Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(2): 3136-3138
Received: 13-01-2018
Accepted: 14-02-2018

Neeraj Kumar Maurya
Department of Fruit Science, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Bhanu Pratap
Department of Fruit Science, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Abhinav Kumar
Department of Floriculture and Landscaping, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Dheeraj Yadav
Department of Fruit Science, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Shiv Praksh Shrivastav
Department of Genetics and Plant Breeding, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Abdul Mazeed
IIAST, Intergal University, Dasauli, Lucknow, Uttar Pradesh, India

Correspondence
Neeraj Kumar Maurya
Department of Fruit Science, Narendra Deva University of Agriculture & Technology, Faizabad, Uttar Pradesh, India

Effect of zinc sulphate and gibberellic acid on chemical attributes of winter season guava (*Psidium guajava* L.) *Cv*. Allahabad safeda

Neeraj Kumar Maurya, Bhanu Pratap, Abhinav Kumar, Dheeraj Yadav, Shiv Praksh Shrivastav and Abdul Mazeed

Abstract
The present investigation was carried out at the Effect of Zinc sulphate and Gibberellic acid on Chemical attributes of Winter Season Guava (*Psidium guajava* L.) cv. Allahabad Safeda" at the Main Experiment Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during the year 2015-2016. The experiment was conducted in Randomized Block Design with seven treatments and replicated in three times, considering one plant as a unit. The observations were recorded for chemicals attributing characters of guava fruits. The maximum fruit size (6.30), weight (110.21), volume (110.35) and diameter (6.87) were recorded with foliar application of GA_3@150ppm. Better quality fruits with respect to highest specific gravity (0.998) were recorded with GA_3@150ppm. The fruit yield was also recorded maximum with the combined spray of GA_3@150ppm. Overall it can be concluded that application of GA_3@150ppm judged the best for higher fruit yield, production and better fruit quality of guava.

Keywords: zinc sulphate, gibberellic acid, total soluble solid, acidity, ascorbic acid and total sugars

Introduction
Guava (*Psidium guajava* L.), "the apple of the tropics", is one of the most common fruits in India. The guava belongs to the family 'Myrtaceae'. It is originated from tropical America and is a subtropical, hardy, evergreen fruit tree. The Guava covers an area of 2.20 Lac ha. Bihar has largest area covering about 29.2 thousand ha. followed by Uttar Pradesh (39.9 thousand ha.) and Karnataka (7.2 thousand ha.) The average productivity of guava is 12 mt/ha. The productivity is higher in M.P, i.e. 29 mt/ha (Misra and Singh, 2005). Guava produced in Allahabad region of U.P. is best in the quality in the world (Chadha, 2001). It is highly tolerant to alkaline and saline soils and it can be grown successfully even upto pH 8.5, it can withstand to the maximum temperature at 46ºC, even with scantly rainfall of less than 25 cm. Guava in one of the cheapest and good source of Vitamin-C and pectin. The ripe guava contains 86.9% moisture, 19.3% dry matter, 0.76% ash, 0.40% crude fat, 1.13% crude protein and 6.2% crude fiber but its composition varies widely with cultivars, stage of maturity and season (Ghosh and Chattopadhyay, 1996) [4]. They also content 8.2 to 10.5 0Brix total soluble solids, 4.9 to 10.1 per cent total sugar content, 0.22 to 0.39 per cent acidity and 260 mg/100g of fruit pulp content ascorbic acid (Mitre, 1999) with good amount of iron, calcium and phosphorus. In northern India, guava flowers mainly twice in a year, April-May which provides the crop in. rainy season, whereas, August-September flowering gives the winter season crop. In Maharashtra and Tamil Nadu, there is a third crop produced with flower appearing in October-November. The natural fruits setting in guava are quite high (80-86%) of which only 34-36% fruit reach maturity. Guava fruits are consumed either fresh or processed in the form of product like jam, jelly, nectar and good quality RTS beverages. The rainy season crop of guava is rough, insipid, poor in quality, less nutritive and it is attacked by several insect-pest and diseases. On the other hand, winter season crop is superior in quality, free from the pest and diseases, having long storage life. It further needs improvement in nutritive value, market value and demand so that it fetches more prices in market as compared to the rainy season crop. Recently it was observed that foliar application of plant growth regulator (GA_3) exerted favorable effect on the physico--chemical characters of guava fruits at harvest (Kher *et al*., 2005) [5]. Micronutrients such as Zinc play important role in growth and development of fruits, vegetables and cereals. It is one of the essential elements for the formation of chlorophyll and hence useful towards photosynthetic activity. Zinc is a constituent of some enzymes and possibly takes part in synthesis on Indol Acetic Acid in plant. The objective of study is to find out the effect of

