Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; SP1: 156-158

Anubhav Singh
Department of Agriculture
Baba Farid College, Deon,
Punjab, India

Gurpinder Kaur
Department of Agriculture
Baba Farid College, Deon,
Punjab, India

Correspondence
Anubhav Singh
Department of Agriculture
Baba Farid College, Deon,
Punjab, India

(Special Issue- 1)
2nd International Conference
"Food Security, Nutrition and Sustainable Agriculture - Emerging Technologies"
(February 14-16, 2019)

Effect of foliar application of micronutrients on yield and quality of guava cv. Sardar

Anubhav Singh and Gurpinder Kaur

Abstract
The present investigation entitled "Effect of foliar application of micronutrients on yield and quality of guava cv. Sardar" was conducted in a well maintained Orchard of Khalsa College, Amritsar during 2015-16. 30 guava trees with uniform size and vigour were selected and were sprayed with different concentrations of different nutrients ($ZnSO_4$ @ 0.50 %, 0.75 % and 1.0 %), ($MgSO_4$ @ 0.50 %, 0.75 % and 1.0 %) and (H_3BO_3 @ 0.50 %, 0.75 % and 1.0 %) at fruit set to find out optimum concentrations of these chemicals for improving yield and quality. The investigation was laid out in RBD (Randomised Block Design) with 10 treatments which replicated thrice. Fruits were analysed for their physical and biochemical characteristics in the laboratory of Department of Horticulture, Khalsa College Amritsar. The results of present study revealed that the fruit physical characters i.e. fruit length (8.20 cm), fruit breadth (7.30 cm), weight (250 g), volume (227.30 cc) and yield (98.03 kg per tree)were improved significantly with use of zinc sulphate 1.0 per cent and biochemical characters as TSS (10.46 %) was improved significantly under treatment T_8 (B @ 0.75 %) and total and reducing sugars were increased to a maximum 7.20 per cent and 5.16 per cent respectively with the application of B @ 1.0 per cent.

Keywords: Zinc sulphate, magnesium sulphate, boron

Introduction
Guava is one of the most common and important fruit crop cultivated all over India. Although it is hardy and can grow under marginal soil conditions. It responds well to nutrient application. To obtain higher yields, micronutrients are becoming necessary in fruit crop nutrition. Zinc is one of the essential micronutrient for plant growth, flowering and yield characters in guava. Zinc plays a part in improving fruit TSS, acidity, sugars, vitamin C and pectin content (Waskela *et al*., 2013) [6]. Magnesium on the other hand is a constituent of chlorophyll, protoplasm and chromosomes (Salaria and salaria, 2010) [5]. Boron on the other hand increases berry size and weight and improves quality of fruits (Nikkhah *et al*., 2013) [3]. The foliar feeding of fruit trees has gained much importance in recent years, as nutrients applied through soil are needed in high quantities due to leaching. Keeping this in view, the present investigation was undertaken to study the effect of foliar application of Zn, Mg and B on yield and quality of guava.

Material and methods
The experiment was carried out during 2015-16 at the experimental Orchard of Khalsa College Amritsar. The experiment was laid out in a randomized block design with ten treatments replicated three times. The trees were sprayed with zinc sulphate, magnesium sulphate and boric acid at three concentrations i.e 0.50, 0.75 and 1.00 per cent. Three trees were sprayed with zinc sulphate at 0.50 per cent, another three trees with zinc sulphate at 0.75 per cent and other trees were sprayed with zinc sulphate at 1.00 per cent. Similarly 18 other trees were sprayed with magnesium sulphate and boric acid and remaining three trees were selected for control. Only mrig bahar flush was taken for study and trees were sprayed twice once in september and then in October. The experimental details are discussed here under

Treatments		Concentration
T_1	Zinc Sulphate	0.50 %
T_2	Zinc Sulphate	0.75%
T_3	Zinc Sulphate	1.00%
T_4	Magnesium Sulphate	0.50%
T_5	Magnesium Sulphate	0.75%
T_6	Magnesium Sulphate	1.00%
T_7	Boric acid	0.50%
T_8	Boric acid	0.75%
T_9	Boric acid	1.00%
T_{10}	Control plain water only	

Results and Discussion

Treatments	Length (cm)	Breadth (cm)	Weight (gm)	Volume (cc)	Specific gravity(g/cc)	Firmness (Kg/cm^2)	Seed count	Yield (kg/tree)
T_1- $ZnSO_4$ @ 0.50%	7.70	6.30	215.00	196.00	1.09	2.16	235.33	83.47
T2-ZnSO4 @ 0.75%	8.00	6.50	230.00	204.00	1.13	2.26	276.33	90.47
T_3 –$ZnSO_4$ @ 1.0%	8.20	7.30	250.00	227.30	1.09	2.86	290.67	98.03
T_4 $MgSO_4$ @ 0.50%	7.19	5.50	177.00	162.70	1.08	2.87	249.33	64.33
T_5-$MgSO_4$ @ 0.75%	7.26	5.74	185.00	177.90	1.03	2.83	266.33	70.33
T_6-$MgSO_4$ @ 1.0%	7.37	6.32	193.30	189.70	1.01	2.80	286.33	75.57
T_7-B@0.50%	6.53	5.40	158.30	151.73	1.04	2.86	270.33	80.73
T_8- B @ 0.75%	6.62	5.67	165.10	161.90	1.02	2.93	276.33	86.00
T_9- B @ 1.0%	6.73	5.39	170.00	163.30	1.04	2.93	279.33	89.73
T_{10}-control	5.86	4.00	155.00	131.33	1.18	2.33	328.67	63.33
Mean	7.14	5.80	189.87	176.59	1.24	2.69	279.89	79.56
CD (p=0.05)	0.69	0.78	56.28	34.96	NS	NS	NS	9.22

The yield and quality parameters were most effected by the application of zinc and boron. The physical parameters of fruits namely fruit size, weight, volume, were significantly affected by the application of zinc sulphate. The maximum fruit size i.e length (8.20 cm) and breadth (7.30 cm) was recorded with the application of zinc sulphate at 1.00 per cent. The increase in fruit size would be possibly due to the stimulation of fruit flesh by zinc sulpate. The results of this study were found by Parmar *et al* (2014) [4].

