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## To study the assessment of foliar spray of boron and zinc in tomato for higher yield and quality improvement

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### Abstract

Quality production is very important to increase the net return. So it is necessary to maintain the different nutrient in Tomato. Therefore, the major objectives for quality tomato production by reducing the fruit cracking, spray of boron and zinc in tomato gave better performance in plant growth, good onset of flowers and fruits, minimized fruit cracking, increased fruit shining. This helps the vegetable grower to increase net return. Krishi Vigyan Kendra conducted an On Farm Trial (OFT) on 0.2% Zinc sulphate and 0.1% Boric Acid on yield and economics of tomato cultivation by controlling fruit cracking in district Sitamarhi (Bihar). The production of Tomato was recorded 355q/ha while farmers were growing average 255q/ha and fruit cracking was found only 5.6% while in the farmers field it was recorded average 54% fruit cracking.

**Keywords:** Zinc sulphate, boric acid, tomato plants

### Introduction

Maintaining the quality of tomato fruits is dependent on many environmental factors like soil moisture, temperature, humidity quality of seeds/seedlings etc. Research has shown that nutrient management is also another important economical and efficient way to increase the quality production of tomato.

In district Sitamarhi, there are large number of vegetable growers who are cultivating tomato since last 3-4 decades but in last 10 years farmers are suffering by fruit cracking, reduced fruit size, average quality etc. So farmers started to reduce the cultivated area of tomato field and incorporating other vegetables. Tomato requires both major and micronutrients for its proper plant growth. Zn plays important role in growth and development as well as carbohydrates, protein metabolism and sexual fertilization of plant (Imtiaz *et al.*, 2003; Vasconcelos *et al.*, 2011; Nagar *et al.*, 2021) [6, 13, 8] while B deficiency reduced yield and quality in tomatoes (Davis *et al.*, 2003) [5]. Balanced fertilization of macro and micro nutrients increases production (Swan *et al.*, 2001; Ali *et al.*, 2008) [12, 2] but foliar application of micronutrients is the not only efficient but also secured way (Aghtape *et al.*, 2011) [1]. The objective of the study was to evaluate the effect of foliar application of zinc and boron for higher yield and quality improvement of tomato.

### Features of Zinc and boron in the tomato cultivation

#### Zinc

- Increase fruit yield.
- Increase chlorophyll, sugar, soluble protein.
- Increase catalase activity in the leaf.
- Help to mature tomato fruits.

#### Boron

- Significantly increased the number of flowers, number of fruits per plant, fruit weight, fruit hardness and total dissolved solid content in fruit.
- Control/minimise the fruit cracking.
- Increase the movement of sugar or energy in to growing parts of plants.
- Increase pollination and seed set.
- Works as protein synthesis.

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### Importance of quality Tomato fruits

- Better market price.
- Long keeping quality.
- Obtain better net return.

### Time of foliar application of Zinc and Boron

Two times foliar application of Zinc and Boron were sprayed. First spray was done just before flowering and second spray done was 15 days after fruit setting in all three technology option TO<sub>1</sub>, TO<sub>2</sub> and TO<sub>3</sub>.

Dose of Zinc sulphate is 0.2% and Boric acid is 0.1%.

### Materials and Methods

Assessment of combined foliar application of Zinc and Boron in Tomato was studied in two different village of district Sitamarhi, one village namely Manjhaur block-Nanpur, second one is Samhauri block-Pupri. In this regard, Krishi

Vigyan Kendra Sitamarhi selected five farmers for assessing the effect of Boron and Zinc on diagnosed problems.

### Sample size and selection

Total five farmers were selected in two different village of district Sitamarhi for assessment of the study.

### Data collection

An interview schedule was used to collect information on general information including location, practice of cultivation, postharvest, market linkage etc.

Data was collected by interviewing on farmer's field, by self field visit and also partially on telephonic discussion.

### Results

Impact of combined foliar application of 0.1% Boric Acid and 0.2% Zinc sulphate.

**Table 1:** Assessment of foliar spray of Zinc and Boron were observed as follows:

Technology option	Cost of cultivation	Fruit cracking (%)	Yield(q/ha)	Gross return	Net return	BCR
Farmer's practice (no use of boron and zinc)	64,650±260.30	54±1.98	255±6.66	125,500±1,067.8	60,850±473.8	1.94±0.063
TO1 Foliar spray of 0.1% boric acid	68,750±360.79	20±0.71	285±4.28	155,700±2377.4	86,950±1580.8	2.26±0.024
TO2 Foliar spray of 0.2% zinc sulphate	68,750±315.44	22±0.71	290±3.96	156,250±816.4	87,500±828.25	2.270±0.013
TO3 (TO1 +TO2)	69,900±173.21	12±0.45	355±4.53	193,650±1104.54	123,754±1447.4	2.770±0.094
CD (5%)	626.004	3.686	11.510	4,381.796	4,185.869	0.194
CV	0.661	9.799	2.789	1.993	3.347	6.040