$ZnSO_4$ and GA_3 on quality of winter season guava fruit.

Materials and Methods

The present investigation was under taken at Main Experimental Station, Horticulture, N.D.U.A.&T., Kumarganj, Faizabad (U.P.) India during summer season of 2016- 17. Geographically, it is situated in typical saline alkali belt of Indo-gangetic plains of eastern U.P. at 26.47 N latitude, 88.12 ^{0}E longitudes and at an altitude of 113 meter from mean sea level. The region enjoys sub humid and subtropical climate receiving a mean annual rainfall of about 1215 mm out of which about 85% is concentrated from mid June to end of September with an average annual rainfall of 764.01mm and relative humidity of 66.76 per cent. The winter months prevails from November to March with mild to severe cool temperature ranging from 17.9 to 33.10C. The severe cold temperature 17.90C was recorded in the month of January and occasionally winter rains and frost was also noticed. The summer months occur from April to June with an average temperature of 39.2 to 41.4 0C. The dry and hot wind waves were also noticed in the months of mid May and June. The experiment was conducted with seven treatments consists three levels of each mineral nutrients and plant growth regulator. Zinc sulphate ($ZnSO_4$) (0.5%, 1.0 % and 1.5%), Gibberellic Acid (GA_3) (50ppm, 100ppm and 150ppm), and plants sprayed with water served as the control in R.B.D. with three replication. Above solution, with different concentrations were sprayed by foot sprayer in the morning hours and the selected plants were fully drenched and the control plants sprayed with water only which were applied after fruit set at walnut stage. The observations were recorded on Total soluble solids, Acidity, Ascorbic acids and Total sugars of fruit. Statistical analyses of the data obtained in the different sets of experiments were calculated, as suggested by Panse and Sukhatma (1989) [9].

Table 1: Effect of zinc sulphate and gibberellic acid on chemical attributes of winter season guava (*Psidium guajava* L.) cv. Allahabad Safeda.

Treatments	T. S. S. (ºBrix)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugars (%)	Acidity (%)	Ascorbic acid (mg/100g pulp)
T_1 : Control	9.90	4.47	2.85	7.32	0.53	190.88
T_2 : $ZnSO_4$ (0.5%)	10.35	4.86	3.07	7.93	0.51	202.55
T_3 : $ZnSO_4$ (1.0%)	10.83	5.02	3.22	8.24	0.49	218.93
T_4 : $ZnSO_4$ (1.5%)	11.23	5.15	3.31	8.46	0.46	226.75
T_5 : GA_3 (50ppm)	12.43	5.36	3.44	8.80	0.42	232.02
T_6 : GA_3 (100ppm)	13.14	5.68	3.54	9.22	0.39	239.30
T_7 : GA_3 (150ppm)	13.27	5.78	3.86	9.64	0.36	247.19
S.Em. ±	0.180	0.102	0.164	0.170	0.024	0.417
C.D. at 5%	0.557	0.337	0.509	0.510	0.020	1.282

