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Dodiya KD
Department of Horticulture, College of Agriculture, J. A. U, Junagadh, Gujarat, India

Dalvadi AC
Department of Horticulture, College of Agriculture, J. A. U, Junagadh, Gujarat, India

Halepotara FH
Department of Horticulture, College of Agriculture, J. A. U, Junagadh, Gujarat, India

Solanki PS
Department of Horticulture, College of Agriculture, J. A. U, Junagadh, Gujarat, India

Correspondence
Dodiya KD
Department of Horticulture, College of Agriculture, J. A. U, Junagadh, Gujarat, India

Effect of foliar application of plant growth regulators and boron on quality of guava (*Psidium guajava* L.) CV. L-49

Dodiya KD, Dalvadi AC, Halepotara FH and Solanki PS

Abstract
An experiment was undertaken to study the effect of Plant Growth Regulators and Boron on growth and yield of guava during winter season of the year 2015 *Khengarvav* farm, Department of Horticulture, Junagadh Agricultural University, Junagadh. The experiment was laid out in a Randomized Block Design (RBD) with three replications and nine treatments Results of the experiment Quality parameter in terms of Vitamin -C content was noted maximum (178.93 mg/100g pulp and 175.48 mg/100g pulp), on 4th and 6th days after storage, respectively, total soluble solid (12.72 °Brix on and 12.80 °Brix) 4th and 6th days respectively, non-reducing sugar (2.68%, 3.02%) 4th and 6th days respectively, pectin content (0.753% and 0.710%) on 4th and 6th days after storage respectively, whereas, minimum acidity was (0.27% and 0.24%) was recorded in NAA 100 ppm. Foliar application boron 0.2% treatment noted the highest reducing sugar (4.57% and 4.74%), total sugar (6.90% and 7.12%) 4th and 6th days after storage, respectively. The maximum TSS: acid ratio was observed under treatment NAA 40 ppm (51.67%) at 4th days after storage and CCC 500 ppm (40.45%) at 6th days after storage.

Keywords: guava, plant growth regulators, boron, quality

Introduction
The guava is the native of tropical America from where it was introduced during 17th century in India by the Portuguese people. It was largely grown in warm tropical countries of the world but now it is grown all over the tropical and subtropical regions and in all parts of India. Much of the interest in common guava has been due to its delightful taste and flavor. It is the fruit that has often been referred to as the "Apple of the tropics". Fruits are nature's gift to mankind. These are not only delicious and refreshing but are also the chief source of vitamins, minerals and proteins. These constituents are essential for normal physiological well-being and help in maintaining healthy state through development of resistant against pathogen. Carbohydrates and fats are the chief sources of energy therefore, are essential for keeping good health. Boron increase nitrogen availability to the plant, act as a regulator of potassium and calcium ratio in plant, help in nitrogen absorption and translocation of sugar in plant. Nitrogen is essential for plant growth, zinc for growth and development, boron for effective fruit set and potassium is necessary for photosynthetic activities and translocation of photosynthates influencing the quality attributes.

Materials and Methods
The resent investigation entitled effect of plant growth regulators and boron on growth and quality of winter season guava (*Psidium guajava* L.) cv. L-49 was under taken during the year 2015 at the Horticulture Instruction Farm, Khengarvav Junagadh Agricultural University, Junagadh, Gujarat. The experiment was conducted in 8 year old guava orchard planted at 6 x 6 m distance. The experiment was laid out in a Randomized Block Design (RBD) with three replications and nine treatments *viz.* T_1- Control, T_2- GA_3 50 ppm, T_3- GA_3 100 ppm, T_4 – NAA 40 ppm, T_5- NAA 100 ppm, T_6 - CCC 500 ppm, T_7 –CCC 750 ppm, T_8- Boron 0.2%, T_9- Boron 0.4%. At three spray on first week of June, July and August. An observation should be taken 4th and 6th days after taken. Stastical analysis was taken by Panse and Sukhatme methods.

Result and Discussion

Significantly the maximum Vitamin -C content was noted in NAA 100 ppm *i.e* 178.93 mg/100g pulp and 175.48 mg/100g pulp 4th and 6th days after storage and Which was found at par with GA_3 100 ppm (168.85 mg/100g pulp), NAA 40 ppm (172.77 mg/100g pulp) and CCC 500 ppm (170.85 mg/100g pulp). On 4th days after storage and NAA 40 ppm (169.37 mg/100g pulp) in 6th days after storage control recorded significantly the minimum vitamin-C value *i.e* 143.89 mg/100g pulp 137.45 mg/100g pulp at 4th and 6th days after storage respectively. Minimum acidity observed that NAA - 100 ppm recorded *i.e* 0.27% and 0.24% in 4th and 6th days after storage. at par with GA_3 100 ppm (0.28%) and CCC 750 ppm (0.29%) for 4th days after storage and GA_3 100 ppm (0.25%), boron 0.2% (0.27%) and boron 0.4% (0.28%) for 6th day after storage of guava fruit.

