Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.6574

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (4):** 661-665 (2018)

International Journal of Pure & Applied Bioscience

Research Article

OPEN ACCESS

Effect of Crop Regulation Practices on Quality Attributes of Guava (*Psidium guajava* L.) cv. G-27

P.K.S. Gurjar[1*], Rajesh Lekhi[2], Lal singh[3] and G.B.K.S. Prasad[4]

[1]Ph.D. Scholar [2] Professor and Head, College of Agriculture, Gwalior, Madhya Pradesh

[3]Scientist (Horti.) [4]Professor and Head, Department of Food Technology, Jiwaji university, Gwalior, M.P.

*Corresponding Author E-mail: pksgurjar@gmail.com

Received: 5.05.2018 | Revised: 26.06.2018 | Accepted: 4.07.2018

ABSTRACT

The present experiment was carried out to ascertain the effect of different crop regulation practices on quality parameters of guava variety G-27. The experiment consisted of thirteen treatment comprising chemical growth regulators (urea @ 10%, 15% and 20%, NAA @ 200; 400 and 800 ppm, 2, 4-D 20, 40 and 60 ppm) and cultural practices (pruning upto 10%, 20% and 30%) were applied during the course of investigation. These treatments were evaluated under randomized block design with three replications by adopting uniform cultural schedule during the investigation. The observation revealed that all treatments had significantly increased in total sugar percentage, reducing sugar percentage, vitamin C and sugar acid ratio and decreased in acidity percentage. However, non reducing sugar percentage was not influenced significantly. Among the treatments, foliar spray of NAA @ 800 ppm (T_6) significantly recorded maximum total sugar percentage (7.91), reducing sugar percentage (5.48), Vitamin C (192.25 mg/100g pulp) and sugar acid ratio (28.47) than rest of the other treatments. However minimum acidity percentage (0.28) was also recorded under NAA @ 800ppm.

Key words: *Guava, Crop regulation, Urea, NAA, 2, 4-D, Pruning*

INTRODUCTION

Guava (*Psidium guajava* L.) Commonly known as *Amrood* in Farsi and Urdu and *Jaam* in Sindhi belong to family Myrtaceae. It is fourth most important fruit crop in India after mango, banana and citrus. Now a day, it is mainly grown in Bihar, Uttar Pradesh, Karnataka, Madhya Pradesh, Gujarat, Andhra Pradesh and Maharashtra. Guava, the "poor men's fruits or apple of the tropical is a popular fruits crop of the tropical and subtropical climate and is native to the tropical America , its cultivation has expended to all tropical counties and become especially important in India[11]. Guava is considered as one of the exquisite, nutritionally valuable and remunerative crops. Fruits are used for both as a fresh consumption and processing. It's also the cheapest and richest source of vitamin C as well as it contains small amounts of vitamin A, vitamin B, carbohydrates and proteins.

Cite this article Gurjar, P.K.S., Lekhi, R., Singh, L. and Prasad, G.B.K.S., Effect of Crop regulation practices on quality attributes of Guava (*Psidium guajava* L.) cv. G-27, *Int. J. Pure App. Biosci.* **6(4):** 661-665 (2018). doi: http://dx.doi.org/10.18782/2320-7051.6574

However, guava trees grow well in different kind of soil and under a wide range of climatic condition. In subtropical climate, three district periods of flowering and fruiting are found in the Guava. According to Shukla *et al.*[13], These three district periods are Ambe Bahar (flowering February to March and fruits ripen in July- August), Mrig Bahar (Flowering June-July and fruit ripen in October to December) and Hasth Bahar (Flowering October to November and fruits ripen February to April). In most of part the Madhya Pradesh and North India, Guava flowering twice a year, first in April to May for rainy season crop and in August September for winter season crop. It is a common experience that rainy season crop is rough, insipid, poor in quality, less nutritive and also attacked by many insect pests and diseases. On the other hand, winter season crop is superior in quality, free from diseases and pests as well as fetches more prices as compared to rainy season crop.

MATERIAL AND METHODS

The research experiment was conducted during 2016-17 and 2017-18 at state department of horticulture, sheopur, M.P. The experimental material consisted of six year old uniform plants of guava variety G-27. There were thirteen treatments each replicated three times in randomized block design. In order to study the total sugar reducing sugar, non-reducing sugar, Ascorbic acid, acidity% and sugar acid ratio. Fruits of each plant of the thirteen treatments were selected at random for the chemical analysis. For the estimating total sugar, 20 ml of Guava Juice solution was taken then solution was boiled under water bath for five minute for the hydrolysis to convert the non – reducing sugar in to reducing sugars. After cooling the solution, the excess of acid was neutralized by sodium carbonate solution. The solution was transferred in a 100 ml volumetric flask and volume was made up to mark by adding distilled water. With 5 ml each of Fehling's "A" and "B" solution were taken in a 300 ml conical flask and diluted with 40 ml of distilled water. The juice solution taken in a burette was added slowly in hot (Boiling) Fehling's solution till the appearance of slight red colour. Now three drops of methylene blue indicator was added and titration was continued till a brick red precipitate appeared by destroying the blue coloration.

The total sugar in percentage were calculated with the help of following formula

$$\text{Total sugars (\%)} = \frac{0.25}{\text{Burette reading}} \text{X100}$$

The difference in percentage between total sugars and reducing sugar was as the estimate of non- reducing sugar. Pulps of randomly selected fruits were crushed and make a homogenized sample and then juice extracted through muslin cloth. The extract was used to determination of total soluble solid in ^{0}Brix by digital refract meter. Few drops of juice were placed on the surface of prism. The hinged part was placed back. Then refract meter was placed against the sun and the reading was noted by revolving eyepiece at room Temperature[1]. The vitamin 'C' content of the product was determined in terms of Ascorbic Acid. It is water soluble and heat – labile vitamin. In principle, Ascorbic acid reduces the 2, 6- dichlorophenol indophenol dye to a colorless leuco-base. The ascorbic acid gets oxidized to dehydroscorbic acid. Through the dye is a blue coloured compound, the end point is the appearance of pink colour. The dye is pink coloured in acid medium. Oxalic acid is used as the titrating medium.

Calculated the amount of vitamin C by the following formula.

$$\text{Ascorbic Acid } (\frac{\text{mg}}{100}\text{g pulp}) = \frac{0.5\,mg}{V1\,ml} \times \frac{V2}{5ml} \times \frac{100\text{ml}}{\text{Weght of the sample}} \times 100$$

Two gram of fruit pulp was mixed with small amount of distilled water and the volume was made to 25 ml. few drops of 1 percent phenolphthalein were added and titrated against N/10 sodium hydroxide taken in burette. Appearance of light pink colored lasting for a minute or longer indicated the end point. Acidity was expressed in terms of percent citric acid.

$$\text{Acidity (\%)} = \frac{\text{Titrate value} \times \text{Normality of NaOH} \times \text{Eqv. Weight of citric acid}}{\text{Juice taken (ml)} \times 1000} \times 100$$

First total sugar and acidity percentage take separately after then total sugar divided by acidity for getting sugar acid ratio and their value was expressed in ratio.

RESULTS AND DISCUSSION

Among the quality characters *viz;* total sugar, reducing sugar, non reducing sugar, total soluble solid, vitamin C, acidity and sugar acid ratio were studied in guava fruit (Table 1).Different treatments showed significant effect over control with regard to total sugar percentage on pooled data basis. The highest total sugar percent (7.91) was recorded in T_6 (NAA 800ppm) followed by T_{12} (pruning of terminal portion of shoot up to 30%), T_3 (20% concentration of urea) and T_9 (2, 4-D 60ppm). The maximum total sugar might be probably due to high leaf to fruit ratio because of restricted number of fruits harvested and high photosynthesis activity or this may be due to quick metabolic transformation of starch into sugars and early ripening. Similar effects of different treatments have been also reported by mohammed *et al*.[9] Kher *et al.*[8], Agnihotri *et al*[3] in guava. Nawaz *et al.*[10] in kinnow mandarin. All the treatment were significant increased the reducing sugar percentage with increasing the urea, NAA, 2, 4-D concentration and level of pruning of terminal portion of shoot. Maximum reducing sugar percentage (5.48) was recorded under the treatment T_6 (NAA 800ppm) followed by T_{12} (pruning of terminal portion of shoot upto 30%), T_3 (20% concentration of urea) T_5 (NAA 400ppm) and T_9 (2, 4-D 60ppm). However, minimum reducing sugar percentage was recorded under the T_0 (control). This finding is in accordance with the observation made by Dubey *et al.*[7] ,Kher *et al.*[8], Agnihotri *et al*.[2] and Agnihotri *et al.*[3] in guava fruit. Non reducing sugar percentage did not differ significantly with different concentration of urea NAA and 2,4-D as well as different level of pruning of terminal portion of shoot as per pooled data. Total soluble solid was significantly influenced by the different concentration of plant growth regulators, chemical as well as level of pruning of terminal portion of shoot. On the pooled data basis, T_3 (20% concentration of urea) gave the highest total soluble solid (12.37°Brix) followed by T_{12} (pruning of terminal portion of shoot up to 30%), T_1 (10% concentration of urea) and T_{11} (pruning of terminal portion of shoot up to 20%). This may be ascribed to the fact that pruned plants have the higher leaves fruit ratio relative to the control plants thereby increasing in total soluble solid due to more metabolites synthesis. Thus, results are in confirmation with singh and Reddy[12], Dubey *et al*.[7], Bariana and Dhariwal[4], sahay and kumar[5], Mohammad *et al.*[9], Das *et al.*[5], Kher *et al.*[8] and Agnihotri *et al.*[2] in guava and Nawaz *et al*.[10] in kinnow mandarin. A significant increase in vitamin C content of fruits was observed with increasing the concentration of urea, NAA, 2, 4-D and level of pruning of terminal portion of portion of shoot. Maximum vitamin C content (192.25 mg/100g pulp) was found under the treatments T_6 (NAA at 800ppm) and minimum was in T_0 (control) treatment. The maximum vitamin C content might be probably due to high leaf to fruit ratio and high photosynthesis activity. The results are cognizance with the finding of Bariana and Dhariwal[4], Sahay and Kumar[5], Yadav *et al.*[14], Agnihotri *et al*.[2], Dhaliwal and Kaur[6] in guava fruit. Acidity content in guava fruit was significantly influenced by the different treatments. Acidity content in guava

fruit, shows decreasing trend with rising concentration of urea, NAA, 2, 4-D and level of pruning of terminal portion of shoot. However, maximum reduction in Acidity content was noted with foliar spray of 800ppm NAA. On the other hand, maximum acidity (0.28%) content was recorded in guava fruit under the T_0 (control) treatment. The lowest acidity might be due to early ripening of fruits caused by treatment. Where acid might have been used during respiration or immediately converted in to sugar. Similar results were obtained by Agnihotri *et al.*[2], Singh and Dhaliwal, Dhaliwal and Kaur[6] in guava fruit. Sugar acid ratio of fruits increased significantly with increasing concentration of urea, NAA and 2, 4-D as well as level of pruning of terminal portion of shoot. Maximum sugar acid ratio (28.47) was recorded under the T_6 (NAA 800 ppm) followed by T_3 (20% concentration of urea), T_9 (2, 4-D 60 ppm).However, minimum sugar acid ratio was noted under T_0 (control). Similar finding were reported by Kher *et al.*[8] and Agnihotri *et al.*[2] in guava fruit.

