Original Research Article

Effect of organic manures and biofertilizers on NPK content of Kasuri methi (*Trigonella corniculata* L.) CV. – Pusa Kasuri

ABSTRACT

A study was conducted at the Research field, Department of Horticulture, College of Agriculture, Gwalior M.P. during rabi 2021-22. The purpose of the study is to evaluate the plant in terms of various parameters such as nitrogen, phosphorous and potassium content in herb and grain. The results of the study indicated that the application of organic manures and bio fertilizers improved the nitrogen, phosphorous and potassium content in herb and grain. The highest nitrogen (1.53% and 3.35%), phosphorous (0.43% and 0.56%) and potassium (0.46% and 0.57%) were observed in the plants treated with FYM (16 t/ha) + Vermicompost (4 t/ha) + *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed) as compared with control.

1. INTRODUCTION

Kasuri methi, scientifically known as *Trigonella corniculata* L and belonging to the Fabaceae family, is an herbaceous plant that grows as an annual spice crop. It is primarily cultivated for its herbage, which is dried for various uses. This herb is commonly grown in the northern plains of India, where its fresh green leaves are utilized in salads and cooked dishes. Additionally, the dried leaves, known for their aromatic qualities, are employed as a seasoning spice for a variety of foods, particularly during the off season. Kasuri methi, a semi – arid crop, typically reaches a height of about 30 cm. Its leaves are pinnate in structure, with individual leaflets measuring between 1.25 to 2.0 cm and it and it produces bright orange – yellow flowers. The pods it bears are approximately 1.2 to 2.2 cm long and possess a sickle shaped appearance, containing 4 to 8 seeds per pod.

Additionally, it is a valuable source of essential minerals, vitamins and dietary fibers. These green leaves are known to contain various alkaloids, including trigonelline, choline, gentianine and carpaine. Furthermore, they are rich in vitamins such as carotene (measuring 2.34 mg/100 g of fresh edible portion), thiamine (0.04 mg), riboflavin (0.31 mg), nicotinic acid (0.8 mg) and vitamin C (52.0 mg/100 g of edible portion).

Integrated nutrient management enhances synthesis of the carbohydrates, phytohormones and even bio fertilizers also promote maximum growth of crop and build up organic status of the soil and maintain the soil health that also increases the availability of other nutrients. Combination effect of organic manures

and nitrogen fixing bio fertilizers and phosphate solubilizing bacteria helps to increase the nitrogen availability. Farm yard manure and vermicompost when integrated with reduced doses of inorganic fertilizers resulted in improved soil fertility, growth and yield of plant (Subbian and Palaniappan, 1992).

2. MATERIAL AND METHODS

The experiment was conducted Experimental Field, Department of Horticulture, College of Agriculture, Gwalior (M.P.). The experiment was laid out in the Randomized Block Design with three replications. Each replication was comprised of sixteen treatments consisting organic manures i.e. FYM and Vermicompost and bio-fertilizers i.e. *Rhizobium*, PSB and KSB were applied for enhancing the crop quality parameters and NPK content of kasurimethi (*Trigonella corniculata* L.) cv. Pusa Kasuri. The treatment details are given below:

T_0 - Control, T_1 – FYM (16 t/ha), T_2 - Vermicompost (4 t/ha), T_3 - *Rhizobium* (30 ml/kg seed), T_4 – PSB (30ml/kg seed), T_5 - KSB (30 ml/kg seed), T_6 - FYM (16 t/ha) + *Rhizobium* (30 ml/kg seed), T_7 - FYM (16 t/ha) + PSB (30 ml/kg seed), T_8 - FYM (16 t/ha) + KSB (30 ml/kg seed), T_9 - Vermicompost (4 t/ha) + *Rhizobium* (30ml/kg seed), T_{10} - Vermicompost (4 t/ha) + PSB (30 ml/kg seed), T_{11} - Vermicompost (4 t/ha) + KSB (30 ml/seed), T_{12} - FYM (16 t/ha) + *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed), T_{13} - Vermicompost (4 t/ha) + *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed), T_{14} - FYM (16 t/ha) + Vermicompost (4 t/ha) + *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed), T_{15} - *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed)

The experimental plot was ploughed thrice by tractor drown cultivator and leveled. The clods were crushed weeds were removed and brought to fine tilt. The land was divided into plots of required size (1.90 m x 2.70 m). Provision was made for bunds and irrigation channels. The seeds of the variety Pusa Kasuri were used with the seed rate of 18-20 Kg/ha. The nitrogen content in the plant samples was estimated by Micro Kjeldhal method (AOAC, 1995) and expressed in percentage on dry weight basis. The phosphorus content of the di-acid digested plant sample was determined by Vanadomolybdo phosphoric yellow colour method (Jackson, 1967) and expressed in percentage on dry weight basis. The potassium content in plant samples was determined by flame photometer method as described by Jackson (1967) and expressed in percentage on dry weight basis.

