

**Effect of integrated nutrient management on yield attributes of onion (*Allium cepa* L.) cv. Pusa Shobha**

**ABSTRACT**

The experiment was conducted at the Horticulture Research Farm, near Gautam Buddha Central Library, Babasaheb Bhimrao Ambedkar University (A Central University), Vidya Vihar Raebareli Road Lucknow, (U.P) experiment was conducted during *Rabi* season in the years, of 2021-2022 and 2022-2023. The experiment was laid out in randomized block design with three replications. The treatments consisted of T<sub>0</sub> -Control (without fertilizers); T<sub>1</sub>- 100% RDF (NPK@150:50:80 Kg/ha); T<sub>2</sub>- 100% RDF + FYM (10 t/ha); T<sub>3</sub> -100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>4</sub> -100% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>5</sub> -100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>6</sub> -75% RDF + FYM (10 t/ha); T<sub>7</sub> -75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>8</sub> -75% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>9</sub> -75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). T<sub>10</sub> -50% RDF + FYM (10 t/ha); T<sub>11</sub>- 50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>12</sub>- 50% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>13</sub> -50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). Results revealed that the treatment T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) performed better with respect of yield characters such as average bulb weight (99.36g), polar diameter (6.22cm), equatorial diameter (6.2cm), neck thickness (0.94cm), number of scales/bulb (9.44) and total bulb yield (259.25q/ha) onion bulb.

**Keywords:** INM, Biofertilizer, PSB, Azotobacter, Vermicompost, Farmyard manure, Yield.

**INTRODUCTION**

Onion (*Allium cepa* L.) is a most important crop belongs to the Alliaceae family. It is one of the most important cash vegetable crops among bulb crops and semi-perishable in nature. Onion is an indispensable item in every kitchen as condiment and vegetable, therefore commands an extensive internal market. Onion is mainly used for its flavor and pungency, the chief component of pungency is 'allyl propyl disulphide'. Onion is used for flavoring or seasoning the food, both at mature and immature stages; Onion is also used in preparing soups, sauces, curries, pickles and for flavoring or seasoning food. It is native of the Central Asia and Mediterranean region and commercially grown in China, India,

**Comment [YK1]:** The introduction is good, but it's necessary more and new references.

U.S.A., erstwhile U.S.S.R., Japan, Spain, Turkey, Brazil, Egypt *etc.* In the world production of onion, India has second place after China. In the foreign exchange point of view, onion ranks first in vegetables. Continuous and unbalanced fertilizer use has a negative impact on agricultural production sustainability while also producing environmental damage. **Greenland (1975)** suggested that for a sustainable crop production system, chemical nutrients removed by the crop must be replenished and physical conditions of the soil maintained. Integrated nutrient management (INM) provides excellent opportunities to overcome all the imbalances besides sustaining soil health and enhancing crop production. Generally, vegetables require large quantity of major nutrients like nitrogen, phosphorus and potassium, in addition to secondary nutrients such as zinc, boron, copper, calcium and sulphur for better growth, yield and post-harvest life. Promotion of the use of inorganic fertilizers for supplying these nutrients in the previous years has now become a bone of contention for its detrimental effect on both soil and environment apart from its enormous price hike every year. The use of FYM, vermicompost and biofertilizers in such situation is, therefore, a practically paying proposal. Although the use of manures as nutrient sources for vegetables is common, their effectiveness is potentially limited by nutrient release pattern that are often out of synchrony with crop demand, large variability in source quality and various edaphological factors. All of these issues need field experimentation with alternative options. A gradual shift from using purely organic sources to some proportion of inorganic fertilization is gaining acceptance. This shift has formed the basis for INM, which could involve three nutrient sources: microbial inoculants or biofertilizers including *Azotobacter*, *Azospirillum*, and phosphate solubilising bacteria (PSB); inorganic fertilizers, and organic manures. However, INM further prescribes that selected nutrient inputs be used judiciously to ensure optimum supply of all essential nutrients for sustainable crop production. Onion is a heavy feeder of mineral elements. A crop of 40 t/ha removes approximately 120 kg of N, 50 kg of P<sub>2</sub>O<sub>5</sub> and 160 kg of K<sub>2</sub>O per ha (**Tandon and Tiwari, 2008**). Hence, the greater its ability to utilize nutrients for crop production, the greater is the yield potential. FYM is the commonly used organic manure but its supply is limited. It contains low and widely varying nutrient concentration. Vermicompost is the good source of all plant nutrients but it is using in high quantity. Use of vermicompost as an excellent organic manure for field crops and vegetable crops has been promoted. Biofertilizers are the inoculation of microorganism which is capable of mobilizing nutrient element from unavailable to available form through biological processes. Use of bio fertilizers not only supplement the nutrient but also improve the efficiency of applied nutrients. The use of vermicompost and biofertilizers in such situation is, therefore, a practically paying proposal Phosphorus solubilizers bacteria like *Pseudomonas* and *Bacillus* which solubilize phosphorus in soil and make it available to plants. While, *Azospirillum*, a nitrogen fixing organism has been reported to be beneficial and economical for several crops. They are known to improve growth, yield as well as productivity of crops (**Gaur, 2010**). Therefore, Keeping this the in the view, the present

