

**“Assessment of foliar application of micronutrients on yield attributes and yield of Brinjal  
(*Solanum melongena* L.)”**

**ABSTRACT**

The present investigation entitled “**Assessment of foliar application of micronutrients on yield attributes and yield of Brinjal (*Solanum melongena* L.)**” was conducted at Research and Instructional Farm, Department of Horticulture, BTC College of Agriculture and Research Station, Bilaspur (C.G.) during *Rabi* Season of 2022-2023. The experiment was carried out in RBD design with three replications. Ten treatments were created by different doses of micronutrients in Brinjal variety BR-112 (Black beauty). The treatments were Control plot (T<sub>1</sub>), RDF (T<sub>2</sub>), RDF+ZnSO<sub>4</sub>(0.4%) (T<sub>3</sub>), RDF+ZnSO<sub>4</sub> (0.5%) (T<sub>4</sub>), RDF+Borax (0.4%) (T<sub>5</sub>), RDF+Borax (0.5%) (T<sub>6</sub>), RDF+CuSO<sub>4</sub> (0.4%) (T<sub>7</sub>), RDF+CuSO<sub>4</sub> (0.5%) (T<sub>8</sub>), RDF+FeSO<sub>4</sub> (0.4%) (T<sub>9</sub>), RDF+FeSO<sub>4</sub> (0.5%) (T<sub>10</sub>). The recommended package of practices in Brinjal were followed as per requirement. Yield and yield attributing characters such as highest number of flowers plant<sup>-1</sup> (42), highest number of fruits plant<sup>-1</sup> (32.68), maximum fruit diameter (9.35cm), highest fruit length (15.53cm), highest fruit weight (78.20g), minimum days required for first flower initiation (38.60), earliest days to first fruit harvest (57.54) was observed in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%). Total number of harvest (picking) did not differ significantly due to effect of different micronutrients.

**Keywords:** Brinjal, RDF (Recommended dose of fertilizer), micronutrient, treatment, yield, fertilizer.

**INTRODUCTION**

Brinjal (*Solanum melongena* L.) often known as eggplant, guinea squash or aubergine is a plant in the Solanaceae family. It has phosphorus and many vitamins especially B-complex. Fruits from Brinjal plants are a good source of minerals, vitamins (B<sub>1</sub>, B<sub>6</sub>, C), dietary fibre, folate, proteins, carbohydrates and antioxidants. They are also low in calories which supports human health (El-Nemr *et al.*, 2012).

Brinjal (*Solanum melongena* L.) is grown extensively (1.86 m ha) throughout the globe with an annual production of 54.08 million tonnes, worth over US\$10 billion. Out of the total Brinjal production, nearly 84% is confined to China (61%) and India (23%) (Anonymous, 2021). The area under Brinjal cultivation in India is 711.3 thousand hectares with estimated annual production of 13,557.8 thousand metric tonnes with a productivity of 19.1 metric tonnes ha<sup>-1</sup> (Anonymous, 2019). In Chhattisgarh, Brinjal is grown in an area of 35,173 hectare with an annual production of 6,42,335 metric tonnes and productivity of 18.26 metric tonnes of fruits ha<sup>-1</sup> which is less than the national average (Anonymous, 2020).

Zinc is an essential component of a number of enzymes *i.e.*, dehydrogenase, aldolase, isomerases, proteinase, peptidase and phosphohydrolase (Mousavi, 2011). Boron aids in the metabolism of carbohydrates and the absorption of water (Haque *et al.*, 2011).

Iron is necessary for the synthesis of chlorophyll, though it actually does not enter into its composition. Plants use iron for a variety of metabolic processes, including the oxidation-reduction cycle, catalytic activities, and the synthesis of chlorophyll. Iron is also necessary for protein synthesis and glucose metabolism. In plants, copper is essential for controlling a variety of metabolic processes (Tripathi *et al.*, 2015). It facilitates the use of iron during the synthesis of chlorophyll (Harris and Lavanya, 2016).

The main aim of this experiment was to observe the effect of two different micronutrient concentrations (0.4&0.5%) on growth and yield of brinjal. Application of micronutrients will not only enhance productivity, but will also increase the production and the efficiency of fertilizer used in brinjal crop (Kumar *et al.*, 2016.)

## **MATERIAL AND METHODS**

The present investigation entitled “**Assessment of foliar application of micronutrients on yield attributes and yield of Brinjal (*Solanum melongena* L.)**” was conducted at Research and Instructional Farm, Department of Horticulture BTC College of Agriculture and Research Station, Bilaspur (C.G.) during *Rabi* season of 2022-23. This chapter deals with a concise description of the materials adopted and methodology used during the course of investigation. The experiment was carried out in Randomized Block Design with three replications. Ten treatments were created by different doses of micronutrients in Brinjal variety BR-112 (Black beauty). The treatments were Control plot (T<sub>1</sub>), RDF (T<sub>2</sub>), RDF+ZnSO<sub>4</sub>(0.4%) (T<sub>3</sub>), RDF+ZnSO<sub>4</sub> (0.5%) (T<sub>4</sub>), RDF+Borax (0.4%) (T<sub>5</sub>), RDF+Borax (0.5%) (T<sub>6</sub>), RDF+CuSO<sub>4</sub> (0.4%) (T<sub>7</sub>), RDF+CuSO<sub>4</sub> (0.5%) (T<sub>8</sub>), RDF+FeSO<sub>4</sub> (0.4%) (T<sub>9</sub>), RDF+FeSO<sub>4</sub> (0.5%) (T<sub>10</sub>). The recommended package of practices in Brinjal were followed as per requirement.

## **RESULT AND DISCUSSION**

### **1. Yield and yield attributes**

#### **1.1 Number of flowers plant<sup>-1</sup>**

The highest number of flowers plant<sup>-1</sup> (42.65) was recorded in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%) at 30 DAT which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)(42.00), T<sub>6</sub> (RDF+Borax 0.5%)(40.23), T<sub>5</sub> (RDF+Borax 0.4%) (39.73) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.4%)(38.95).table 1.

#### **1.2 Number of fruits plant<sup>-1</sup>**

The highest number of fruits plant<sup>-1</sup> (32.68) table 1, was recorded in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%) which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)(32.60), T<sub>6</sub> (RDF+Borax 0.5%)(31.27), T<sub>5</sub> (RDF+Borax 0.4%) (30.80) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.4%)(29.96).

#### **1.3 Fruit diameter(cm)**

Maximum Fruit diameter (9.35) was observed in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.4%) which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)( 9.10), T<sub>6</sub> (RDF+Borax 0.5%)(8.86), T<sub>5</sub> (RDF+Borax (0.4%)(8.70) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.5%) (8.40). Significantly minimum fruit diameter (6.84) was observed in treatment T<sub>1</sub> (Control). Table 1.

#### 1.4 Length of fruit (cm)

The highest length of fruit(15.53) was recorded in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%) which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)(15.03), T<sub>6</sub> (RDF+Borax 0.5%)(14.90), T<sub>5</sub> (RDF+Borax 0.4%) (14.50) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.4%)(14.40). Table 1.

#### 1.5 Fruit weight (g)

The highest fruit weight (78.20) was recorded in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%) which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)(76.94), T<sub>6</sub> (RDF+Borax 0.5%)(72.63), T<sub>5</sub> (RDF+Borax 0.4%) (72.52) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.4%)(72.33).Table 2.

#### 1.6 Days of first flower initiation

The maximum number of days required for first flower initiation (45.19) was observed in treatment T<sub>1</sub> (control) which was at par with T<sub>2</sub> (RDF), T<sub>7</sub> (RDF+CuSO<sub>4</sub>0.4%), T<sub>8</sub> (RDF+CuSO<sub>4</sub> (0.5%) and T<sub>9</sub>(RDF+FeSO<sub>4</sub> (0.4%). Significantly minimum days required for first flower initiation (38.60) was observed in treatment T<sub>4</sub>(RDF+ZnSO<sub>4</sub>0.5%). Table 2.

#### 1.7 Days taken to first fruit harvest

Highest number of days taken to first fruit harvest (68.92) was observed in treatment T<sub>1</sub> (control) which was at par with T<sub>2</sub> (RDF)(66.48), T<sub>7</sub> (RDF+CuSO<sub>4</sub> 0.4%)(65.87), T<sub>8</sub> (RDF+CuSO<sub>4</sub> 0.5%)(64.98) and T<sub>9</sub> (RDF+FeSO<sub>4</sub> 0.4%) (64.58). Significantly lowest number of days taken to first fruit harvest (57.54) was observed in treatment T<sub>4</sub> (RDF+Zinc sulfate 0.5%). Table 2.

