The Asian Journal of Horticulture, **Vol. 3 No. 2 : 330-332 (December-2008)**

Effect of preharvest application of plant growth regulators on post-harvest quality of organically grown guava (*Psidium guajava* L.) fruits

P.N. KATIYAR, J.P. SINGH, P.C. SINGH AND A.P.S. GANGWAR

Accepted : ***September, 2008***

See end of the article for authors' affiliations

Correspondence to:

P.N. KATIYAR
Department of Horticulture, Chandra Shekhar Azad University of Agriculture and Technology, KANPUR (U.P.) INDIA

ABSTRACT

Guava plants of cultivar Sardar were treated with four concentrations of GA_3 (30,60,90,120 ppm), CCC (300,600,900,1200 ppm) and NAA (20,40,60, 80ppm) along with a control. The fruits were kept in perforated poly bags and stored at room temperature. GA_3 treated fruits stored at ambient temperature expressed relatively slower senescence as compared to control. The fruit size and specific gravity reduced with the advancements of storage. All the other quality parameters *viz*. TSS, acidity and total sugars were found to be changed with the storage period. There was an increase in the T.S.S. while a decrease in the acidity as compared with these parameters recorded on the day of storage. Maximum fruit size and specific gravity and the lowest acidity was recorded with 90ppm GA_3 as compared to control. Foliar spray of 60 ppm NAA induced maximum T.S.S. content. It is evident that the foliar application of plant growth regulators brought about a favourable effect on the post harvest life of guava fruits and maintained various physico-chemical attributes at the desired level of consumers acceptance till 6th day of storages and foliar sprays of 90 ppm GA_3 applied 30 days prior to harvest was adjudged as the best treatment.

Key words : NAA, GA_3, CCC, Quality, Yield, Guava.

Guava is widely grown in Indian tropics and subtropics. It is a very common fruit popular among the rich and the poor alike due to its moderate price, nourishing value, excellent flavour and delicious taste. The fruit is rich in vitamin 'C'. Uttar Pradesh, the largest grower produces best quality of fruits. But the fruits are blemished being highly delicate in nature besides the biochemical post harvest changes soften it leading to spoilage. However, the storage life of fresh fruits can be effectively increased and spoilage can be reduced. In recent years, plant growth regulators like auxins, gibberellins and growth retardants like cycocel are being used for improving the fruit quality, delaying deterioration in storage and increasing the shelf life (Rao, 2001 and Tondon *et al.*,1989).

MATERIALS AND METHODS

The experiment was carried out during the year 2006-07 on 10 years old Sardar guava plants uniform in size and vigour maintained at C.S. Azad University of Agriculture and Technology, Kanpur with the following technical details. There were 13 treatments in all *viz*. four concentrations each of GA_3 (30, 60, 90 and 120 ppm), CCC (300, 600, 900 and 1200 ppm) and NAA (20, 40, 60 and 80 ppm) along with a control replicated thrice under a Randomized Block Design. GA_3 and CCC were sprayed 30 days before harvest while NAA 15 days before harvest. The unit of plot was single plant. Well rotten FYM @ 75 kg per plant was given in the last week of June and it was thoroughly mixed. The fruits were kept in perforated poly bags and stored at room temperature for a period of six days in the month of December (Temperature range 13-15°C and humidity 65.5%). Physical observations were recorded by routine method and chemical estimations were done as per A.O.A.C. (1990).

RESULTS AND DISCUSSION

Fruits harvested from guava trees treated with different concentrations of GA_3, CCC and NAA were stored at ambient condition for a period of 6 days. The fruits produced under different treatments after the expiry of storage showed significant variation in their size (Table 1). Irrespective of concentrations all the growth regulators retained significantly larger size of the fruits during storage as compared to control. Treatment with GA_3 at 90 ppm expressed significantly maximum of 6.32 and 6.79 cm length and diameter, respectively followed by its 120 ppm concentration showing 6.20 and 6.70 cm corresponding values against 4.92 and 5.85 cm of control. Amongst the three growth regulators, GA_3 proved relatively more effective in inducing better fruit growth and retaining it during storage followed by NAA sprays. GA_3 is known to activate polar transport, promote cell elongation and induce flowering and fruiting. The gibberellins affect both by cell division as well as cell elongation. Thus, it might