investigation was undertaken to study the **effect of integrated nutrient management on yield attributes of onion (*Allium cepa* L.) cv. Pusa Shobha**

## MATERIALS AND METHODS

The experiment conducted during *Rabi* season in the years, of 2021-2022 and 2022-2023 both the year same time at Horticulture Research Farm, near Gautam Buddha Central Library, Babasaheb Bhimrao Ambedkar University (A Central University), Vidya Vihar Raebareli Road Lucknow, (U.P).. The experiment was laid out in randomized block design with three replications. The treatments consisted of T<sub>0</sub>- 100% RDF (NPK@150:50:80 Kg/ha); T<sub>2</sub>- 100% RDF + FYM (10 t/ha); T<sub>3</sub> -100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>4</sub> -100% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>5</sub> -100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>6</sub> -75% RDF + FYM (10 t/ha); T<sub>7</sub> -75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>8</sub> -75% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>9</sub> -75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). T<sub>10</sub> -50% RDF + FYM (10 t/ha); T<sub>11</sub>- 50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha); T<sub>12</sub>- 50% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha); T<sub>13</sub> -50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha).having an even topography with adequate irrigation and proper drainage facilities. The soil was sandy clay loam and slightly alkaline in reaction, good in fertility situated at an elevation of 111 meter above mean sea level in the sub-tropical climate of central Uttar Pradesh at 26°56 North Latitude 80°52 east longitude. The topography of experimental field was fairly uniform during experimental year. Experiment was studies in RBD keeping three replications in each treatment plants were transplanted in a plot size 1.8m x 1.2m and at the spacing of 15x10cm. According to standard processors, the soil samples were collected randomly from the experiment field at the depth of 0-15cm. The randomly collected sample were thoroughly mixed well and composite soil sample was made up (500 g) of soil, all the cultural practices and treatment application is applicable timely. The sample was analyzed to determine the physical and chemical analysis of soil testing laboratory of university. The pH was determined by electric pH meter and available Nitrogen was determined by alkaline permanganate method as reported by Piper (1966) and available phosphorus and potash by Olsen's method Olsen *et al.* (1954) and Flame photometer method respectively. The E.C. was determined by Conductivity Bridge as described by Jackson (1967).

**Comment [YK2]:** How the data were analyzed? This topic must be clear about that. Also, as the work has more than two treatments, is necessary to make a mean test, like Tukey's test (this test will separate the means with letters). Without F test and Tukey's test when the means of the treatments are different (verified in the F test in ANOVA), is not possible discuss the results at all. I strongly recommend to the authors make these changes.

**Yield and yield attributing characters are recorded as-**

**1. Average bulb weight (g)**

Five selected plants from each plot and replication were weighed to determine the average weight for bulb yield of a plant.

**2. Equatorial diameter of bulb (cm)**

Equatorial diameter of randomly selected bulbs were measured at both equatorial portion of bulb with the help of Vernier's calipers was used to denote bulb diameter (cm) of each accessions.

**3. Polar diameter of bulb (cm)**

Polar diameter of randomly selected bulbs were measured at both polar portion of bulb with the help of Vernier's calipers was used to denote tuber diameter (cm) of each bulb.

**4. Neck thickness (cm)**

The neck thickness of five bulbs randomly selected in each plot was measured with the help of Vernier's calipers at harvesting and average was worked for each treatment.

**5. Number of scales per bulb**

Number of scales per bulb was counted after cutting of the bulb horizontally in two halves.

**6. Bulb yield (q/ha)**

After cutting the leaves (2-2.5 cm above the neck) of cured bulbs, bulbs were weighed on electronic balance and bulb yield per net plot was recorded in kilogram which was converted into quintal per hectare as given below:

$$\text{Bulb yield per hectare (q)} = \text{Bulb yield (kg/plot)} \times 10,000 / \text{Net area of plot (m}^2\text{)} \times 100$$

## **RESULTS AND DISCUSSION**

Data presented in Table-1 and Table-2 the effect of integrated nutrient management on yield and yield attributes of onion showed the significant difference among the treatments.

**Average bulb weight**-Data presented in table-1, during 2021-22, the maximum average bulb weight (98.86g) was recorded in T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) followed by the T<sub>13</sub>. The minimum average bulb weight (43.34g) was recorded in case of control (T<sub>0</sub>). During 2022-23, the maximum average bulb weight (99.87g) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) followed by the T<sub>13</sub>. The minimum average bulb weight (44.35g) was recorded in case of control (T<sub>0</sub>). These similar results are in conformity by Upadhyay *et al.*(2023).

**Polar diameter of bulb**-Perusal of data in table-1 indicated significant effects of different treatments on polar diameter of bulb in both the years. During 2021-22, the maximum polar diameter (6.12cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha).The minimum polar diameter (3.95cm) was recorded in case of control (T<sub>0</sub>). During 2022-23, the polar diameter was the maximum (6.32 cm) in case of application T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). The minimum polar diameter (3.85cm) was recorded in case of control (T<sub>0</sub>).However the use of organic and biofertilizers increase the polar diameter similar results found by Dhakad *et al.* (2019).

**Equatorial diameter of bulb**-Data in table-1 indicated significant effects of different treatments on Equatorial diameter of bulb during both the years. The maximum Equatorial diameter during 2021-22 (6.21cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). The minimum Equatorial diameter (3.80cm) was recorded in case of control (T<sub>0</sub>). During 2022-23, the maximum equatorial diameter (6.24cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). The minimum equatorial diameter (3.82cm) was recorded in case of control (T<sub>0</sub>). These similar results are in conformity by Meena *et al.* (2015).

**Neck thickness of bulb(cm)** -The data pertaining to neck thickness of bulb has been presented in table-2 perusal of data in table indicated significant effects of different treatments on neck thickness of bulb during both the years. During 2021-22, the neck thickness of bulb was minimum (0.90cm) with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha), while the maximum neck thickness of bulb (1.35cm) was recorded in case of control (T<sub>0</sub>). During 2022-23, the minimum neck thickness of bulb (0.98cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) which was at par with T<sub>13</sub>.The maximum neck thickness of bulb (1.45cm) was recorded in case of control (T<sub>0</sub>). These similar results are in conformity by Chavan *et al.* (2016).

**Number of scales/bulb**-Perusal of data in table-2 indicated significant effects of different treatments on number of scales/bulb during both the years. The maximum number of scales/bulb during 2021-22 (9.78cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). The minimum number of scales/bulb (4.21cm) was recorded in case control (T<sub>0</sub>). During 2022-23, the maximum number of scales/bulb (9.11cm) was recorded with application of T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). The minimum number of scales/bulb (4.59cm) was recorded in case of control (T<sub>0</sub>). These findings are in conformity with Dudhat *et al.* (2011), Brar *et al.* (2015).

