



Effect of organic, inorganic and bio-fertilizers on nutrient uptake and productivity of byadagi chilli

P.S. HIRAGULI* AND T.B. ALLOLLI¹

Department of Horticulture, University of Agricultural Sciences, DHARWAD (KARNATAKA) INDIA
(Email : hiragulips@yahoo.com)

Abstract : A field experiment was conducted on block soil at Regional Agricultural Research Station, Raichur during *Rabi* 2003, to study the response of chilli (cv. BYADAGI KADDI) to combined application of organic, inorganic and biofertilizers. Results revealed that, chilli nourished with FYM @ 25 t/ha + 100 per cent RDF, gave significantly higher yield (7.42 q/ha.) followed by chilli which was supplemented with FYM @ 75 t/ha + *Azospirillum*+ Phosphate solubilizing bacteria(PSB) +25 per cent RDF(6.25 q/ha.). Similarly, uptake of nutrients viz. nitrogen(101.25 kg/ha.), phosphorus(24.02 kg/ha.) and potassium(126.37 kg/ha.) were found highest when chilli was applied with FYM(25 t/ha)+ RDF(100%). On the contrary, the lowest uptake of nutrients was observed in chilli when it was supplemented with FYM@25 t/ha+*Azospirillum*+PSB.

Key Words : Chilli, Organic, Inorganic, Bio-fertilizers, Nutrient uptake, Yield

View Point Article : Hiraguli, P.S. and Allolli, T.B. (2012). Effect of organic, inorganic and bio-fertilizers on nutrient uptake and productivity of byadagi chilli. *Internat. J. agric. Sci.*, 8(1): 191-193.

Article History : Received : 02.07.2011; Revised : 05.10.2011; Accepted : 22.11.2011

INTRODUCTION

With the dawn of green revolution during the mid sixties in India the use of chemical fertilizers and pesticides has been on rising scale. The detrimental effects of indiscriminate use of these chemicals have been felt in recent past. The lands which have been applied with application of abundant quantity of chemical fertilizers alone have turned out to be less productive.

Now people from all walks of life have realized the importance of organic and bio-fertilizers, as source of nutrient to crop plants. Use of organic and bio-fertilizers with little amount of inorganic fertilizer were found to be most effective to enhance yield and maintaining soil health. Hence, an experiment was conducted to combine organic, inorganic and bio-fertilizer as nutrient supplement, so as to phase out use of inorganic fertilizers.

MATERIALS AND METHODS

The field experiment was laid out in randomized block

design at Regional Agricultural Research Station, Raichur during *Rabi* 2003. *Rabi* chilli was grown with different combination of organic, inorganic and bio-fertilizers consisting of 10 treatments. Soil physical and chemical properties were determined by using standard procedure. Initial soil properties were analysed and given in Table A. The soil was clay-loam in texture and low in available N(245.60 kg/ha), high in P₂O₅(29.58 kg/ha) and medium in K₂O(278.00 kg/ha) with pH of 7.93. The gross and net plot sizes were 4.8mx4.5m and 3.6mx3.0m, respectively. Five week old chilli (cv. BYADAGI KADDI) seedlings were transplanted on October 25, 2003 at a spacing of 75 cm x 60 cm. Well decomposed FYM was incorporated according to treatment combinations. *Azospirillum* and PSB were used as source of bio-fertilizers for both seed treatment and seedling treatment.

The picking of red chilli fruits was started from 60 days after planting and were dried on the floor, totally four pickings were done. The treatment wise total production obtained from all pickings was expressed on hectare basis.

* Author for correspondence.

¹Department of Regional Horticultural Research and Extension Centre, University of Agricultural Sciences, DHARWAD (KARNATAKA) INDIA

Table A : Initial soil property of the experiment site

Particulars	Soil depth (0-30cm)	Method employed
Sand (%)	21.20	Hydrometer method (Piper,1966)
Silt (%)	28.68	Hydrometer method (Piper,1966)
Clay (%)	50.00	Hydrometer method (Piper,1966)
pH	7.93	Jackson (1967)
ECE (ds/m)	0.93	Jackson (1967)
OC (%)	0.53	Walkely and Blocks wet oxidation method (Jackson, 1967)
Available N (kg/ha)	245.60	Jackson (1967)
Available P ₂ O ₅ (kg/ha)	29.58	Jackson (1967)
Available K ₂ O (kg/ha)	278.00	Kjeldal method (Jackson,1967)

RESULTS AND DISCUSSION

The data on yield, yield parameters and nutrient uptake recorded in chilli is presented in Table 1. There was significant difference among the treatments for yield, yield parameters and nutrient uptake. The plants supplied with FYM @ 25 t/ha + 100 per cent RDF recorded maximum values for fruit weight (69.89 g), fruit length (13.85cm) and fruit girth (0.95cm), while minimum values for all these parameters were recorded in the plants supplied with FYM @ 25 t/ha + *Azospirillum*+ PSB (59.00g, 10.23cm and 0.58cm, respectively, for fruit weight, fruit length and fruit girth).

Impact of integrated nutrient management (INM) practices was analysed on the yield performance and nutrient uptake of chilli. Significant differences were observed with respect to nutrient (nitrogen, phosphorus and potassium) uptake by chilli due to INM practices. Chilli supplemented with FYM @ 25 t/ha + 100 per cent RDF (100:50:50 NPK kg/ha) resulted in maximum uptake of nitrogen (101.25 kg/ha), phosphorus (24.02 kg/ha) and potassium (126.37 kg/ha) followed by chilli which was applied with FYM @ 75 t/ha +

Azospirillum+ PSB+ 25 per cent RDF. The lowest uptake of nitrogen (74.25 kg/ha), phosphorus (12.16 kg/ha) and potassium (101.38 kg/ha) was observed in chilli which was supplied with FYM @ 25 t/ha + *Azospirillum*+ PSB. These results in turn reflected on the productivity of chilli in a similar manner.

Significantly, the highest yield was obtained (7.42 q/ha) in chilli, due to application of FYM@ 25 t/ha + 100 per cent RDF, which was followed by crop supplemented FYM @ 75 t/ha + *Azospirillum*+ PSB+ 25 per cent RDF (6.25 q/ha).

All the nutrients are important in several physiological processes like growth and development of plants. Combined application of inorganic and organic nutrient sources might have increased the concentration of nutrient ions in the soil solution and their uptake by plants. The subsequent increase in chilli yield could be correlated with increase in uptake of N, P and K by crop.

Farm yard manure might have stimulated the activity of micro organisms that makes the plant food elements in the soil readily available to the crops (Dahama, 1996). Moreover,

Table 1 : Yield parameters, yield and nutrient uptake of chilli as influenced by integrated nutrient management practices

Treatments	100 dry fruit weight (g)	Fruit length (cm)	Fruit girth (cm)	Yield (q/ha)	Nitrogen uptake (kg/ha)	Phosphorus uptake (kg/ha)	Potassium uptake (kg/ha)
T ₁ - FYM @ 75 t/ha + 25% RDF	60.93	11.75	0.78	5.10	90.45	16.05	120.02
T ₂ - FYM @ 50 t/ha + 25% RDF	62.52	11.70	0.76	5.20	88.97	15.44	110.92
T ₃ - FYM @ 25 t/ha + 25% RDF	58.47	11.48	0.70	3.83	81.36	14.56	107.26
T ₄ - FYM @ 75 t/ha + <i>Azospirillum</i> + PSB+ 25% RDF	66.74	12.82	0.81	6.25	96.15	21.15	115.37
T ₅ - FYM @ 50 t/ha + <i>Azospirillum</i> + PSB+ 25% RDF	65.68	12.99	0.82	6.21	95.85	19.97	114.09
T ₆ - FYM @ 25 t/ha + <i>Azospirillum</i> + PSB+ 25% RDF	59.12	11.61	0.72	4.54	84.87	15.21	110.92
T ₇ - FYM @ 75 t/ha + <i>Azospirillum</i> + PSB	59.40	11.56	0.74	4.86	85.32	15.36	112.62
T ₈ - FYM @ 50 t/ha + <i>Azospirillum</i> + PSB	58.79	11.57	0.71	2.61	74.25	12.16	101.38
T ₉ - FYM @ 25 t/ha + <i>Azospirillum</i> + PSB	59.00	10.23	0.58	2.61	74.25	12.16	101.38
T ₁₀ - FYM @ 25 t/ha + 100% RDF	69.89	13.85	0.95	7.42	101.25	24.02	126.37
S.E. _±	0.62	0.32	0.03	0.35	1.35	0.73	1.27
C.D. (P=0.05)	1.85	0.95	0.10	1.06	4.01	2.17	3.79

FYM: Farm yard manure ; RDF: Recommended dose of fertilizers ; PSB: Phosphate solubilizing bacteria.

FYM seems to act directly in increasing crop yields either by accelerating respiratory process by increasing cell permeability, by hormone growth action or by combination of all these processes. The beneficial effect of FYM on chilli yield is well documented by several workers (Natarajan, 1990; Ching Fong and Kvonon, 1994 and Chavan *et al.*, 1997).

This investigation clearly indicated that application of FYM @ 25 t/ha and 100 per cent RDF had beneficial effect on improving the growth and yield of red chilli. Further, it is expected that continuous use of these with bio-fertilizers in long run may bring remarkable dividends.

REFERENCES

- Chavan, P.J., Syed, I., Rudraksa, G.B., Malewar, G.V. and Baig, M.I. (1997).** Effect of varies nitrogen levels through FYM and urea on yield, uptake of nutrients and ascorbic acid content in chilli. (*Capsicum annum* L.). *J. Indian Soc. Soil Sci.*, **45**(4):833-835.
- Ching Fang, H. and Kvonon, H. (1994).** Effect of organic manures on the growth and yield of selected pepper. *Bulletin of Jacking District Agriculture Improvement Station*, **42**:1-10.
- Dahama, A.M. (1996).** Organic forming for sustainable agriculture, Agro botanical publishers (India), pp. 115-130.
- Jackson, M.L. (1967).** *Soil chemical analysis*-Prentice Hall of Indian Private Limited, New Delhi, 362 pp.
- Natarajan, S. (1990).** Standardization of nitrogen application for chilli (*Capsicum annum* L.) growth under semi arid condition. *South Indian Hort.*, **38**: 315-318
- Piper, C.S. (1996).** *Soil and plant Analysis*. Academic Press, New York.

*_*_*_*_*_*_*_*_*_*