



## Effect of Biofertilisers on Yield and Quality of Sweet Pepper (*Capsicum annuum* cv. *grossum* L.)

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The effects of biofertilizers along with organic and inorganic fertilizers were studied on growth, yield and quality of capsicum grown in sandy loam soils for two consecutive years 2011-2012 and 2012-13 at the Experimental Farm of Orissa University of Agriculture and Technology, Bhawanipatna. In the pooled analysis, the treatments with application of chemical fertilizers (RDF) along with basal application of vermicompost showed better yield performance than with RDF and basal application of farm yard manure. Supplementing nutrients through 100% chemical fertilizers i.e. RDF were significantly inferior in producing fruit yield to organic manures (vermicompost and farm yard manure) applied with chemical fertilizers (RDF). Also, it is seen that basal application of organic manures showed significant difference in yield than the split application as top dressing. Application of 75% nitrogen and phosphorus, full potassium along with biofertilizers (*Azotobacter* + *Azospirillum* + PSB) and FYM (10 t ha<sup>-1</sup>) showed the best result with respect to growth i.e. plant height (57.68 cm), number of leaves (109.43), number of branches (10.48), leaf area (104.70 cm<sup>2</sup>) per plant, days to 50% flowering (39.63 days), yield (45.76 t ha<sup>-1</sup>), TSS (6.37° Brix) of fruits, ascorbic acid content in fruit (172.53 mg 100 g<sup>-1</sup>) and chlorophyll content in fruit (4.89 mg g<sup>-1</sup>) and is significantly different from all other treatments tried in the experiment. As regards the net return is concerned, maximum return of Rs. 139005 per hectare was obtained where the crop was supplied with 75% nitrogen, phosphorus and 100% potassium of the recommended dose of chemical fertilizer in presence of farm yard manure along with bioinoculants. The highest benefit: cost recorded was 2.55 (mean of two years) which was significantly superior to other treatments.

(**Key words:** *Capsicum*, Integrated nutrient management, Chemical fertilizers, Biofertilizers, Vermicompost, FYM, Growth, Quality and Yield)

The basic challenge before India is to enhance the production of nutritious food in a sustainable manner, besides feeding the country's large population, as well as increasing the income of the farmers and giving them economic security for the future. Hence, enhancing the vegetable production can play a major role in meeting the food needs from the limited land resources. At present, indiscriminate, injudicious and improper use of chemical fertilizers and pesticides, has posed a great problem causing serious damage to the environment and simultaneously affecting the health of millions of people in the world particularly in India.

The spiraling costs of chemical fertilizers and their ill effects on soil and human health (due to excessive use) compelled the researchers to look for alternative sources of manure such as biofertilizers in the fertility management programme of the crops. Biofertilizers are economically viable, ecologically sound and also are self generating sources without any negative influence either to the crop or to the environment. These microorganisms

do not require nonrenewable energy in huge quantities during their production and improve the crop growth as well as the quality of the produce. These are also biocontrol agents as they control many pathogens and microorganisms. Capsicum (*Capsicum annuum* cv. *grossum*) commonly known as "Shimla Mirch" or "Sweet Pepper" is a highly priced vegetable crop, rich in Vitamin A and C, cultivated in the mid-hills during summer and in plains during winter season. In coastal agro-ecological situations, the agroclimatic condition is very suitable for cultivation of *Capsicum*. However, the cultivation of sweet pepper in coastal areas of Orissa has started very recently. The nutrient requirement of capsicum is very high (200-80-100 kg ha<sup>-1</sup> NPK) and fertilizer use in Orissa is also very low. It is reported that application of chemical fertilizers in conjunction with biofertilizers like *Azotobacter*, *Azospirillum* and PSB culture and organic manures is of paramount importance in achieving sustainable yield and productivity of capsicum. This also provides favourable environment for

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plant growth in addition to improving the physical, chemical and biological properties of soil (Patiram, 1996). Application of biofertilisers (*Azotobacter*+*Azospirillum*+*PSB*) significantly increased the yield over control and so also the application of 75 per cent inorganic NP with biofertilisers over 100% NP (Pattnayak and Naik, 2003). Studies pertaining to integrated use of organics, biofertilisers and inorganic fertilizers for *Capsicum* cultivation under coastal tracts of Odisha are meager. Therefore, there is a need to study the effect of integrated nutrient management on growth, yield and quality of *Capsicum* under east and south eastern coastal plain zones of Odisha.