**Total bulb yield (q/ha)** -As evident from the data present in table number-2 treatment effect on total bulb yield (q/ha) was significant during both the years. During 2021-22, the maximum total bulb yield (258.79 q/ha) was recorded with T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5Kg/ha) which was at par with T<sub>7</sub>, T<sub>8</sub> and T<sub>13</sub>. On the other hand, the minimum (124.53 q/ha) for total bulb yield was recorded in case of control (T<sub>0</sub>). During 2022-23, total bulb yield was found to be maximum (259.72 q/ha) in case T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5Kg/ha) which was at par with T<sub>7</sub>, T<sub>8</sub> and T<sub>13</sub>. The minimum total bulb yield (126.85q/ha) was found in control (T<sub>0</sub>). Similar results were found by Kaur and Singh (2019).

Results showed that equatorial diameter, polar diameter, neck thickness, weight of bulb and total yield increased with T<sub>9</sub>- 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha). This might be due to the fact that combined application of inorganic fertilizers and organic manures helped in the expansion of leaf and chlorophyll content which together might have accelerated the photosynthetic rate and in turn increased the supply of carbohydrates to the plants. The application of 75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha) favored the metabolic and auxin activities in plant and ultimately resulted in increased bulb diameter, average bulb weight, number of scales and total yield. Similarly, vermicompost and biofertilizers improved physical, chemical and biological properties of soil which consequently increased the value of yields attributes and finally yield. Further, it is relevant to note that, organic manure and biofertilizers seem to be directly responsible in increasing crop yields either by accelerating the respiratory process by increasing cell permeability due to hormone growth action or combination of all these processes. It supplies nitrogen, phosphorus, potassium of which phosphorus is involved in cell division, photosynthesis and metabolism of carbohydrates where potash regulated proper translocation of photosynthesis and stimulated enzyme activity which in turn might have increased the rate of growth and positive development in yield characters which was resulted in high bulb yield of onion. These findings are in conformity with Dudhat *et al.* (2011), Brar *et al.* (2015), Meena *et al.* (2015), Chavan *et al.* (2016),

Sharma *et al.* (2017), Prusty *et al.* (2019), Kaur and Singh (2019), Dhakad *et al.* (2019), Sahoo *et al.* (2022), Kalirawna *et al.* (2022), Upadhyay *et al.* (2023).

### CONCLUSION

On the basis of experimental results, it could be concluded that the application of T<sub>9</sub>- 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 yield and yield attributing parameters of onion. Integrated approach of Vermicompost, FYM and biofertilizer performed better with respect to yield parameters average bulb weight (99.36g), polar diameter (6.22cm), equatorial diameter (6.2cm), neck thickness (0.94cm), number of scales/bulb (9.44) and total bulb yield (259.25q/ha) onion bulb.

**Comment [YK3]:** See the comment in "material and methods". I strongly believe that "conclusion" also be change.

**Table.1.** Effect of integrated nutrient management on average bulb weight (g), polar diameter (cm) and equatorial diameter (cm) of onion (*Allium cepa* L.)

Treatment Details		Average bulb weight (g)		Polar diameter (cm)		Equatorial diameter (cm)	
		2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
T <sub>0</sub>	Control (without fertilizers)	43.34	44.35	3.95	3.85	3.80	3.82
T <sub>1</sub>	100% RDF (NPK@150:50:80 Kg/ha)	72.78	73.84	4.13	4.23	4.29	4.30
T <sub>2</sub>	100% RDF + FYM (10 t/ha)	73.46	74.92	4.43	4.53	4.38	4.41

**Comment [YK4]:** Like I said before, the tables must be remake after the new statistical analyses. All the treatments must be showing the significance of F test. Also, if the F test does not show statistical difference between the means, the "ns" must be in front of the mean. In the same way, if the F test shows the difference between the means, the letters must be in front of the mean. Example: "Average bulb" = T<sub>0</sub> = 43.34<sup>ns</sup>QR 43.34 a. With these changes, I really believe that paper will be better.

