Effect of integrated nutrient management on growth, yield and quality of onion (*Allium cepa* L.) cv. Pusa Shobha

SUMMARY

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SUMMARY

The present investigation entitled **"Effect of integrated nutrient management on growth, yield and quality of onion (*Allium cepa* L.) cv. Pusa Shobha"** was carried out at Horticulture Research Farm, School of Agricultural Sciences and Technology, Babasaheb Bhimrao Ambedkar University (A Central University), Vidya Vihar Rae Bareli Road, Lucknow, (U.P.), India carried out during *rabi* season in the consecutive years of 2021-22 and 2022-23 respectively. The experiment was laid out in Randomized Block Design with three replication and fourteen different treatments combination. The salient features of the findings of the investigation are summarized below:-

- The maximum height of plant 32.86 cm, 50.26 cm and 63.16 cm, were recorded at 30 days, 60 days and 90 days after transplanting respectively with the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum height of plant *i.e.* 15.05 cm, 27.18 cm and 36.85 cm, respectively were recorded at different stages in case of control (T_0).
- The maximum number of the leaves per plant 8.82, 10.08 and 13.35, were counted at 30 days, 60 and 90 days after transplanting respectively with the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). On the other hand minimum number of leaves per plant *i.e.* 3.13, 4.12 and 6.68 respectively were counted at different days in control (T_0) treatment.
- The maximum length of leaf 27.70 cm, 48.40 cm and 59.86cm, were recorded at 30 days, 60 days and 90 days after transplanting respectively with the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum length of leaf *i.e.* 10.48 cm, 22.78cm and 31.65 cm, respectively were recorded at different days in case of control (T_0).
- The maximum average bulb weight (99.36g) was observed in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) whereas, minimum average bulb weight (38.84g) was recorded in control (T_0).

- The maximum polar diameter of (6.69 cm) was recorded with application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha).The minimum polar diameter (3.89 cm) was recorded in case of control (T_0).
- The maximum equatorial diameter (6.22cm) was recorded with the application of treatment T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha).The minimum equatorial diameter (3.81cm) was recorded in case of control (T_0).
- The neck thickness of bulb was maximum (1.94) with application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum neck thickness of bulb (1.01) was recorded in case of control (T_0).
- The maximum number of scales/bulb (9.44) was recorded with application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum number of scales/bulb (4.39) was recorded in case of control (T_0).
- The maximum bulb yield (5.35kg/plot) was recorded with application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum bulb yield (2.23 kg/plot) was recorded in case of control (T_0).
- The maximum total bulb yield (246.91 q/ha) was recorded with application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum total bulb yield (103.15q/ha) was recorded in case of control (T_0).
- The maximum fresh weight of bulb (81.10g), with the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum fresh weight of bulb (45.75g), were recorded in case of control (T_0).
- The maximum dry weight of bulb (10.30 g) was observed in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) whereas, minimum dry weight of bulb (3.83g) was recorded in control (T_0).

- The maximum TSS (13.86 ^{0}Brix) in was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum TSS (10.20 ^{0}Brix) was recorded in case of control (T_0).
- The maximum acidity (0.46%) was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum acidity (0.26%) was recorded in case of control (T_0).
- The maximum value of reducing sugar (4.02%) was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum reducing sugar (2.09 %) was recorded in case of control (T_0).
- The maximum value of non-reducing sugar (3.10%) was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) while the minimum non-reducing sugar (2.29%) was recorded in case of 50%RDF + FYM @12t/ha (T_0).
- The maximum content of total sugars (7.12%) in was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The total sugar content was minimum total sugars (4.38%) in case of control (T_0).
- The maximum ascorbic acid (11.77mg/100g) was recorded in case of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha). The minimum ascorbic Acid (7.35mg/100g) was recorded in case of control (T_0).
- The maximum gross return (Rs.3,70,365/ha) and maximum net profit (Rs.2,60,016.8/ha)was recorded with the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 kg/ha) + PSB (5 kg/ha) resulted in maximum cost benefit ratio (2.35).

CONCLUSION

The overall results obtained from this present investigation clearly revealed that the integration of organic manures and biofertilizers had a significant effect in enhancing growth, yields as well as quality characters of onion with maximum net returns. On the basis of present investigation, it can be concluded that the application of T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) was found to be the best treatment combination in terms of plant growth, yield, quality characters of onion and also found to be best treatment in terms of the benefit: cost ratio or economic returns. Integrated approach of vermicompost and biofertilizers performed better with respect to growth characters like plant height, number of leaves, length of leaf and yield characters like average bulb weight, polar diameter, equatorial diameter, neck thickness, number of scales, bulb yield per plot, total bulb yield per hectare, fresh weight of bulb and dry weight of bulb. Whereas, quality characters like total soluble solids, acidity, reducing sugar, non-reducing sugar, total sugars and ascorbic acid content and net returns with highest benefit: cost ratio, recorded superior with the application T_9- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) for commercial cultivation of onion for getting higher marketable bulb yield with maximum net returns per unit area under agro-climatic condition of Lucknow,(U.P.) India.

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