

**YIELD, QUALITY AND NUTRIENT UPTAKE AS INFLUENCED BY ORGANIC MANURES
AND INORGANIC FERTILIZERS IN FINGER MILLET**

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ABSTRACT: A field experiment was conducted to study the influence of organic manures and chemical fertilizers on yield, nutrient uptake by finger millet and soil fertility status at harvest during kharif 2013 at Agricultural Research Station, Perumallapalle, ANGRAU. The results revealed that significantly highest grain yield (37.21 q ha⁻¹), protein content (8.82%), N uptake (84.80 kg ha⁻¹), P uptake (12.04 kg ha⁻¹), No. of tillers/plant (2.5), No. of fingers/ear head (13) were recorded in inorganic treated plot when compared with organic treated plot (35.08 q ha⁻¹ of grain yield, 8.61% of protein content, 75.29 kg ha⁻¹ of N uptake, 11.58 kg ha⁻¹ of P uptake, 2.2 tillers/plant, 11 fingers/earhead). Organic carbon content in soil was increased in organic plot (0.02% only) when compared with initial value. In both the treatments available N was reduced and available K was increased when compared with initial available N and K.

Key words: Finger millet, nutrient uptake, soil fertility and yield.

INTRODUCTION

Intensive cultivation, growing of exhaustive crops, use of unbalanced and inadequate fertilizers accompanied by restricted use of organic manures have made the soils not only deficient in nutrients, but also deteriorated soil health resulting in decline in crop response to recommended dose of fertilizers. Boosting yield, reducing production cost and improving soil health are three interlinked components of sustainable triangle (Kumar and Yadav, 1995). Therefore there is need to improve soil fertility and quality of economic product by increasing use of organic manures and biofertilizers. Finger millet is an important millet food crop. The cultivated area with finger millet is gradually increasing every year in Southern states of India due to its rich nutritional value. Finger millet grain has greater nutritional value when compared with rice and wheat. The nutritional value or quality of grain is improved by use of organic manures. Keeping thus in view, the present study was taken up to know the effect of manures and inorganic fertilizers on yield and quality of finger millet along with soil fertility.

MATERIALS AND METHODS

The field experiment was conducted during *kharif* 2013 to study the effect of organic manures and inorganic fertilizers on yield, nutrient uptake and soil fertility status at harvest in finger millet (variety: Vakula) at Agricultural Research Station, Perumallapalle, ANGRAU. The experiment was laid out with two treatments i.e. organic treated plot and inorganic treated plot. The recommended dose of NPK (60:40:30 kg NPK ha⁻¹) were applied to inorganic treated plot and FYM@ 4t ha⁻¹ was applied to organic treated plot. Recommended nitrogen was applied through urea in two equal splits as basal and 30 days after transplanting. Entire dose of phosphorus and potassium were applied through single super phosphate and muriate of potash as basal. Crop was harvested at maturity stage. Grain yield, straw yield and yield characters like plant height, no. of productive tillers/plant, no. of ear heads/plant, no. of fingers/ear head were recorded. Plant sample was collected at harvesting stage to determine nutrient content and nutrient uptake. The soil samples were collected after harvest. The available nutrients in soil samples were determined by adopting standard procedures.

RESULTS AND DISCUSSIONS

Data on grain and straw yield, nutrient uptake, yield characters was presented in table 1. Among two treatments significantly the highest grain yield was recorded with inorganic treated plot (37.21q ha^{-1}) than organic treated plot (35.08q ha^{-1}). However the higher straw yield was recorded in organic treated plot (82.51q ha^{-1}). The results are similar with findings of Pawar *et al.*, (2013). The protein content was higher in inorganic treated plot (8.92%) than organic treated plot (8.61%). This might be due to higher N content in grain. The N and P uptake was significantly highest in inorganic treated plot (84.90 and 12.04 kg ha^{-1} respectively) than organic treated plot (75.29 and 11.58 kg ha^{-1} respectively). This could be ascribed primarily due to increased availability of the nutrients in the crop root zone resulted in increased absorption of the elements by the plants as well as higher dry matter production (Singh *et al.*, 2009).

Regarding soil properties available N was reduced in inorganic treated plot (208 kg ha^{-1}) and organic treated plot (214 kg ha^{-1}) compared with initial value (223 kg ha^{-1}). Available P was reduced in inorganic treated plot (13.68 kg ha^{-1}) and increased in organic treated (14.28 kg ha^{-1}). The increase in P availability might be due to the release of appreciable quantities of carbon dioxide during decomposition of organic matter which forms the carbonic acid, leading to increased solubility of phosphorous resulting in higher availability (Sedvi *et al.*, 2005). Available K was increased in both plots when compared with initial value. The higher K status in soil might be due to the organic manures on decomposition released the organic acid which might have mobilised the native or non-exchangeable forms of K and charge the soil solution with K ions, so that it may be readily available (Yaduvanshi *et al.*, 2013). The organic carbon % was increased with application of FYM. The buildup of OC could be attributed to the manures and subsequently addition of leaf residue and debris of plants (Bhandari *et al.*, 2002).

Table-1: Effect of organic manures and inorganic fertilizers on yield and yield attributing parameters in finger millet

Particulars	Organic	Inorganic	T value
Grain yield (q ha^{-1})	35.08	37.21	0.215*
Straw yield (q ha^{-1})	82.51	79.57	0.067
Protein (%) in grain	8.61	8.92	0.193*
N uptake (kg ha^{-1})	75.29	84.30	5.40*
P uptake (kg ha^{-1})	11.58	12.04	0.230*
Plant height (cm)	101	94	0.053
No. Of tillers / Plant	2.2	2.5	0.261*
Ear head length (cm)	7.24	7.82	0.055
No. Of fingers/Earhead	11	13	0.748*

*Significant at P=0.05 level

Table-2: Effect of organic manures and inorganic fertilizers on soil fertility status at harvest

Particulars	Organic	Inorganic	Initial	T value
Soil Ph	7.35	7.51	7.46	0.034
Soil EC (Ds m^{-1})	0.241	0.227	0.234	0.018
T Available N (kg ha^{-1})	214	208	223	0.235
Available P (kg ha^{-1})	14.28	13.68	14.07	0.257
Available K (kg ha^{-1})	315	307	298	0.560*
Organic carbon (%) s	0.43	0.41	0.41	0.093

*Significant at P=0.05 level

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