The volume of guava fruits was observed maximum i.e 227.30 cm^3 with the application of zinc sulphate at 1.00 per cent. Similarly, the fruit weight was recorded maximum i.e. 250 g with 1.00 per cent zinc sulphate. The increase in fruit volume and weight might be due to increase in metabolites and amount of stored food with the effect of zinc sulphate Parmar (2014) [4]. Specific gravity, firmness and seed count were unaffected by the application of either of the chemicals. The fruit yield of the trees was most affected by the treatment of zinc sulphate at 1.00 per cent.

Treatments	TSS (%)	Titrable acidity (%)	TSS: Acid	Organoleptic rating	Fruit colour	Total sugars (%)	Reducing sugars (%)
T_1- $ZnSO_4$ @ 0.50%	9.10	0.43	82.70	3.40	2.67	4.20	3.40
T2- ZnSO4 @ 0.75%	8.06	0.41	98.53	5.23	2.47	4.33	3.63
T_3 – $ZnSO_4$ @ 1.0%	10.06	0.45	83.11	5.53	2.20	4.70	3.96
T_4 –$MgSO_4$ @ 0.50%	9.30	0.44	70.59	6.13	3.33	4.96	3.93
T_5- $MgSO_4$ @ 0.75%	8.60	0.37	118.20	6.67	3.60	5.06	4.06
T_6- $MgSO_4$ @ 1.0%	8.47	0.35	127.93	7.03	3.70	5.33	4.26
T_7- B @0.50%	9.20	0.40	111.83	7.77	4.30	6.23	4.83
T_8- B @ 0.75%	10.46	0.35	173.33	8.47	4.50	6.83	5.03
T_9- B @ 1.0%	8.73	0.32	119.63	9.5	4.80	7.20	5.16
T_{10}- control	7.23	0.38	94.13	1.77	3.20	4.33	2.86
Mean	8.92	0.39	108.05	6.27	3.48	5.32	4.12
CD (p=0.05)	1.48	NS	NS	0.69	0.32	1.35	1.11

The chemical characters i.e. titrable acidity was minimum under the application of boric acid at 1 per cent. The TSS of the fruits was maximum (10.46 %) under the treatment of boric acid at 0.75 per cent increase. The increase in the amount of total soluble solids might be due to the role of boron in transmembrane sugar transport (Gaur *et al* 2014) [2]. The organoleptic rating of the guava fruits were most affected by the application of boric acid at 1.00 per cent. On the other hand the TSS: acid ratio remained unaffected by the application of either of chemicals.

The sugars (total and reducing) in the guava fruits were increased by the treatment of boric acid at 1.00 per cent to as maximum as 7.20 per cent (total sugars) and 5.16 per cent (reducing sugars). The increase in the sugars by the action of boric acid might be due to the translocation of photosynthates by the regulation of boron (Arora *et al* 1972) [1].

Conclusion

According to the results of the present study, it can be concluded that physical characters *viz*. fruit size, weight, volume and yield were significantly affected by the application of zinc sulphate at 1.00 per cent. On the other hand biochemical characters like TSS, titrable acidity, TSS: acid, reducing and total sugars and organoleptic rating were significantly affected with the application of boric acid at 1.00 per cent (sugars and titrable acidity) and at 0.75 per cent (TSS and TSS: Acid).

References

1. Arora JS, Singh JS Responses of guava (*Psidium guajava* L.) to boron spray Japan Soc. Hort Sci. J. 1972; 41:239-244.
2. Gaur Brijesh, Veer Karma, Hada TS, Kanth Neeharika, Syamal MM. Studies on the effect of foliar application of

nutrients and GA_3 on fruit yield and quality of winter season guava Inter J of Env Sci. 2014, 479-483.
3. Nikkhah Rahim, Nafar Hoda, Sasan Rastgoo, Dorostkar Molslem. Effect of foliar application of born and zinc on qualitative and quantitive fruit characterstics of grapevine (*Vitis vinifera* L.) Inter J Agri And Crop Sci. 2013; 6-9:485-492.
4. Parmar JM, Karetha KM, Rathod PJ. Effect of foliar spray of urea and zinc on growth and flowering attributes of guava (*Psidium guajava*) cv. Bhavnagar Red Ind. J Horti. 2014; 5:140-143.
5. Salaria AS, Salaria BS. A_2Z solutions Fruits and Plantation crops Kalayani publications, 2010, 352p.
6. Waskela RS, Kanpure RN, Kumawat BR, Kachouli BK. Effect of foliar spray of micronutrients on Growth, yield and quality of guava (*Psidium guajava* L.) cv. Dharidar Int. J Agri Sci. 2013; 9:551-556.