### MATERIALS AND METHODS

A field experiment was conducted during October 2011 to February, 2012 and October 2012 to February, 2013 at the experimental farm of Orissa University of Agriculture and Technology, Bhubaneswar, Odisha. The field is located at an altitude of 25.9 m above mean sea level with geographical location at 22°15' N latitude and 80°22' E longitude. The soil of the experimental site is sandy loam having pH 6.3, medium level of organic carbon (%) and available N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as 180, 40 and 120 kg ha<sup>-1</sup> respectively. The experiment was laid out in a randomized block design with four replications. The treatments consisted of T<sub>1</sub> – Control, T<sub>2</sub> – 100% NPK (Soil test based), T<sub>3</sub> – 100% NPK + FYM (10 t ha<sup>-1</sup>) basal, T<sub>4</sub> – 100% NPK + vermicompost (5 t ha<sup>-1</sup>) basal, T<sub>5</sub> – 100% NPK + FYM (5 t ha<sup>-1</sup>) basal + vermicompost (2.5 t ha<sup>-1</sup>) (1st top dressing), T<sub>6</sub> – 100% NPK + FYM (5 t ha<sup>-1</sup>) basal + vermicompost (1.25 t ha<sup>-1</sup>) (1st top dressing) + vermicompost (1.25 t ha<sup>-1</sup>) (2nd top dressing), T<sub>7</sub> – 100% NPK + vermicompost (2.5 t ha<sup>-1</sup>) basal + vermicompost (2.5 t ha<sup>-1</sup>) (1st top dressing); T<sub>8</sub> – 100% NPK + vermicompost (2.5 t ha<sup>-1</sup>) basal + vermicompost (2.5 t ha<sup>-1</sup>) + vermicompost (1.25 t ha<sup>-1</sup>) (1st top dressing) + vermicompost (1.25 t ha<sup>-1</sup>) (2nd top dressing) and T<sub>9</sub> – 75% NP + 100% K + biofertilisers and FYM (10 t ha<sup>-1</sup>). The manures were incorporated in the respective plots 20 days before planting when applied as basal. Full dose (100%) of P and K and half dose (50%) of N were applied at the time of land preparation and the remaining dose (50%) of N was applied 45 days after planting. The seedlings were transplanted in the main field at a spacing of 60 cm row to row and 50 cm plant to plant. Growth parameters such as plant height, number of leaves and branches per plant were recorded at 90 days after planting. Green fruit yield, total soluble solid (TSS) of fruit, ascorbic acid content and

chlorophyll content in fruits were recorded when it attained the marketable maturity. Chlorophyll was extracted using 80% acetone and measured by spectrophotometer at 645 and 663 nm wavelengths (Arnon, 1949). 100 g plants and 100 g fruits were dried in shade, chopped and dried in an oven at 63°C ± 2°C and finely ground to homogenous powder. These powdered samples were later digested and N, P and K were determined. N was estimated by digesting the fresh samples using concentrated sulphuric acid following the method of Bremner 1965, P and K were estimated by digesting the samples using di-acid (HNO<sub>3</sub>: HClO<sub>4</sub> :: 3:2), by vanadomolybdo phosphoric acid method for P, and K by flame photometry.

### RESULTS AND DISCUSSIONS

#### Growth attributes, yield and quality of fruit

The different treatments significantly influenced the plant height, number of leaves, number of branches per plant, leaf area, days to 50% flowering, yield, TSS of fruit, Ascorbic acid content in fruit and chlorophyll content in fruits. Application of 75 % NP, 100% K along with biofertilisers and FYM recorded maximum plant height (57.68 cm), number of leaves (109.43), number of branches per plant (10.48), leaf area (104.70 cm<sup>2</sup>), days to 50 % flowering (39.63 days) and was significantly superior to all other treatments (Table 1). This might be due to creation of favourable nitrogen nutrition, environment in the rhizosphere as fertilizer nitrogen from inorganic source would be available to the crop instantly and immediately after application, while organic nitrogen would be mineralized slowly but steadily that supplied regulated quantity of plant usable nitrogen to match the nitrogen requirement of the plant during progressive growth period thereby, reducing various types of nitrogen losses. Thus, initial requirement of nitrogen would be met from the former source organic source and subsequent requirement of nitrogen from the inorganic source assuming continuous nitrogen supply throughout the growing period. Such situation favours consistent nitrogen uptake by capsicum crop at different growth stages. Nitrogen being a constituent of protoplasm which would play a positive role through increased cell division and multiplication resulting faster growth to produce bigger stature plants having more number of leaves, leaf area, number of branches per plant, etc. Phosphorus (P) being an important nutrient for root development, is required for better utilization of increased nitrogen dose (Marschner, 1986). Potassium (K) plays an important role in improving the

