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## Effect of different organic growth promoters on growth and yield of Onion

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**Abstract**

A field experiment was conducted at college of horticulture, VNMKV, Parbhani during *kharif* season of 2017 on a medium black cotton clay textured well drained soil to evaluate different organic growth promoters on growth and yield of Onion (*Allium cepa* L.). The experiment was laid out in a Randomized Block Design with 13 treatments replicated twice. Treatments consist of application of Vermiwash @ 5% and 10% (T<sub>1</sub>&T<sub>2</sub>), Panchagavya @ 3% and 6% (T<sub>3</sub>&T<sub>4</sub>), Humic acid @ 0.2% & 0.4% (T<sub>5</sub>&T<sub>6</sub>), Cow urine @ 5% and 7.5% (T<sub>7</sub> &T<sub>8</sub>), Amritpani @ 3% and 6% (T<sub>9</sub> &T<sub>10</sub>), combination of RDF + Vermiwash 5% + Panchagavya 3% + Humic acid 0.2% + cow urine 5% + Amritpani 3% (T<sub>11</sub>), Combination of RDF + Vermiwash @ 10% + Panchagavya 6% + Humic acid 0.4% + Cow urine 7.5% + Amritpani 6% (T<sub>12</sub>) and RDF i.e. 100:50:50 kg NPK/ha (T<sub>13</sub>). The outcome from experiment revealed that, all growth parameters like plant height, number of leaves, leaf length and width were recorded highest in treatment T<sub>12</sub>. As regards to yield, maximum values were obtained from the same treatment.

**Keywords:** Organic growth promoters, panchagavya, humic acid, amritpani, vermiwash, cow urine, growth parameters, yield

**Introduction**

Onion is one of the most versatile vegetable crops that can be kept for a fairly long period and can be safely stand with the hazards of rough handling including long distance transportation. The crop is known to possess several medicinal and therapeutic properties. The pungency is due to volatile oil Allyl-propyl-disulphide. Generally 100g of edible bulb contains moisture (86.8%), protein (1.2 g), Fat (0.1%), Carbohydrates (11 g), Calcium (180 mg), Phosphorus (50 mg), Oil (0.002-0.03%) and (35IU), Vitamin A.(Hazra *et al.*, 2012) [3]. Onion is an indispensable item in every kitchen as vegetable and condiment used to flavor many of the food stuffs. Therefore, as onion is popularly referred in cookery; it is called as queen of kitchen by Germans. Balanced nutrition is one of the most important factors which govern the productivity of onion. Nutrients needed by crop are supplied through organic manures and inorganic fertilizers. In recent years, the trends in vegetable production are to produce chemical free, organic produce with high nutritive value and low cost input. This increases the usefulness of introducing low cost organic farming techniques as viable alternative to high cost conventional chemical farming. Organic cultivation of onion is done to maintain sustainability, higher crop productivity, improving soil quality and fertility. The use of organic growth promoters like vermiwash, panchagavya, humic acid, cow urine and Amritpani is becoming popular in farming systems and vegetables in particular. Vermiwash is a liquid manure obtained from earthworms that contain phytohormones like auxins and cytokinins. Panchagavyais an organic formulation made from cow goods. It provides essential macro and micro nutrients, many vitamins, amino acids and growth promoting substances. Humic acid is a considerable natural compound to be applied as an alternative fertilizer for supplying plant requirements (Sharif *et al.*, 2002) [4]. In ancient Ayurveda, cow urine has been greatly mentioned for its pharmacological importance having ability to kill numerous germs and to boost-up immunity. Amritpani is made using cow-dung, cow-urine, butter-milk, leaves of basil or neem and honey; that is an effective tool for enhancing germination and managing soil borne diseases.