In application of NAA 100 ppm was astimated significant the highest total soluble solid *i.e.* 12.72 °Brix on and 12.80 °Brix 4th and 6th days after storage respectively and which was at par with GA_3 100 ppm (12.21°Brix), NAA 100 ppm (12.72°Brix), boron 0.4% (12.71°Brix), in 4th days after storage and GA_3 100 ppm (12.35°Brix), NAA 100 ppm (12.92°Brix), CCC 500 ppm (12.70°Brix), CCC 750 ppm (12.16°Brix), in 6th days after storage of fruit. NAA 100 ppm highest reducing sugar *i.e* 2.68%, 3.02%, 4th and 6th days respectively. Which was at par GA_3 50 ppm (2.28%), CCC 750 ppm (2.39%), boron 0.2% (2.33%), boron 0.4% (2.66%) in 4th days, GA_3 50 ppm (2.63%), GA_3 100 ppm (2.40%), CCC 500 ppm (2.58%), CCC 750 ppm (2.84%) boron 0.2% (2.47%), boron 0.4% (2.99%) where, the minimum non reducing sugar control. The maximum pectin content was recorded in treatment NAA 100 ppm (0.753% and 0.710%) on 4th and 6th days after storage, respectively and same treatment was at par in GA_3 100 ppm (0.737%), and NAA 40 ppm (0.723%) at 4th days after storage and GA_3 100 ppm (0.680%) NAA 40 ppm (0.667%) at 6th days after storage. The variation in decreasing trend of ascorbic acid might be due to different leval of oxidation in different treatments. During storage, oxidizing enzymes like ascorbic acid oxidase, peroxidase, catalase and polyhenol oxidase might be causing decrease in ascorbic acid of the fruits. Similar result were also found by Brahmachari *et al.* (1995), Yadav *et al*. (2001) [11], Arora and Singh (1972) [5], and Garasiya *et al.* (2013) [8] in guava.

The maximum TSS : acid ratio content was observed in treatment of NAA 40 ppm (51.67%) at 4th days after storage and CCC 500 ppm (40.45%) at 6th days after storage, which was at par in with GA_3 100 ppm (40.05%), NAA 100 ppm (36.12%), CCC 750 ppm (37.40%), boron 0.2% (37.38%) in 6th days, minimum TSS: acid ratio was observed in 4th days control (28.10%) and NAA 40 ppm (28.42%) in 6th days, this leads to the biochemical reactions including conversion of complex food material *i.e* starch into simple substances like sugars. These result are in close conformity with finding of Agnihotri *et al.* (2011) [3], and Abhijit *et al.* (2010) [6] in guava.

Boron 0.2% was recorded the highest total sugar *i.e* 6.90% and 7.12%, 4th and 6th days after storage, respectively, and it was at par with NAA 40 ppm (6.61%), CCC 500 ppm (6.89%), CCC 750 ppm (6.87%) on 4th days, and CCC 500 ppm (6.97%), CCC 750 ppm (6.91%), at 6th days after storage. Where, as the minimum total sugar NAA 100 ppm (5.43% and 5.50%) was found in NAA 100 ppm treatment at 4th and 6th days after storage. Boron this leads to the biochemical reactions including conversion of complex food material *i.e.* starch into simple substances like sugars. This is due to its action on converting complex substance into simple ones, which enhance the metabolic activities in fruits and it result in increase total sugar. Boron is associated with the development flavo-proteins. These result are in close conformity with finding of Brijesh *et al.* (2014) [7], Trivedi *et al.* (2012) [10], Rawat *et al.* (2006) [9], in guava, Ghosh and Bersa (2009) [12] in sweet orange.

Foliar application boron treatment an application boron 0.2% treatment noted the highest reducing sugar (4.57% and 4.74%) at 4th and 6th days after storage respectively which was at par with NAA 100 ppm (4.52%), NAA 40 ppm (4.34%), CCC 500 ppm (4.35%). On 4th days. NAA 40 ppm (4.50%), CCC 500 ppm (4.73%), NAA 40 ppm (4.50%), NAA 100 ppm (4.53%), boron 0.4% (4.66), in 6th days. Where, the minimum reducing sugar was recorded in control (3.92% and 4.17%) at 4th and 6th days after storage respectively. The might be due to that zinc promoters hydrolysis of starch into sugars. These results are in agreement with the findings of Brahamachri *et al.* (1997), Arora and Singh (1972) [5], and Yadav *et al*. (2006) in guava fruits.