Table 1: Effect of pre-harvest treatment of GA_3, NAA, CCC and storage on post harvest quality of guava fruits

Treatments	Length (cm)	Diameter (cm)	Specific gravity	PLW%	TSS°B	Acidity (%)	Total Sugar (%)	Organoleptic Rating (out of 10 score)
GA_3-30 ppm	5.90	6.31	1.020	5.02	11.75	0.48	7.96	7.9
GA_3-60ppm	6.01	6.55	1.011	4.70	11.88	0.47	7.98	8.0
GA_3-90ppm	6.32	6.79	1.021	4.25	12.06	0.44	7.94	8.8
GA_3-120ppm	6.20	6.70	1.019	4.00	11.86	0.46	8.10	8.5
CCC-300ppm	5.07	5.82	1.018	4.09	10.84	0.53	7.43	7.8
CCC-600ppm	5.12	5.81	1.019	3.69	11.21	0.51	7.62	7.2
CCC-900ppm	5.01	5.72	1.010	3.95	11.02	0.54	7.69	7.7
CCC-1200ppm	5.00	5.65	1.007	4.43	11.08	0.55	7.63	7.6
NAA-20ppm	5.68	6.20	1.015	5.31	12.22	0.49	8.17	8.7
NAA-40ppm	5.57	6.35	1.012	5.10	12.11	0.45	8.19	8.1
NAA-60ppm	5.84	6.52	1.015	4.40	12.31	0.47	8.28	8.2
NAA-80ppm	5.97	6.42	1.017	4.10	12.29	0.47	8.20	8.0
Control	4.92	5.58	0.995	7.16	10.63	0.56	7.07	5.0
On the day of storage average	6.69	6.99	1.013	0.00	11.00	0.57	8.50	10
C.D. (P=0.05)	0.09	0.07	0.001	0.65	0.09	0.05	0.10	-

have caused significant role in producing healthy fruits of larger size.

The specific gravity of guava fruits after 6 days of storage was maximum (1.021) under 90 ppm of GA_3 treatment and 1.013 on the day of storage. GA_3 at 90 and 30ppm remaining at par in between in this regard proved statistically superior to the rest of the treatments barring 120 ppm GA_3 and 600 ppm CCC.

Respiration leads to breakdown of glucose and all other forms of organic compounds metabolize in the fruit tissues. Higher temperature aggravates the losses while the low diminishes it. That is why the storage of fruits under cold storage is longer as compared to ambient condition. The spoilage of fruits under storage in the present investigation was mainly due to slow release of free water which reduced the metabolism as well as the rate of respiration. (Gautam *et al.*, 1979).

Post harvest loss (weight) in stored fruits was significantly maximum (5.31%) when the fruits were treated with 20ppm NAA followed by its 40 ppm concentration (5.10). However, all the concentrations of different growth regulators proved significantly effective in minimizing the PLW as compared to the control (7.16%). It is obvious from the data that CCC treatment despite its concentrations proved most effective in minimizing the loss significantly.

The TSS content of guava fruits prior to storage was noted to be 11.0°B. The treatment of all the three growth regulators affected the TSS significantly and increased the values during storage irrespective of concentrations of the growth regulators applied. As regards doses, 90ppm GA_3, 600ppm CCC and 60ppn NAA revealing 12.16, 11.21, and 12.31^0 B, respectively TSS giving the greater values proved superior than their respective concentrations. When the three growth regulators were compared among themselves, NAA induced relatively higher TSS content than GA_3 and CCC.

The acidity content of guava fruit varied significantly during storage as compared to control. The fruits from control trees expressed 0.56% acidity and under storage the values deteriorated significantly under all the treatments. CCC expressed most acidic fruits 6 days after storage and its 1200ppm maximized the acidity revealing 0.55% value. NAA and GA_3 sprays were observed to be similar in this regard. These findings are in accordance with the observations of Some (1999).

There was a significant deterioration in the total sugar content of guava fruits during storage under all the treatments. