria (PSB) and *Azospirillum* each at 25g per plant increased pseudoslem height crop duration and yield attributes (Bhalerao *et al.* 2009) [3] *Tricoderma* strains are know to be induce resistance in plants present investigation was carried out at Banana Research Station, Nanded during the year 2016-17 on soil application of bio –fertilizer on yield and quality of banana. Cv Grand Naine.

Materials and Methods

The experiment was conducted at Banana Research Station Nanded of Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani during the year 2016-17. The experiment was conducted in Randomised Block design with three Replication nine treatments. Recommended spacing 1.5 m 1.5 M was maintained. Grand Naine tissue calculate sapling were used as planting material. Bio-fertilizer *Azospirillum lipoferum* *Phosphate Solubilizing bacteria* and *Trichoderma harzianum* @25 g per plant in two split doses at the time of planting and 75 days after planting T₁- 100% RDF Control, T₂-75 RDF + *Trichoderma harzianum*, T₃- 75 % RDF + *Azospirillum*, T₄-75 % RDF+ soil application of PSB, T₅-7 5%. RDF + *Tricoderma harzianum* + *Azospirillum* + PSB, T₆ 100 %s RDF + soil application of *Trichoderma harziannum* + *Azospirillum* + PSB T₇ 100 %s RDF + soil application *Azospirillum*, T₈ 100 %s RDF + soil application PSB T₉- 100 %. RDF + *Tricoderma harzianum* + *Azospirillum* + PSB. Observation on growth yield and quality of banana were recorded.

Result and Discussion

Results presented in Table 1 revealed that the significant results were observed due to application of bio-fertilizer in respect of yield and quality.

Significantly differences in weight of bunch per plant and yield of banana (Mt/ha) were observed. Significantly maximum weight of bunch per plant were recorded by the treatment T₉ i.e. application of 100% RDF along with soil application of *Trichoderma harziarum* + *Azospirillum* and PSB @ 25gm per plant (23.80 kg per plant). Treatment T₇

i.e. 100 percent RDF with soil application of *Azospirillum* @25gm per plant (22.80 kg per plant) and treatment T₅ i.e. 75 % RDF with soil application of *Trichoderma harziarum* which were found at par with each other as compared with rest of the treatment under study.

Table 1: Effect of soil application of bio-fertilizers on yield and quality of banana Cv. Grand Naine

Treatment	Weight of bunch per plant(Kg)	Banana yield Mt/ha	TSS (Brix)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)
T ₁ -100 % RDF (Control)	17.83	79.24	20.78	8.48	3.79	12.64
T ₂ - 75 % RDF + <i>Trichoderma harzianum</i>	20.09	89.02	21.67	9.32	4.20	13.49
T ₃ -75 % RDF + <i>Azospirillum</i>	20.27	90.06	21.60	9.01	4.06	13.16
T ₄ -75 % RDF + Soil application of PSB	19.47	86.5	21.53	8.71	3.97	12.88
T ₅ -75 % RDF + <i>Trichoderma harzianum</i> + <i>Azospirillum</i> + PSB	22.57	109.15	22.71	10.89	4.53	15.43
T ₆ -100 % RDF + Soil application of <i>Trichoderma harzianum</i>	20.47	10.94	22.39	10.67	4.42	15.09
T ₇ -100 % RDF + Soil application of <i>Azospirillum</i>	22.80	101.3	22.23	10.43	4.29	14.75
T ₈ -100 % RDF + Soil application of PSB	21.67	96.26	21.39	10.44	4.26	14.60
T ₉ -100 % RDF + <i>Trichoderma harzianum</i> + <i>Azospirillum</i> +PSB	23.80	114.2	24.88	11.37	4.26	16.21
SE±	0.61	0.61	0.73	0.25	0.11	0.40
CD at 5%	1.83	7.93	0.73	0.77	0.36	1.22

Yield of banana (Mt/ha)

Significantly maximum yield of banana (114.20 Mt/ha) were obtained from treatment T₉ i.e. 100 percent RDF with soil application of *Trichoderma harzianum* + *Azospirillum* and PSB @25gm per plant followed by the treatment T₅ i.e. RDF will soil application of *Trichoderma harzianum* + *Azospirillum* and PSB@ 25gm per plant (109.15Mt/ha). banana being an exhaustive plant availability of more nutrient through organic source might have helped to get better weight of bunch and yield per hectore.

TSS

Significantly maximum T.S.S. (22.8 Brix) was recorded by treatment T₉ i.e 100 percent RDF with soil application of *Trichoderma harzianum*+*Azospirillum* and PSB. However, it was statistically at par with treatment T₉ i.e 100% percent RDF with Soil application of *Trichoderma harzianum*, *Azospirillum* and PSB. However, it was statically at par with treatment T₅. An improvement fruit quality (TSS) could be due to the involvement of organic manures. The beneficial influence can also be attributed to bio-fertilizers particularly *Azospirillum* and PSB application. These finding are in concordance with the results of (Athani and Hulamani 2000) [2].

Non reducing and Reducing Sugar

Significantly maximum non-reducing sugars (4.64%) was recorded by the treatment T₉ i.e 100 percent RDF with soil application of *Trichoderma harzianum* + *Azospirillum* and PSB. However it was at par with treatment T₅ the reducing Sugar was affected by treatment T₉ T₉ i.e 100 percent RDF with soil application of *Trichoderma harzianum*+ *Azospirillum* and PSB. Reducing sugars (11.37%) However, it was found significantly at par with treatment T₅ i.e. 75% RDF + *Trichoderma harzianum* + *Azospirillum* + PSB. These was confirmation with (Vanilarasau and Balakrishnamurthy, 2014) [5].

Total sugar

The treatment T₉ i.e.100% RDF + soil application of

Trichoderma harzianum + *Azospirillum* +PSB produced maximum (16.21%) total sugars was found at par with treatment T₅ i.e. 75% RDF + *Trichoderma harzianum* + *Azospirillum* + PSB.

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