#### 1.8 Fruityield (q ha<sup>-1</sup>)

The highest fruit yield (422.55) was recorded in treatment T<sub>4</sub> (RDF+ZnSO<sub>4</sub> 0.5%) which was at par with T<sub>3</sub> (RDF+ZnSO<sub>4</sub> 0.4%)(410.93), T<sub>6</sub> (RDF+Borax 0.5%)(404.99), T<sub>5</sub> (RDF+Borax 0.4%)(400.74) and T<sub>10</sub> (RDF+FeSO<sub>4</sub> 0.4%)(390.74). Significantly lowest fruit yield (118.31)was observed in treatment T<sub>1</sub> (control)(118.31). Table 2.

**Table 1: Effect of micronutrients on yield attributes of Brinjal at harvest**

Treatments	Treatments details	Number of flowers plant <sup>-1</sup>	Number of fruits plant <sup>-1</sup>	Fruit diameter (cm)	Length of fruit (cm)
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T <sub>1</sub>	Control	30.00	24.33	6.84	9.18
T <sub>2</sub>	RDF (120:60:80 NPK kg ha <sup>-1</sup> )	32.10	26.44	7.69	11.27
T <sub>3</sub>	RDF+ZnSO <sub>4</sub> (0.4%)	42.00	32.60	9.10	15.03
T <sub>4</sub>	RDF+ZnSO <sub>4</sub> (0.5%)	42.65	32.68	9.35	15.53
T <sub>5</sub>	RDF+Borax (0.4%)	39.73	30.80	8.70	14.50
T <sub>6</sub>	RDF+Borax (0.5%)	40.23	31.27	8.86	14.90
T <sub>7</sub>	RDF+CuSO <sub>4</sub> (0.4%)	34.80	28.60	7.92	12.22
T <sub>8</sub>	RDF+CuSO <sub>4</sub> (0.5%)	35.67	28.97	8.09	12.30
T <sub>9</sub>	RDF+FeSO <sub>4</sub> (0.4%)	36.54	29.52	8.25	13.48
T <sub>10</sub>	RDF+FeSO <sub>4</sub> (0.5%)	38.95	29.96	8.40	14.40
	<b>Mean</b>	<b>37.26</b>	<b>29.51</b>	<b>8.32</b>	<b>13.28</b>
	<b>SEM+-</b>	<b>1.27</b>	<b>1.00</b>	<b>0.28</b>	<b>0.45</b>
	<b>CD (0.05%)</b>	<b>3.78</b>	<b>2.98</b>	<b>0.84</b>	<b>1.35</b>

**Table 2: Effect of micronutrients on yield and yield attributes of Brinjal at harvest**

Treatments	Treatments details	Fruit weight (g)	Days of first flower initiation	Days taken to first fruit harvest	Fruit yield (q ha <sup>-1</sup> )
T <sub>1</sub>	Control	46.37	45.19	68.92	118.31
T <sub>2</sub>	RDF (120:60:80 NPK kg ha <sup>-1</sup> )	54.71	43.65	66.48	332.48
T <sub>3</sub>	RDF+ZnSO <sub>4</sub> (0.4%)	76.94	38.95	58.64	410.93
T <sub>4</sub>	RDF+ZnSO <sub>4</sub> (0.5%)	78.20	38.60	57.54	422.55
T <sub>5</sub>	RDF+Borax (0.4%)	72.52	39.83	60.23	400.74
T <sub>6</sub>	RDF+Borax (0.5%)	72.63	39.00	59.43	404.99
T <sub>7</sub>	RDF+CuSO <sub>4</sub> (0.4%)	59.23	43.24	65.87	357.55
T <sub>8</sub>	RDF+CuSO <sub>4</sub> (0.5%)	62.34	42.95	64.98	366.81
T <sub>9</sub>	RDF+FeSO <sub>4</sub> (0.4%)	67.33	42.65	64.58	377.59
T <sub>10</sub>	RDF+FeSO <sub>4</sub> (0.5%)	72.33	40.94	61.25	390.74
	<b>Mean</b>	<b>66.26</b>	<b>41.50</b>	<b>62.79</b>	<b>358.26</b>
	<b>SEM+-</b>	<b>2.28</b>	<b>1.36</b>	<b>2.13</b>	<b>14.81</b>
	<b>CD (0.05%)</b>	<b>6.77</b>	<b>4.05</b>	<b>6.35</b>	<b>44.00</b>

## CONCLUSION

On the basis of results of present investigation, it is concluded that foliar application of micronutrients coupled with RDF enhanced most of the yield attributes and yield of Brinjal cv BR- 112 (Black beauty). The crop should be sprayed thrice with RDF+ZnSO<sub>4</sub> 0.5%.

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