**Table 1.** Effect of organic, inorganic and biofertilisers on growth and yield of *Capsicum* (pooled)

| Tr. No         | Treatments                                                                                                                                                                    | Plant Height (cm) | Number of leaves | Number of branches | Leaf area (cm <sup>2</sup> ) | Days to 50% flowering (days) | Yield (t ha <sup>-1</sup> ) |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|--------------------|------------------------------|------------------------------|-----------------------------|
| T <sub>1</sub> | Control                                                                                                                                                                       | 28.08             | 53.09            | 4.86               | 83.12                        | 49.11                        | 17.61                       |
| T <sub>2</sub> | Full NPK (soil test based)                                                                                                                                                    | 32.85             | 68.73            | 5.34               | 85.90                        | 41.75                        | 30.86                       |
| T <sub>3</sub> | Full NPK + FYM (10 t ha <sup>-1</sup> ) basal                                                                                                                                 | 37.79             | 73.17            | 5.62               | 89.08                        | 41.19                        | 36.83                       |
| T <sub>4</sub> | Full NPK + Vermicompost (5 t ha <sup>-1</sup> ) basal                                                                                                                         | 41.86             | 80.47            | 6.09               | 95.06                        | 40.64                        | 38.95                       |
| T <sub>5</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1st top dressing                                                                        | 40.34             | 79.28            | 5.83               | 91.93                        | 41.02                        | 37.82                       |
| T <sub>6</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1st top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2nd top dressing            | 44.07             | 84.09            | 6.65               | 96.05                        | 40.30                        | 39.89                       |
| T <sub>7</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1st top dressing                                                             | 47.74             | 85.87            | 7.23               | 100.84                       | 40.04                        | 41.16                       |
| T <sub>8</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1st top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2nd top dressing | 52.07             | 87.38            | 7.96               | 101.86                       | 39.89                        | 42.23                       |
| T <sub>9</sub> | 75% NP + Full K + Biofertilisers & FYM                                                                                                                                        | 55.16             | 93.16            | 9.01               | 104.70                       | 39.63                        | 45.76                       |
|                | CD at 5%                                                                                                                                                                      | 1.43              | 2.66             | 0.38               | 1.046                        | 1.27                         | 1.10                        |

photosynthetic activity and translocation of carbohydrates for the development of aerial parts. Application of balanced dose of nitrogen, phosphorus and potassium improved the growth of the plant to a greater extent. Similar results were also obtained by Patiram (1996); Deepika *et al.* (2010) in *Capsicum* crop and by Naik and Hosamani (2003) in chilli.

The perusal of data clearly indicated that application of organic and inorganic fertilizers along with bioinoculants significantly increased the yield (Table 2) and quality of *Capsicum* fruits. The highest yield (45.76 t ha<sup>-1</sup>), TSS (6.37), Ascorbic acid (172.53 mg 100 g<sup>-1</sup>) and chlorophyll content (4.89 mg g<sup>-1</sup>) in fruit was recorded with application of 75% NP, 100% K along with biofertilizers and FYM followed by 100% NPK + FYM (5 t ha<sup>-1</sup>) basal + vermicompost (2.5 t ha<sup>-1</sup>) (1st top dressing) and 100% NPK + FYM (5 t ha<sup>-1</sup>) basal + vermicompost (1.25 t ha<sup>-1</sup>) (1st top dressing) + vermicompost (1.25 t ha<sup>-1</sup>) (2nd top dressing). Sharu and Meerabai (2001) studied the effect of INM on yield and quality of capsicum and observed significantly higher yield by application of organic manures and chemical fertilizers. Maximum fruit yield per hectare and quality of fruits were recorded by application of 75% NP, 100% K along with biofertilisers and FYM due to difference in mineralization resulting in better availability and

utilization of nutrients by plants. This also helped in achieving more yield with better quality fruits with 75 % NP as there is better fixation of nitrogen and phosphorus from soil and atmosphere by FYM cultured biofertilisers (Pattnayak and Naik, 2003). The FYM cultured biofertilizers further might have enhanced the efficacy of applied nitrogen and phosphorus which resulted in better growth and in turn lead to more number and greater size of fruits that ultimately contributed to higher yield with quality fruits in comparison to other treatments.

#### **N, P and K content in fruits and economics**

It is evident from Table 2 that organic manures in combination with chemical fertilizers significantly increased the N, P and K content in capsicum fruits. The combined effect of 75% NP and 100% K of recommended dose of chemical fertilizer along with biofertilisers and farm yard manure recorded the maximum N and P content in fruits (3.37% and 0.96%). Application of 75% NP, 100% K along with biofertilizers and FYM caused maximum concentration of N in fruits which might be due to continuous supply of nitrogen that resulted in better absorption and utilization. Higher content of N, P and K in fruits were observed with the application of organic manures incubated with biofertilizers along with inorganic fertilizers. This might be due to chelating effect of organic manures resulting in enhanced nutrient supply.