Table 1. Effect of different crop regulation practices on Fruit quality of guava

Treatments	Total sugar %	Reducing Sugar %	Non reducing Sugar%	Vitamin C(mg/100g pulp)	Acidity%	Sugar acid ratio
Control	6.32	3.71	2.61	165.70	0.41	15.55
Urea 10%	6.75	4.28	2.48	178.70	0.37	18.42
Urea15%	6.70	4.27	2.43	183.53	0.34	19.53
Urea20%	7.40	4.79	2.60	188.61	0.30	25.19
Urea Mean	6.95	4.45	2.50	183.61	0.33	21.05
NAA 200 ppm	6.77	4.29	2.54	172.07	0.37	18.38
NAA400ppm	7.17	4.64	2.65	181.02	0.34	21.31
NAA800 ppm	7.91	5.48	2.43	192.25	0.28	28.47
NAA Mean	7.28	4.80	2.54	181.78	0.33	22.72
2,4-D 20ppm	6.38	4.00	2.37	169.32	0.37	17.31
2,4_D40ppm	3.76	4.34	2.42	171.53	0.33	20.58
2,4-D 60ppm	7.10	4.62	2.48	175.89	0.30	23.55
2,4-D Mean	6.74	4.32	2.42	172.25	0.33	20.48
Pruning up to 10%	7.05	4.56	2.49	173.42	0.39	18.23
Pruning up to 20%	7.18	4.17	2.47	180.58	0.38	19.06
Pruning up to 30%	7.68	5.20	2.48	187.60	0.31	24.76
Pruning Mean	7.30	4.82	2.48	180.53	0.36	20.68
Treatment Mean	7.07	4.60	2.49	179.54	0.34	21.23
Control Vs others						
S.E.(m) ±	0.088	0.079	0.079	1.083	0.005	0.492
C.D.(at 5%)	0.177	0.158	NS	2.166	0.010	0.983
Between groups						
S.E.(m) ±	0.069	0.062	0.108	0.850	0.004	0.386
C.D.(at 5%)	0.139	0.124	NS	1.699	0.008	0.771
Within treatments or Urea or NAA or 2,4-D						
S.E.(m) ±	0.120	0.107	0.108	1.471	0.007	0.668
C.D.(at 5%)	0.240	0.215	NS	2.943	0.014	1.336

REFERENCES

1. A.O.A.C., Official method of analysis. Association of official analytical chemists, *Washington, D.C.*, (1975).
2. Agnihotri, Ashutosh, Tiwari, Rajesh and Singh, O.P., Effect of crop regulators on growth, yield and quality of guava. *Annals of plant and soil research*, **15(1):** 54-57 (2013).
3. Agnihotri, M.K., Sarolia, D.K. and Shukla, A.K., Crop regulation in guava cv.sardar as influenced by chemicals and cultural practices under semi arid conditions of Rajasthan. *Journal of Agriculture and Ecology*, **1:** 85-90 (2016).
4. Bariana, D. and Dhaliwal, G.S., Effect of chemicals on fruit quality and yield of winter season crop of guava cv. Sardar guava. *J. Res. Punjab agric. Univ.,* **39(4):** 508-512 (2002).
5. Das, Bikash, Nath, Vishal, Jana, B.R., Kumar, S. and Dey, p., Evaluation of

different methods of crop regulation in guava grown under rainfed plateau conditions of eastern India. *India J.Hort.* **64(3):** 294-299 (2007).

6. Dhaliwal, G.S. and Kaur, Rajwant., Effect of time and pruning intensity in age of bearing shoot and fruit 'Sardar' guava. *Haryana J. Hortic. Sci.,* **32(1-2):** 21-24 (2003).
7. Dubey, A.K., Singh, D.B. and Dubey, N., Deblossoming of summer season flowering of guava(*Psidium guavjava* L.) by shoot pruning. *Prog. Hort.* **33(2):** 165-168 (2001).
8. Kher, R., Bhat, S. and Wali, V.K., Effect of foliar application of GA3, NAA and CCC on physico-chemical characteristics of guava cv. Sardar. *Haryana J. Hort. Sci*., **34(1-2):** 31-32 (2005).
9. Mohammed, S., Sharma, J.R., Kumar, Pal, R. and singh, S., Effect of different chemicals on cropping pattern and quality of guava cv. Sardar. *Haryana J.Hort.Sci.*, **35:** 226-227 (2006).
10. Nawas, M.A., Ahmad, W., Ahmad, S. and Khan, M.M., Role of growth regulators on preharvest fruit drop, yield and quality in Kinnow mandarin. *Pakistan J. Bot.,* **40(5):** 1971-1981(2008).
11. Samson, J.A., Tropical Fruits. Trop. Agri. Series, Longman Sci. and Tech. Longman Inc., New York (1986).
12. Singh, gorakh and Reddy, Y.T.N., Regulation of cropping in guava. *Indian J. Hort.* **54(1):** 44-49 (1997).
13. Shukla, A.K., Kaushik, R.A., Panday, D. and Sarolia, D.K., *A technical bulletin on Guava*, published by *Maharana pratap University of Agriculture and Technology, Udaipur,pp:7* (2008).
14. Yadav, S., Bhatia, S.K., Godara, R.K. and Rana, G.S., Effect of growth regulators on the yield quality of winter season guava cv. L-49. *Haryana J. Hort. Sci*., **30(1-2):** 1-2 (2001).