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ASSESSING THE EFFECT OF BALANCED FERTILIZATION OF NPK AND VERMICOMPOST IN THE YIELD ATTRIBUTES OF FENUGREEK

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ABSTRACT: A pot experiment on balanced fertilization of NPK and vermicompost on growth and yield of fenugreek was carried out at Krishna College of Agriculture and Technology, Usilampatti with the objective of to study the effect of different doses of nitrogen and vermicompost in growth and yield characters of fenugreek (*Trigonella foenum-graecum)*. The experiment was laid out in completely randomized block design with three replications. The treatment consist of soil application of NPK @ 30:25:40 kg N, P_2O_5 and K_2O kg ha^{-1},Vermicompost applied @12.5 tha^{-1} along with foliar application of urea @ different doses. The results from the present study that soil application of NPK @ 30:25:40 kg N, P_2O_5 and K_2O kg ha^{-1}, Vermicompost applied @12.5 tha^{-1}along with foliar application of urea @ 0.5% (T_1),1.0% (T_2),1.5% (T_3),2.0% (T_4),2.5% (T_5),3.0% (T_6). Therefore, the soil application of NPK @ 30:25:40, Vermicompost @ 12.5 t ha^{-1} along with foliar application of urea @ 2.0% is proved to be effective. India has attained the status of major producer and exporter of Fenugreek (Altuntas *et al.*, 2005).

Index terms: Fenugreek, NPK, Vermicompost, Yield

1.INTRODUCTION

Fenugreek (*Trigonella foenum-graecum*) is herbaceous annual plant dicotyledonous belonging to the family Leguminosae. It is a multipurpose crop whose every part is consumed in one or other forms. This species is indigenous to Western Asia and South Eastern Europe. It is an important minor spice regularly grown for its seeds and leaves. It is also a good soil renovator and widely used as green manure in agriculture production. It can be grown on a wide variety of soils but clayey loam is relatively better. The optimum pH should be 6.0 to 7.0. The prime factor limiting the productivity of fenugreek is inadequate and unbalanced supply of nutrients. The gap between the nutrient demand and supply can be filled only through appropriate combination of organic manures and inorganic fertilizers. Integrated chemical fertilizer and organic manure applications often show better economics than chemical fertilizers alone for fenugreek greens (Rana *et al*., 2018). Hence the study is undertaken to assess the response of fenugreek with the following objective, the effect of balanced fertilization of NPK and Vermicompost in yield attributes of Fenugreek.

2. MATERIALS AND METHODS

The pot experiment was carried out in the soil science laboratory at Krishna college of Agriculture and Technology, Usilampatti to study the response of Fenugreek to various level of Nitrogen application in soils with six treatments replicated three times in a Completely Randomized Block Design (CRBD). Uniform size of 18 pots were used. Pots were filled with 5 kilograms of soil which passes through 2mm sieve and the seeds of test crop (Fenugreek) were broadcasted. The experiment was laid out statistically in a completely randomized block design with six treatment combinations of different levels of urea dose for each pot. The NPK is uniformly applied to all pots as per the recommended dose (30:25:40 kg/ha) as Urea, Single Super Phosphate, Murate of Potash respectively. Life irrigation was given after sowing, second on third day and at weekly interval. Plants are thinned at 10 DAS. Hand weeding was done weekly twice. The test crops were harvested and yield was recorded. Phosphorus application at 30 kg P_2O_5/ha significantly increased biomass yield in fenugreek, attributed to enhanced root growth and nutrient uptake (Verma and Yadav .,2017). Harvest was carried out by clipping the leaves. Dry matter production was estimated at 30th DAS. Samples were sun dried for 2-3 days followed by oven drying @ 60°C till constant weight was obtained to record Dry weight and expressed as 5 kg of soil. Adequate nitrogen and phosphorus increased protein content in fenugreek leaves, while potassium improved mucilage levels (Patel *et al*., 2014).

3. RESULTS AND DISCUSSION

Application of inorganic fertilizers, NPK @ 30:25:40 kg N, P_2O_5 and K_2O kg ha^{-1}, and application of organic manure Vermicompost @ 12.5 t ha^{-1}significantly influenced the available N status of the soil. The recommended dose of 30:25:40 NPK kg/ha results in the increased biomass yield of fenugreek greens by 28% over control (Khalid *et al*., 2015). Among the treatments, the higher available N status of (328 kg ha^{-1} in crop 1 and 335 kg ha^{-1} in crop 2) was registered in T_4, the higher available P status of (54 kg ha^{-1} in crop 1 and 56 kg ha^{-1} in crop 2) was registered in T_4, the higher available K status of (504 kg ha^{-1} in crop 1 and 510 kg ha^{-1} in crop 2) was registered in T_4, the higher available S status of (34 mg/kg in crop 1 and 38 mg/kg in crop 2) was registered in T_4, the higher available Ca status of (3.4 meq /100g in crop 1 and 3.8 meq/100g in crop 2) was registered in T_4, the higher available Mg status of (2.0 meq/100g in crop 1 and crop 2) was registered in T_4 . Nitrogen coupled with phosphorus application significantly increased fresh herbage yield in both leafy and seed crops of fenugreek (Sharma *et al.*, 2016).