**Table 2.** Effect of organic, inorganic and biofertilisers on quality, nutrient concentrations in fruits

| Tr. No.        | Treatments                                                                                                                                                                                            | TSS (°Brix) | Ascorbic acid content (mg 100 g <sup>-1</sup> ) | Chlorophyll content (mg g <sup>-1</sup> ) | Fruits (%) |      |      |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------|-------------------------------------------|------------|------|------|
|                |                                                                                                                                                                                                       |             |                                                 |                                           | N          | P    | K    |
| T <sub>1</sub> | Control                                                                                                                                                                                               | 4.21        | 156.47                                          | 3.63                                      | 1.48       | 0.47 | 1.51 |
| T <sub>2</sub> | Full NPK (soil test based)                                                                                                                                                                            | 4.86        | 164.69                                          | 3.71                                      | 2.20       | 0.72 | 2.58 |
| T <sub>3</sub> | Full NPK + FYM (10 t ha <sup>-1</sup> ) basal                                                                                                                                                         | 4.94        | 165.41                                          | 3.80                                      | 2.42       | 0.76 | 3.24 |
| T <sub>4</sub> | Full NPK + Vermicompost (5 t ha <sup>-1</sup> ) basal                                                                                                                                                 | 5.28        | 168.00                                          | 4.39                                      | 2.79       | 0.84 | 3.75 |
| T <sub>5</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing                                                                                    | 5.19        | 166.62                                          | 4.30                                      | 2.59       | 0.80 | 3.39 |
| T <sub>6</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2 <sup>nd</sup> top dressing            | 5.39        | 168.67                                          | 4.50                                      | 2.90       | 0.88 | 3.86 |
| T <sub>7</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing                                                                         | 5.49        | 169.34                                          | 4.54                                      | 3.02       | 0.90 | 4.01 |
| T <sub>8</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2 <sup>nd</sup> top dressing | 5.83        | 170.83                                          | 4.63                                      | 3.19       | 0.93 | 4.10 |
| T <sub>9</sub> | 75% NP + Full K + Biofertilisers & FYM                                                                                                                                                                | 6.37        | 172.53                                          | 4.89                                      | 3.37       | 0.96 | 4.78 |
|                | CD at 5%                                                                                                                                                                                              | 0.17        | 2.04                                            | 0.44                                      | 0.12       | 0.15 | 0.34 |

**Table 3(a).** Effect of organic, inorganic and biofertilisers on economics of production (2011-12)

| Tr. No.        | Treatments                                                                                                                                                                                            | Cost of cultivation excluding input cost (Rs. ha <sup>-1</sup> ) | Cost of inputs (Rs. ha <sup>-1</sup> ) | Total cost (Rs. ha <sup>-1</sup> ) | Gross Return (Rs. ha <sup>-1</sup> ) | Net Return (Rs. ha <sup>-1</sup> ) | B:C ratio |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------|------------------------------------|--------------------------------------|------------------------------------|-----------|
| T <sub>1</sub> | Control                                                                                                                                                                                               | 40200                                                            | 16005                                  | 56205                              | 66000                                | 9795                               | 1.17      |
| T <sub>2</sub> | Full NPK (soil test based)                                                                                                                                                                            | 40200                                                            | 33130                                  | 73330                              | 135810                               | 62480                              | 1.85      |
| T <sub>3</sub> | Full NPK + FYM (10 t ha <sup>-1</sup> ) basal                                                                                                                                                         | 40200                                                            | 53130                                  | 93330                              | 181850                               | 88520                              | 1.95      |
| T <sub>4</sub> | Full NPK + Vermicompost (5 t ha <sup>-1</sup> ) basal                                                                                                                                                 | 40200                                                            | 53130                                  | 93330                              | 192100                               | 98770                              | 2.06      |
| T <sub>5</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing                                                                                    | 40200                                                            | 53130                                  | 93330                              | 186150                               | 92820                              | 1.20      |
| T <sub>6</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2 <sup>nd</sup> top dressing            | 40200                                                            | 53130                                  | 93330                              | 197500                               | 104170                             | 2.11      |
| T <sub>7</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing                                                                         | 40200                                                            | 53130                                  | 93330                              | 203500                               | 110170                             | 2.18      |
| T <sub>8</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1 <sup>st</sup> top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2 <sup>nd</sup> top dressing | 40200                                                            | 53130                                  | 93330                              | 206000                               | 112670                             | 2.21      |
| T <sub>9</sub> | 75 % NP + Full K + Biofertilisers & FYM                                                                                                                                                               | 40200                                                            | 49595                                  | 89795                              | 227000                               | 137205                             | 2.53      |