3. RESULT AND DISCUSSION

There was a significant effect of various treatments on nutrient content. Among the different level of treatment T_{14} recorded the maximum N content (1.45%) in herb and (3.31%) in grain.It was found the best treatment as compared to other treatments. On the other hand, the treatment T_0 – Control was recorded the minimum N content (1.30 %) in herb and (2.90 %) in grain, respectively

The different organic manures and bio-fertilizers were significantly enhanced the P content in kasurimethi and the maximum P content (0.42%) in herb and (0.55%) in grain was recorded in treatment T_{14} and it

was at par to treatments T_9, T_{10}, T_{11}, T_{12} and T_{13}. Conversely, the treatment T_0 – Control was recorded the minimum P content (0.30%) in herb and (0.45%) in grain, respectively.

Among the different level of treatment T_{14} recorded the maximum K content (0.45%) in herb and (0.57%) in grain and it was found the best treatment as compared to other treatments. Equally, the treatment T_0 – Control was recorded the minimum K content (0.32%) in herb and (0.40%) in grain, respectively.

It might be due to the organic manures viz., FYM and vermicompost supplied the nutrients all over crop period. Moreover application of biofertilizers increased the major and micronutrients accessibility in the rhizosphere as a greater expansion, resulted in more uptakes of nutrients by the plants. The application of nutrients through FYM, vermicompost and biofertilizers definitely increased the nutrient content in the crop. The results are in confirmation with the results achieved byBabaleshwar and shetty (2017), Dadiga*et al.* (2017), Sen *et al*. (2018), Singh *et al.* (2018), Kusuma *et al.* (2019), Altaf *et al.* (2020), Babaleshawar*et al*. (2020), Sahu *et al*. (2020) and Raghuwanshi*et al*. (2021).

Table 1. Effect of organic manures and bio-fertilizers on N, P& K content (%) in herb and grain of kasurimethi

Treatments detail	N content (%) in herb	N content (%) in grain	P content (%) in herb	P content (%) in grain	K content (%) in herb	K content (%) in grain
T_0	1.30	2.90	0.30	0.45	0.32	0.40
T_1	1.35	3.08	0.34	0.47	0.35	0.45
T_2	1.36	3.12	0.34	0.49	0.36	0.46
T_3	1.32	3.00	0.33	0.46	0.33	0.43
T_4	1.33	3.02	0.33	0.46	0.34	0.44
T_5	1.31	2.92	0.32	0.46	0.33	0.41
T_6	1.36	3.17	0.34	0.48	0.36	0.46
T_7	1.36	3.15	0.35	0.50	0.37	0.47
T_8	1.36	3.14	0.34	0.48	0.36	0.46
T_9	1.41	3.20	0.39	0.51	0.41	0.53
T_{10}	1.42	3.23	0.39	0.52	0.42	0.54
T_{11}	1.40	3.19	0.37	0.50	0.40	0.52
T_{12}	1.43	3.24	0.40	0.53	0.43	0.55
T_{13}	1.44	3.27	0.41	0.54	0.44	0.56
T_{14}	1.45	3.31	0.42	0.55	0.45	0.57
T_{15}	1.34	3.04	0.34	0.47	0.35	0.44
SEm ±	**0.029**	**0.049**	**0.024**	**0.019**	**0.026**	**0.017**
CD 5%	**0.085**	**0.140**	**0.068**	**0.054**	**0.076**	**0.050**

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4. CONCLUSION

According to the current research, the use of organic manures and bio fertilizers had a significantly positive impact on the nitrogen, phosphorous and potassium content in herb and grain of kasurimethi. Among the various treatments that were evaluated, T_{14} – FYM (16 t/ha) + Vermicompost (4 t/ha) + *Rhizobium* (10 ml/kg seed) + PSB (10 ml/kg seed) + KSB (10 ml/kg seed) yielded the most favorable results in terms of The highest nitrogen (1.53% and 3.35%), phosphorous (0.43% and 0.56%) and potassium (0.46% and 0.57%) in herb and grain.

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