Plant Archives Vol. 20 Suppliment 1, 2020 pp. 3718-3720 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

BIOEFFICACY OF TETRAPOWER ON GROWTH, YIELD AND QUALITY ATTRIBUTES OF BRINJAL (*SOLANUM MELONGENA* L.) CV. ANNAMALAI

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Abstract

An experiment to study Bioefficacy of TETRAPOWER, a biostimulant manufactured by EXOME Life Sciences Pvt. Ltd. on growth, yield and quality attributes of Brinjal was conducted in a farmer's field near Chidambaram, Tamil Nadu in 2019.The bioefficacy of TETRAPOWER was tested along with growth regulators such as gibberellic acid (GA_3**)** and Naphthalene Acetic Acid (NAA). The experiment was laid out in Randomized Blocks Design with three replications. Brinjal variety ANNAMALAI was used in the experiment. Plants were sprayed three times at 30, 60 and 90 days after transplanting. The highest plant height, number of branches, number of leaves, number of fruits per plant, fresh fruit weight per plant and ascorbic acid content were observed in plants treated with TETRAPOWER @ 2ml/ plant followed by 3ml/plant while untreated control recorded the lowest value.

Key Words: TETRAPOWER, Bio-stimulant, Brinjal, growth, yield, quality attributes

Introduction

Solanum melongena L., popularly known as brinjal or egg plant or aubergine, is an important tropical vegetable belongs to the family Solanaceae. With the production of 12.81 million tonnes from an area of 0.73 mha, India ranks second in world production after China and contributes 24.5 % to world production (Anon., 2018). Brinjal suffers from various abiotic and biotic stresses (Kaur *et al*., 2004). It is one of the most popular vegetable crops in many parts of the world including India. The crop is cultivated on small family farms and considered to be important source of nutrition and cash income for many resource poor farmers (Bose *et al*., 1993). The brinjal is of much importance in the warm areas of Far East, beinggrown extensively in India, Bangladesh, Pakistan, China and the Philippines. In India, it is one of the most common, popular and principal vegetable crops grown throughout the country except higher altitudes. It is a versatile crop adapted to different agro-climatic regions and can be grown throughout the year. It is a perennial but grown commercially as an annual crop. A number of cultivars are grown in India, consumer preference being dependent upon fruit color, size and shape (Gopalan *et al*., 2007). The fruits are known for being low in calories and having a mineral composition beneficial for human health. They are also rich source of Potassium, Magnesium, Calcium and Iron (Zeniaand Halina, 2008).Brinjal is known to have ayurvedic medicinal properties and is good for diabetic patients. It has also been recommended as an excellent remedy for those suffering from liver complaints (Shukla and Naik, 1993). Plant growth regulators are used in brinjal to increase the yield. Nowadays bio stimulants are increasingly used in Brinjal production. TETRAPOWER is a biostimulant manufactured by Exome Life Sciences Pvt. Ltd. It is found used in variety of agricultural and horticultural crops. This study was therefore initiated to investigate bioefficacy of TETRAPOWER in Annamalai Brinjal variety.

Material and methods

The experiment was carried out in 2019 in a farmer field near Chidambaram in Tamil Nadu. The experiment consisted of three levels each of gibberellic acid, naphthalene acetic acid andTETRA POWER and arranged in Randomized Blocks Design with three replications(T_1- Control, T_2- GA3 @10 ppm, T_3-GA3 @ 20 ppm, T_4- GA3 @ 30 ppm, T_5- NAA@ 10 ppm, T_6-

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NAA@ 20 ppm, T_7- NAA @ 30 ppm, T_8- TETRAPOWER @ 1ml/l., T_9-TETRAPOWER @ 2ml/ l. T10- TETRAPOWER @ 3ml/l. The solution was poured into Knapsack sprayer and was directly sprayed on the plants three times at 30, 60 and 90 days after transplanting. Spraying was performed early in the morning to avoid rapid drying of the spray solution, due to transpiration. Data were collected from selected plants in the rows. The collected data includes average plant height (cm), number of leaves/plant, number of branches/ plant, number of fruits/plant, fresh fruit weight (kg/plant), Ascorbic acid (mg/100g). The data was analyzed using analysis of variance (ANOVA) by software and mean separation was carried out at 5% probability level.

Results and discussion

Plant Height (cm)

Plant height at 30 DAT was the highest in T_9 (37.63 cm) followed by T_{10} (34.42 cm) and was the lowest in control (20.10 cm). The plant height at 60 DAT was maximum in T_9 (52.07 cm) followed by T_{10} (48.75 cm) and minimum in control (34.24 cm). At 90 DAT, the highest plant height was reported in T_9 (74.27 cm) followed by T_{10} (69.10 cm) and the lowest in control (46.73). Tetrapower might promotes the activity of xyloglucan endotransglycosylase (XET) which cause loosening of cell wall and increase in cell permeability (Saptari and Dawi 2013). This result is similar to findings in brinjal by Meena and Dhaka (2003).