Integrated nutrient management practices with different organic manure and bioinoculants combination exhibited noticeable influence in the economics of capsicum cultivation, i.e net income and benefit cost ratio

during both the years of study. The highest net return of Rs 139005 per hectare (mean of two consecutive years) was obtained with application of inorganic fertilizer (75% NP and 100% K of recommended dose of chemical

**Table 3 (b).** Effect of organic, inorganic and biofertilisers on economics of production (2012-13).

| Tr. No.        | Treatments                                                                                                                                                                    | Cost of cultivation excluding input Cost (Rs. ha <sup>-1</sup> ) | Cost of inputs (Rs. ha <sup>-1</sup> ) | Total cost (Rs. ha <sup>-1</sup> ) | Gross Return (Rs. ha <sup>-1</sup> ) | Net Return (Rs. ha <sup>-1</sup> ) | B:C ratio |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|----------------------------------------|------------------------------------|--------------------------------------|------------------------------------|-----------|
| T <sub>1</sub> | Control                                                                                                                                                                       | 40200                                                            | 16005                                  | 56205                              | 74840                                | 18635                              | 1.33      |
| T <sub>2</sub> | Full NPK (soil test based)                                                                                                                                                    | 40200                                                            | 33130                                  | 73330                              | 141885                               | 68555                              | 1.93      |
| T <sub>3</sub> | Full NPK + FYM (10 t ha <sup>-1</sup> ) basal                                                                                                                                 | 40200                                                            | 53130                                  | 93330                              | 186450                               | 93120                              | 1.20      |
| T <sub>4</sub> | Full NPK + Vermicompost (5 t ha <sup>-1</sup> ) basal                                                                                                                         | 40200                                                            | 53130                                  | 93330                              | 197350                               | 104020                             | 2.11      |
| T <sub>5</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1st top dressing                                                                        | 40200                                                            | 53130                                  | 93330                              | 192050                               | 98720                              | 2.06      |
| T <sub>6</sub> | Full NPK + FYM (5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1st top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2nd top dressing            | 40200                                                            | 53130                                  | 93330                              | 201400                               | 108070                             | 2.16      |
| T <sub>7</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (2.5 t ha <sup>-1</sup> ) 1st top dressing                                                             | 40200                                                            | 53130                                  | 93330                              | 208100                               | 114770                             | 2.23      |
| T <sub>8</sub> | Full NPK + Vermicompost (2.5 t ha <sup>-1</sup> ) basal + Vermicompost (1.25 t ha <sup>-1</sup> ) 1st top dressing + Vermicompost (1.25 t ha <sup>-1</sup> ) 2nd top dressing | 40200                                                            | 53130                                  | 93330                              | 216300                               | 122970                             | 2.32      |
| T <sub>9</sub> | 75 % NP + Full K + Biofertilisers & FYM                                                                                                                                       | 40200                                                            | 49595                                  | 89795                              | 230600                               | 140805                             | 2.57      |

fertilizer) with organic manure as farm yard manure and bioinoculants as compared to other treatments tried in the experiment. However, the lowest net return for 2011-12 and 2012-13 was Rs. 9795 and Rs. 18635 respectively (Table 3 a & b). The highest benefit cost ratio of 2.55 (mean of two years) was calculated with integrated use of inorganic fertilizers (75% NP and 100% K of recommended dose of chemical fertilizer) with bioinoculants and farm yard manure as an organic source where as the lowest benefit cost ratio of 1.25 (mean of two years) was observed with no nutrient application (control) for both the year trials. The findings are in conformity with Avitoli *et al.* (2008) in onion, Gopinath *et al.* (2008), Jaipaul *et al.* (2011) in capsicum and Kondapa *et al.* (2009) in chilli.

It may be concluded that higher yield of capsicum could be achieved by the combined application of 75% N, P and 100% K of the recommended dose of chemical fertilizer along with biofertiliser and farm yard manure as a organic source The highest yield was due to the combined application of nitrogen, phosphorus and potassium as a source of chemical fertilizer which was boosted by the application of biofertiliser and farm yard manure as an organic source. The capsicum plant can readily absorb and utilize the nutrients and express the highest value in all the characters finally the fruit yield.

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