Table 1: Treatment Details

Treatments ID	**Description**
Control	No chemical fertilizers
T_1	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 0.5 % urea
T_2	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 1.0 % urea
T_3	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 1.5 % urea
T_4	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 2.0 % urea
T_5	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 2.5 % urea
T_6	100%RDF+Vermicompost@ 12.5 t ha^{-1}+ 3.0 % urea

Vermicompost and foliar urea significantly improved yield parameters and enhance the availaibility of multiple macro and secondary nutrient reserves.

Table 1 illustrates the treatments carried out for the observation of yield attributes in Fenugreek. Here the control is supplied with no chemical fertilizer which is used as the standard for the experiment. The vermicompost is applied at the uniform rate of 12.5t/ha for every treatments. The dose of urea is changed for the choosen number of treatments.

Table 2: Effect of NPK and Vermicompost on yield at different growth stages of Fenugreek

	Yield (g)	
Treatments	**CROP 1**	**CROP 2**
T_0	28.2	32.4
T_1	35.6	39.7
T_2	38.9	42.1
T_3	51.6	57.2
T_4	54.5	61.3
T_5	46.3	51.9
T_6	43.4	47.6
SEd	1.71	1.20
Cd	3.42	3.60

Table 2 illustrates the yield of fenugreek (greens) by the application of vermicompost and urea at different doses for both the crop 1 &2. A significant increase in yield of greens due to combined application of NPK and vermicompost along with 2 % urea spray was recorded. The soil application of NPK @ 30:25:40 kg N, P_2O_5 and K_2O kg ha^{-1}, vermicompost applied @ 12.5 t $ha^{-1}$and foliar application of urea @ 2.0 % (T_4) registered highest yield of greens per pot 54.5 g& 61.3 g in crop 1 and crop 2 respectively followed by foliar application of urea @ 1.5 %. Optimal K application improved green biomass yield due to better utilization of nitrogen and water (Singh *et al*., 2019).The lowest yield of greens per pot was recorded in untreated control pot.

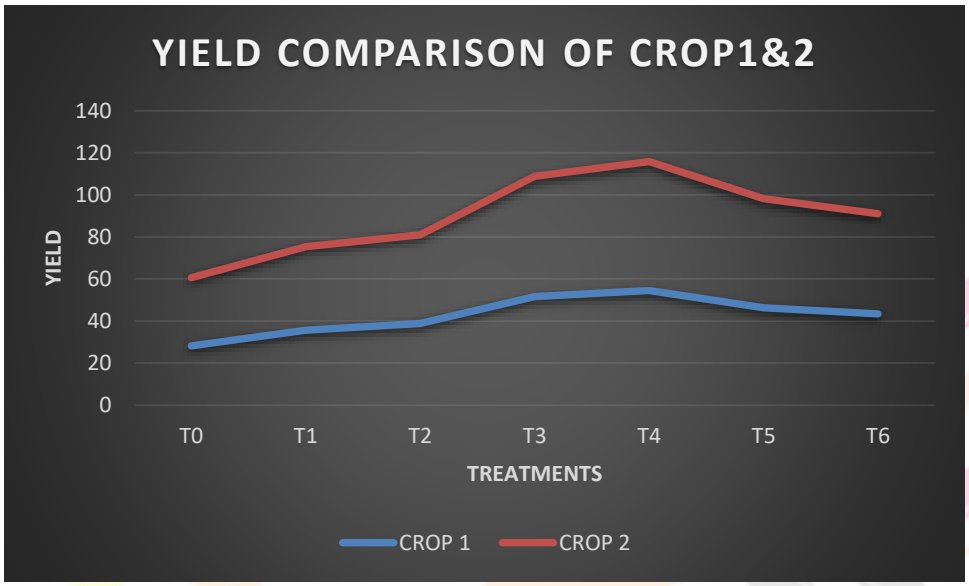

Fig.No:1 Yield comparison of crop 1&2

4. CONCLUSION

In this study we conclude that the best result for fenugreek were obtained by using NPK @30:25:40 kg/ha, vermicompost @ 12.5t/ha, and a 2% urea foliar spray (T4). This combination gave the highest yield of the greens @30th day. It also improves the soil after harvest, increasing the nitrogen, phosphorous, potassium, sulphur, calcium and magnesium levels.

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