<b>T<sub>3</sub></b>	100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	75.25	76.28	4.60	4.80	4.70	4.81
<b>T<sub>4</sub></b>	100% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	77.33	78.45	4.88	4.98	4.98	4.99
<b>T<sub>5</sub></b>	100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	79.20	80.20	5.29	5.39	5.18	5.19
<b>T<sub>6</sub></b>	75% RDF + FYM (10 t/ha)	76.89	77.89	5.53	5.63	5.40	5.42
<b>T<sub>7</sub></b>	75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	81.56	82.56	5.65	5.75	5.52	5.53
<b>T<sub>8</sub></b>	75% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	89.78	90.72	5.75	5.85	5.69	5.70
<b>T<sub>9</sub></b>	75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	98.86	99.87	6.12	6.32	6.21	6.24
<b>T<sub>10</sub></b>	50% RDF + FYM (10 t/ha)	83.44	84.52	5.28	5.38	5.26	5.29
<b>T<sub>11</sub></b>	50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	85.34	86.45	5.67	5.77	5.11	5.24
<b>T<sub>12</sub></b>	50% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	87.87	88.88	5.56	5.66	5.02	5.02
<b>T<sub>13</sub></b>	50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	94.56	95.57	5.85	5.95	5.97	5.98
<b>SE(m) ±</b>		0.972	0.697	0.053	0.056	0.064	0.07
<b>CD (P=0.05)</b>		2.828	2.028	0.155	0.163	0.188	0.204

**Table. 2. Effect of integrated nutrient management on neck thickness (cm), number of scales/bulb and total bulb yield (q/ha) of onion (*Allium cepa* L.)**

	Treatment Details	Neck thickness (cm)		Number of scales/bulb		Total bulb yield (q/ha)	
		2021-22	2022-23	2021-22	2022-23	2021-22	2022-23
<b>T<sub>0</sub></b>	Control (without fertilizers)	1.35	1.45	4.21	4.59	124.53	126.85
<b>T<sub>1</sub></b>	100% RDF (NPK@150:50:80 Kg/ha)	1.24	1.25	5.65	5.12	201.85	203.70

<b>T<sub>2</sub></b>	100% RDF + FYM (10 t/ha)	1.22	1.33	6.68	5.25	209.72	211.57
<b>T<sub>3</sub></b>	100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	1.20	1.31	6.55	5.34	220.83	223.61
<b>T<sub>4</sub></b>	100% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	1.28	1.43	6.10	5.67	218.98	220.83
<b>T<sub>5</sub></b>	100% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	1.31	1.41	5.78	6.15	230.55	232.87
<b>T<sub>6</sub></b>	75% RDF + FYM (10 t/ha)	1.19	1.29	6.26	6.20	236.57	238.88
<b>T<sub>7</sub></b>	75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	1.14	1.24	6.79	6.66	240.74	242.59
<b>T<sub>8</sub></b>	75% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	1.00	1.10	7.03	7.59	244.44	248.61
<b>T<sub>9</sub></b>	75% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	0.90	0.98	9.78	9.11	258.79	259.72
<b>T<sub>10</sub></b>	50% RDF + FYM (10 t/ha)	1.17	1.18	5.46	6.97	218.05	219.90
<b>T<sub>11</sub></b>	50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha)	1.09	1.12	6.74	6.44	232.87	234.72
<b>T<sub>12</sub></b>	50% RDF + FYM (10 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	1.10	1.13	6.10	7.09	219.90	222.68
<b>T<sub>13</sub></b>	50% RDF + FYM (5 t/ha) + Vermicompost (2 t/ha) + Azotobacter (5 Kg/ha) + PSB (5 Kg/ha)	0.99	1.01	8.76	8.24	242.12	246.29
<b>SE(m) ±</b>		0.011	0.014	0.209	0.215	6.879	6.961
<b>CD (P=0.05)</b>		0.033	0.040	0.608	0.626	19.997	20.237

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