## Materials & Methods

The present research work was carried out on instructional-cum-research farm of College of Horticulture, VNMKV, Parbhani during *khariif* season of 2017 on a well drained, clay textured black cotton soil with slight alkaline pH, low available N, moderate available P<sub>2</sub>O<sub>5</sub> and high available K<sub>2</sub>O. Baswant-780, a commonly available high yielding variety of onion was selected for trial. The experiment was laid out in Randomized Block Design with 13 treatments which were replicated twice. Seedlings of the said variety were raised on raised beds in nursery after achieving pencil thickness (50 days old) were transplanted to main site on flat bed with spacing of 15×10 cm<sup>2</sup>. While preparing a flat bed of size 2.2×1.8 m<sup>2</sup> a distance of 0.5 m was maintained between two plots and that of 1.0m between two replications. The treatment used were inclusive of; application of Vermiwash @ 5% (T<sub>1</sub>) application of Vermiwash @ 10% (T<sub>2</sub>), application of Panchagavya @ 3% (T<sub>3</sub>) application of Panchagavya @ 6% (T<sub>4</sub>), application of Humic acid @ 0.2% (T<sub>5</sub>) application of Humic acid @ 0.4% (T<sub>6</sub>), application of Cow urine @ 5% (T<sub>7</sub>) and application of Cow urine @ 7.5% (T<sub>8</sub>), application of Amritpani @ 3% (T<sub>9</sub>) application of Amritpani @ 6% (T<sub>10</sub>), combination of RDF + Vermiwash 5% + Panchagavya 3% + Humic acid 0.2% + cow urine 5% + Amritpani 3% (T<sub>11</sub>), Combination of RDF + Vermiwash @10% + Panchagavya 6% + Humic acid 0.4% + Cow urine 7.5% + Amritpani 6% (T<sub>12</sub>) and RDF i.e. 100:50:50 kg NPK/ha (T<sub>13</sub>). 20t/ha FYM was applied to all treatment plots before transplanting and 50% N + full P & K was applied to treatments T<sub>11</sub>, T<sub>12</sub> & T<sub>13</sub> at transplanting and remaining 50% N was applied one month after transplanting through urea, SSP and MOP. All the organic preparations required for the investigation were prepared on experiential site as per mentioned in ancient literatures. All the preparations were applied in the form of foliar sprays at 30, 60 and 90 days after transplanting with various concentrations as per treatments. Irrigation was given to crop as per need as well as plots were kept weed free by manual hand weeding at 30 and 60 days after transplanting. By taking care of proper plant protection measures successfully raised plants were harvested at neck-fall stage when more than 60% plants showed maturity signs.

During the course of investigation, all growth parameters were recorded as per schedule along with meteorological parameters also. After harvest, all post-harvest quality and yield parameters were also recorded from each plot in pre-determined frequency.

## Result & Discussion

### Effect of organic growth promoters on growth parameters of Onion;

The results obtained from investigation reveals that, all growth parameters i.e. plant height, no. of leaves, leaf length and width haven't shown any difference at 30 days after transplanting but at 60 and 90 days after transplanting treatment T<sub>12</sub> recorded highest numerical values which was statistically at par with treatment T<sub>11</sub>, T<sub>6</sub>, T<sub>5</sub>, T<sub>13</sub> and T<sub>3</sub> at 90 days after transplanting. This might be because of combined effect of inorganic nutrients and different organic growth promoters in general and panchagavya in particular, as panchagavya and other growth promoters might have provided nutrients as well as growth hormones that are linked to the increased leaf growth of the plants as a consequence of more assimilatory surface area which promoted production of larger quantities of photosynthates finally resulting in better plant growth and development, (Gopakkali and Sharanappa. 2014) [2].

### Effect of organic growth promoters on yield of Onion;

The data from table also revealed that, highest numerical yield of crop (296.59 qu/ha) was observed in treatment T<sub>12</sub> i.e. application of RDF + Vermiwash 10% + Panchagavya 6% + Humic acid 0.4% + Cow urine 7.5% + Amritpani 6% and it was statistically at par with T<sub>11</sub>, T<sub>6</sub>, T<sub>5</sub>, T<sub>13</sub> and T<sub>3</sub>. This could be attributed to the combined effect of inorganic nutrients and organic growth promoters in general and humic acid in particular. As humic acid have been shown to stimulate plant growth and yield by acting on mechanism involved in physiological respiration by acting as an activator, photosynthesis, protein synthesis, water & nutrient uptake, cation exchange capacity, enzymes activity and antioxidant metabolism (Chen and Aviad 1990) [1].