Results and Discussion

The statistical analysis of data (Table-1) revealed that the maximum (13.27ºBrix) accumulation of total soluble solids content in guava fruit was noted with the spray of GA_3 150 ppm. While, minimum (9.90ºBrix) total soluble solids were obtained with the control. Similar pattern in respect to total sugars content was also noted for increasing both reducing and non-reducing sugar contents in guava fruit as influenced by different treatments. The highest (9.64 %) total sugars content were recorded with the spray of GA_3 (150ppm) and minimum (7.32%) total sugars content were obtained with control treatment. The reason for increase in total soluble solids content of fruit may be due to fact that nutrients and plant growth regulators played important role on photosynthesis which ultimately lead to the accumulation of carbohydrates and attributed to increase in T.S.S. of fruit. These results are in similar with the finding of $ZnSO_4$ and GA_3 may be attributed to the quick metabolic transformation of starch and pectin into soluble compounds and rapid translocation of sugars from leaves to developing fruits. These results are in line with those of Brahmachari *et al.* (1996) [1] who reported increase in T.S.S. and total sugars contents with spray of GA_3 at 100ppm in guava. Kumar Further *et al.* (1998) and Kher *et al.* (2005) [5] reported increased T.S.S. and total sugars contents with higher dose of gibberellic acid in guava.

The results revealed that the acidity content in fruits was not significant by the different treatments. The low (0.36%) acidity per cent was noted with the foliar application of $ZnSO_4$ and GA_3. However, the highest (0.53%) acidity was noted with the control (water spray). Decrease in acidity with foliar application of $ZnSO_4$ and GA_3 might be due to increase in translocation of carbohydrate and increase metabolic conversion from acidity to sugars. The ascorbic acid content significantly influenced by spraying of different treatments. The maximum (247.19 mg/100g pulp) ascorbic acid content in guava fruit was recorded with the spraying of $GA_3$150ppm. However, minimum (190.88 mg/100g pulp) ascorbic acid was recorded in control. The increased ascorbic acid content of fruit juice was due to catalytic activity of gibberellin and auxin on its bio-synthesis from its precursors (glucose 6-phosphate) or inhibition of its conversion into dehydro ascorbic acid by enzyme ascorbic acid oxidase or both Brahamchari and Rani (2001) [2]. Yadav *et al*. (2001) [10] and Kher *et al*. (2005) [5] in guava also observed increase in ascorbic acid contents with GA_3 application. Based on present investigation it can be concluded that foliar application of 150ppm GA_3 was proved to be most effective to increase the qualitative characters of fruit viz. total soluble solids, reducing sugars, non-reducing sugar, total sugars, ascorbic acid (Vitamin-C) and maximum fruit yield besides, acidity in the fruit was drastically reduced.

References

1. Brachmachari VS, Mandel AK, Kumar R, Rani R. Effect of growth substances on flowering and it characters of Sardar guava. Hort. J. 1996; 9(1):1-7.
2. Brahamchari VS, Rani R. Effect of growth substances on cracking and physico-chemical composition of Litchi. Orissa J. Hort. 2001; 29(1):44-45.
3. Chadha KL. Handbook of Horticulture, I.C.A.R. New Delhi-110012, 2001, pp. 2-10.
4. Ghosh SN, Chattopadhyay N. The Hort. J. 1996; 9:121-127.
5. Kher R, Shoo-Baht Wali VK. Effect of foliar application of GA3, NAA and CCC on physico-chemical

characteristics of guava cv. Sardar. Haryana J. Hort. 2005; 34(1/2):31-32.
6. Kumar R, Chauhan KS, Sharma S. A note on the effect of zinc sulphate on berry set, panicle drying and quality of gapes cv. Gold. Haryana J. Hort. Sci. 1998; 17(3-4):213-215.
7. Mishra LN, Singh SK, Sharma HC, Goswami AM, Pratap Bhanu. Effect of micronutrients on fruit yield and quality of Kinnow mandarin under high density planting. Indian J. Hort. 2003; 60(2):131-134.
8. Mitra SK. In: Tropical Horticulture Vol. I (Eds: T.K. Bose, S.K. Mitra, A.A. Farooqui and M.K. Sandhu) Nayak Prakash, Calcutta, 1999, pp. 297-307.
9. Panse VG, Sukhatme PV. Statistical methods for agricultural workers, Indian Council of Agricultural Research, New Delhi. 1989; 2:197.
10. Yadav S, Bhati SK, Godara RK, Rana GS. Effect of growth substance on the yield and quality of winter season guava cv. L-49. Haryana J. Hort. Sci. 2001; 30:1-2.