In the above table, performance of combined foliar spray of Zinc sulphate and Boric Acid was found better than farmers practices. Technology Option-1 and Technology Option-2 productivity by combined foliar spray was found 355q/ha compare to farmers practice 255 q/ha, Technology Option-1 285 q/ha and Technology Option-2 292 q/ha. In this regard yield increased by 39.21% of TO-3 compare to farmers practice. So combined foliar spray of 0.1% Boric Acid and 0.2% Zinc sulphate may be recommended to farmers for better result. Foliar application of zinc and boron significantly increases the yield of different crops (Singram and Prabhu, 2001; Mustafa *et al.*, 2006; Sindhu *et al.*, 1999; Patil *et al.*, 2010; Ashoori *et al.*, 2013; Ali *et al.*, 2015) <sup>[10, 7, 11, 9, 4, 3]</sup>.

### Conclusion

Foliar spray of zinc sulphate 0.2% and Boric Acid 0.1% play a crucial role to controlling fruit cracking as well as better fruit and flower setting, plant growth and quality and size of fruits. There are about 50% tomato fruits damaged due to fruit cracking which directly effected as net income as well as productivity. Such problems of farmers of district Sitamarhi may be solved by combined foliar spray of Boric Acid 0.1% and Zinc sulphate 0.2% which increase the productivity by 39.2%.

### References

1. Aghtape AA, Ghanbari A, Sirousmehr A, Siahsar B, Asgharipour M, Tavssoli A. Effect of irrigation with wastewater and foliar fertilize application on some forage characteristics of foxtail millet (*Setaria italica*). Int J Plant Physiol Biochem. 2011;3(3):34-42.
2. Ali S, Khan AZ, Mairaj G, Arif M, Fida M, Bibi S. Assessment of different crop nutrient management practices for yield improvement. Aust J Crop Sci. 2008;2(3):150-157.
3. Ali MR, Mehraj H, Jamal Uddin AFM. Effects of foliar application of zinc and boron on growth and yield of summer tomato. J Biosci Agric Res. 2015;6(1):512-517.
4. Ashoori M, Lolaei A, Zamani S, Mobasheri S. Effect of N and Zn on quantity and quality characters of grapevine (*Vitis vinifera*). Int J Agri Crop Sci. 2013;5(3):207-211.
5. Davis JM, Sanders DC, Nelson PV, Lengnick L, Sperry WJ. Boron improves growth, yield, quality and nutrients contents of tomato. J Am Soc Hort Sci. 2003;128(3):441-446.
6. Imtiaz M, Alloway BJ, Shah KH, Siddiqui SH, Memon MY, Aslam M, Khan P. Zinc nutrition of wheat: Growth and zinc uptake. Asian J Plant Sci. 2003;2(2):152-155. <http://dx.doi.org/10.3923/ajps.2003.152.155>
7. Mustafa EAM, El-shamma MS, Hagass LF. Correction of boron deficiency in grape vines of Bez El-Anze cultivar. Am-Eur J Agric Environ Sci. 2006;1(3):301-305.
8. Nagar V, Kumar S, Bagri UK, Bunker RR, Rana H. Assessment of Effect of Foliar Spray of Zinc Sulphate on Fruit Quality of Tomato under Polyhouse. Int J Curr Microbiol App Sci. 2021;10(02):2376-2383.
9. Patil VK, Yadlod SS, Kadam AS, Narsude PB. Effect of foliar application of micronutrients on yield and quality of tomato (*Lycopersicon esculentum* Mill.) cv. Phule Raja. Asian J Hort. 2010;2(4):458-460.
10. Singram P, Prabhu PC. Effect of zinc and boron on growth and quality of grapes cv. Muscat. Madras Agric J. 2001;88(4-6):233-236.
11. Sindhu PC, Ahlawat VP, Nain AS. Effect on yield and fruit quality of grapes (*Vitis vinifera* L.) cv. Perlette. Haryana J Hort Sci. 1999;28(2):19-21.
12. Swan ZM, Hafez SA, Basyony AE. Effect of phosphorus fertilization and foliar application of chelated zinc and

- calcium on seed, protein and oil yield and oil properties of cotton. *J Agric Sci.* 2001;136:191-198.
13. Vasconcelos ACF, Nascimento CWA, Filho FC. Distribution of zinc in maize plants as a function of soil and foliar Zn supply. *Inter Res J Agric Sci Soil Sci.* 2011;1(1):1-5.