**Table 1:** Effect of organic growth promoters on growth parameters of Onion

Treatments	Plant Height (cm)			Leaves per plant			Length of leaves (cm)			Leaf width (cm)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
T <sub>1</sub>	32.60	44.70	55.00	5.20	8.30	12.00	28.60	40.40	50.00	0.53	1.31	1.60
T <sub>2</sub>	33.45	45.50	56.40	5.30	8.40	12.10	29.30	40.20	52.40	0.55	1.33	1.63
T <sub>3</sub>	33.95	47.55	57.67	5.55	8.60	12.40	29.80	43.20	53.85	0.57	1.34	1.64
T <sub>4</sub>	32.70	46.45	56.70	5.50	8.50	12.30	28.60	42.40	52.70	0.55	1.33	1.61
T <sub>5</sub>	34.30	50.90	61.60	6.10	9.10	12.60	30.10	46.40	58.10	0.60	1.42	1.67
T <sub>6</sub>	35.10	52.65	62.80	6.30	9.40	12.80	30.60	48.90	59.40	0.63	1.44	1.69
T <sub>7</sub>	32.00	43.10	54.00	5.30	8.10	11.40	27.70	39.50	51.20	0.52	1.27	1.52
T <sub>8</sub>	32.70	44.35	55.40	5.60	8.12	11.80	28.50	40.90	50.40	0.54	1.29	1.55
T <sub>9</sub>	32.00	43.00	51.50	5.10	7.40	11.20	28.00	38.50	48.50	0.54	1.28	1.58
T <sub>10</sub>	32.80	43.80	52.30	5.30	8.00	11.40	28.80	41.00	49.70	0.58	1.30	1.60
T <sub>11</sub>	35.15	52.95	63.40	6.30	9.20	12.60	31.10	48.90	59.40	0.63	1.45	1.72
T <sub>12</sub>	35.45	53.60	65.40	6.60	9.40	12.80	31.60	50.50	61.50	0.65	1.47	1.74
T <sub>13</sub>	33.15	50.35	60.50	5.30	9.00	12.50	26.50	46.00	56.00	0.54	1.35	1.67
SE±	1.74	2.31	2.64	0.47	0.31	0.20	1.25	2.43	2.48	0.03	0.04	0.03
CD at 5%	NS	7.10	7.74	NS	0.96	0.60	NS	7.48	7.66	NS	0.13	0.08
Mean	33.48	47.61	58.51	5.65	8.57	12.14	29.16	43.60	54.08	0.57	1.35	1.63

\*DAT = Days after transplanting

**Table 2:** Effect of organic growth promoters on yield of Onion

Tr. No	Treatment details	Yield per plot (kg)	Yield per hectare (q)	% increases over control
T <sub>1</sub>	Vermiwash @ 5%	9.28	234.35	-14.13
T <sub>2</sub>	Vermiwash @ 10%	9.57	241.55	-06.93
T <sub>3</sub>	Panchgavya @ 3%	9.82	247.98	-00.50
T <sub>4</sub>	Panchgavya @ 6%	9.74	245.96	-02.52
T <sub>5</sub>	Humic acid @ 0.2%	10.93	275.89	27.41
T <sub>6</sub>	Humic acid @ 0.4%	11.08	279.67	31.19
T <sub>7</sub>	Cow urine @ 5%	7.79	196.59	-51.89
T <sub>8</sub>	Cow urine @ 7.5%	8.88	224.25	-24.23
T <sub>9</sub>	Amritpani @ 3%	7.75	195.71	-52.77
T <sub>10</sub>	Amritpani @ 6%	8.73	220.46	-28.02
T <sub>11</sub>	RDF + vermiwash5% + panchgavya 3% + humic acid 0.2%+ cow urine 5%+ amritpani 3%	11.65	294.19	45.71
T <sub>12</sub>	RDF +vermiwash10% + panchgavya 6% + humic acid 0.4%+cow urine7.5%+ amritpani 6%	11.75	296.59	48.11
T <sub>13</sub>	Control (RDF 100:50:50 NPK kg /ha)	9.84	248.48	--
	SE ±	0.65	16.40	--
	CD at 5%	2.00	50.53	--
	Mean	9.75	246.28	--

### Conclusion

Critical evaluation of the results of present investigation concludes that, for getting better growth, high yield and quality onion bulb production, it will be advisable to provide the additional nutrients through foliar application of organic growth promoters in addition to recommended dose (100:50:50 NPK kg/ha) of inorganic fertilizers.

### References

1. Chen Y, Aviad T. Effect of humic substances on plant growth In: Humic Substances in Soil and Crop Science: Selected Readings, 1990, 161-186.
2. Gopakkali P, Sharanappa. Effect of organic farming on growth, yield, quality and economics of onion (*Allium cepa*) in Dry Zone of Karnataka. Indian Journal of Agronomy. 2014; 59(2):103-107.
3. Hazra P, Chattopadhyay A, Krmarkar K, Dutta S. Modern technology on vegetable production book, 2012, 166
4. Sharif MR, Khattak A, Sarir MS. Effect of different levels of lignitic coal derived humic acid on growth of maize plants. Comm. Soil Sci. plant Anals. 2002; 33:3567-3580.