Number of leaves

At 30 DAT, maximum number of leaves was found in T_9(22.46) followed by T_{10} (21.58) and minimum in control (16.31). Number of leaves at 60 DAT was maximum in T_9(52.18) followed by T_{10} (50.55) and minimum in control (41.53). At 90 DAT, maximum number of leaves was observed in T_9(93.46) followed by T_{10} (89.09) and minimum was found in control (70.14). Similar result was reported in tomato by Gabal*et al.* (1999).

Number of branches

The number of branches at 30 DAT was the highest in T_9 (8.90) followed by T_{10}(8.37) and lowest in control (4.60). At 60 DAT, maximum number of branches was found in T_9 (22.90) followed by T_{10} (20.95) and minimum in control (11.38). Number of branches at 90 DAT was maximum in T_9 (25.80) followed by T_{10}(24.92) and minimum in control (17.36). Similar result was found in chilli by Gollagi (1999) and tomato by Mehta *et al.* (1989).

Number of fruits

Maximum number of fruits/plant was found in T_9 (14.86) followed by T_{10}(14.09) and minimum in control (9.31). Exogenous supply of Tetrapower at critical stages of flowering and fertilization, ovary formation, fruit and seed development period etc. may enhance source to sink relationship, accumulation of photosynthates and efficient utilization of food reserves for the development of fruit. These results are supported by the findings of Mehta *et al*. (1989) in chilli.

Fruit weight per plant

Maximum fresh fruit weight/plant (kg) was found in T_9 (3.66 kg) followed by T_{10} (3.40 kg) and minimum in control (1.26 kg). The brinjal plants exhibited improvements in relation to growth, sustainable health and enhancement in flowering & fruit parameters in such a coordinated manners for collective contribution toward the higher weight of fruit. These results are in conformity with reported findings of Sumiati(1987) and Edison (1991) in tomato and Pampapathy and Rao (1975) in brinjal.

Table 1: Bio efficacy of plant growth regulators and Tetrapower on growth parameters at different stages in Brinjal.

Treatments	Plant Height (cm)			No. of leaves/ plant			No. of branches /plant		
	30DAT	60DAT	90DAT	30DAT	60DAT	90DAT	30DAT	60DAT	90DAT
T_1	20.10	34.24	46.73	16.31	41.53	70.14	4.60	11.38	17.36
T_2	21.89	36.05	49.51	16.95	42.80	72.50	5.08	12.56	18.22
T_3	23.67	37.88	52.30	17.59	43.88	74.86	5.55	13.75	19.09
T_4	25.45	39.69	55.09	18.26	44.99	77.21	6.02	14.96	19.95
T_5	27.26	41.49	57.88	18.92	46.08	79.59	6.50	16.12	20.83
T_6	29.06	43.30	60.66	19.55	47.17	81.95	6.98	17.33	21.72
T_7	30.84	45.10	63.47	20.20	48.29	84.31	7.44	18.55	22.61
T_8	32.62	46.95	66.28	20.88	49.39	86.68	7.92	19.78	23.47
T_9	37.63	52.07	74.27	22.46	52.18	93.46	8.90	22.90	25.80
T_{10}	34.42	48.75	69.10	21.58	50.55	89.09	8.37	20.95	24.92
S. Ed	0.87	0.89	1.37	0.31	0.53	1.17	0.23	0.58	0.41
CD (5%)	1.75	1.78	2.75	0.61	1.07	2.33	0.44	1.15	0.84

Ascorbic acid

Ascorbic acid content of the fruit was the highest in T_9 (12.39 mg) followed by T_{10} (12.24 mg) and was the lowest in the control (10.98) . The maximum content of ascorbic acid with Tetrapower treatment might be either due to encouragement of biosynthesis of ascorbic acid or protection of synthesized ascorbic acid from oxidation through the enzyme ascorbic acid oxidase. Similar results were obtained for Gibberellic Acid treatment by Saptari and Dewi(2013) and Chattopadhyay and Sen (1974) and Desai *et al*. (1993) in chilli.

Table 2: Efficacy of plant growth regulators on physiological and yield parameters at different stage in Brinjal

Treatments	Number of fruits/plant	Fruits weight (kg/plant)	Ascorbic Acid (mg/100g)
T_1	9.31	1.26	10.98
T_2	9.86	1.55	11.26
T_3	10.39	1.79	11.45
T_4	10.93	2.06	11.60
T_5	11.48	2.32	11.65
T_6	12.03	2.60	11.79
T_7	12.59	2.88	11.94
T_8	13.15	3.13	12.10
T_9	14.86	3.66	12.39
T_{10}	14.09	3.40	12.24
S.Ed	0.29	0.11	0.07
CD (5%)	0.52	0.24	0.13

Conclusion

Results showed that foliar spray of TETRAPOWER not only increased the vegetative growth and fruit characters but also the quality characters of brinjal cv Annamalai. On the basis of the experiment, it is concluded that TETRAPOWER (2ml/l.) showed positively significant effect on growth, yield and physiological parameters of brinjal.

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