Table 1

Treatments	Vitamin - c		Acidity (%)		T.S.S (°Brix)		Reducing sugar (%)		Non Reducing sugar (%)		Total sugar (%)		Pectin content (%)		TSS: acid ratio	
	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days	4th Days	6th Days
T_1 : Control	143.89	137.45	0.41	0.39	11.17	11.55	3.92	4.17	1.51	1.87	5.75	5.81	0.623	0.603	28.10	35.13
T_2 : GA_3 50 ppm	155.46	144.54	0.32	0.30	11.46	11.85	4.13	4.25	2.28	2.63	6.18	6.22	0.607	0.590	26.45	28.52
T_3 : GA_3 100 ppm	168.85	149.41	0.28	0.25	12.21	12.35	4.27	4.35	1.91	2.40	6.44	6.43	0.737	0.680	34.33	40.05
T_4 : NAA 40 ppm	172.77	169.37	0.35	0.32	11.23	12.21	4.34	4.50	2.68	3.02	6.61	6.37	0.723	0.667	51.67	28.42
T_5 : NAA 100 ppm	178.93	175.48	0.27	0.24	12.72	12.92	4.52	4.53	1.77	1.94	5.43	5.50	0.753	0.710	28.09	36.12
T_6 : CCC 500 ppm	170.85	142.67	0.33	0.31	12.36	12.70	4.35	4.73	2.20	2.58	6.89	6.97	0.670	0.597	45.88	40.45
T_7 : CCC 750 ppm	153.67	151.97	0.29	0.32	11.69	12.16	4.26	4.36	2.39	2.84	6.87	6.91	0.597	0.543	30.02	37.40
T_8 : Boron 0.2%	144.33	143.34	0.32	0.27	11.83	11.85	4.57	4.74	2.33	2.47	6.90	7.12	0.570	0.497	36.34	37.38
T_9 : Boron 0.4%	162.56	153.82	0.32	0.28	12.71	12.80	4.23	4.66	2.66	2.99	6.23	6.32	0.640	0.593	34.20	31.56
S.Em. ±	4.82	3.90	0.01	0.02	0.31	0.28	0.08	0.10	0.20	0.22	0.15	0.18	0.022	0.018	1.70	1.74
C.D. at 5%	14.31	11.58	0.04	0.05	0.93	0.85	0.24	0.29	0.59	0.64	0.46	0.54	0.065	0.054	5.07	5.16
C.V. (%)	5.17	4.44	7.20	10.09	4.53	4.02	3.31	3.76	15.6	14.84	4.21	4.90	5.760	5.190	8.43	8.60

Conclusion

From the forgoing discussion, it can be concluded that spraying of plant growth regulators and micro-nutrient like boron, significantly influenced the physical and quality parameters of guava cv. L-49. Better performance in majority of parameters like acidity, Vitamin –C, reducing sugar, pectin content, were obtained when sprayed with 100 ppm NAA and TSS : acid ratio, total sugar reducing sugar, and at three time of spray on last week of June, July, and August. However maximum number of fruits per plant, fruit length, minimum spoiled fruit, by CCC 750 ppm and followed by NAA 100 ppm treatment.

References

1. Anonymous. Horticultural database, National Horticultural Board, Ministry of Horticulture, New Delhi, 2014. http: www.nhb.gov.in.
2. AOAC. Official Method of Analysis. Association of official analytica chemists, Washington, D. C., 1970; 16:37.
3. Agnihotri A, Tiwari R, Singh OP. Effect of crop regulators on growth yield and quality of guava cv. Chittidar. Annals Plant and Soil Res., 2011; 15(1):54-57.
4. Anonymous. Director of Horticulture, Gujarat State, Gandhinagar. Source, www.nhbdatabase.gov.in, 2014.
5. Arora JS, Singh JS. Response of guava (P*sidium guajava* L.) to boron sprays. J Japan Soc. Hort. Sci. 1972; 41(3):239-244.
6. Abhijit D, Vanajalatha K, Umarfarooque M, Mallikarjun R. Effect of NAA, GA_3, kinetin and ethrel on yield and qualityin phalsa. The Asian J Hort. 2010; 6(2):474-477.
7. Brijesh G, Tejraj H, Karma B, Neeharika, Syamal MM. Studies on the effect of foliar application of micronutrient and GA_3 on yield and reproductive parameters of winter season guava. Indian J. Horti. 2014; 7(21):3386-3389.
8. Garasiya VR, Patel NM, Bhadauria HS, Wankhade VR. Studies of plant growth substances on the yield components of winter season guava cv. L-49(Sardar). The Asian J of Horti. 2013; 9(1):114-116.
9. Rawat V, Tomar YK. Influence of foliar application of micronutrients on the fruit quality of guava cv.L-49. Journal of Hill Agric. 2006; 1(1):75-79.
10. Trivedi N, Singh D, Bhadur V, Prasad VM, Collis JP. Effect of foliar application of zinc and boron on yield and fruit quality of guava (*Psidium guajava* L.). Horti flora research Spectrum. 2012; 1(3):281-283.
11. Yadav S, Bhatia SK, Godara RK, Rana G. Effect of growth regulators on the yield and quality of winter season guava cv. L-49. Haryana J Hort. Sci., 2001; 30(1-2):1-2.
12. Ghosh SN, Bersa KC. Effect of boron and iron spray on yield and fruit quality of sweet orange cv. Moshmbi grown under rainfed laterite soil. Indian Agri., 2009; 44(3, 4):147-151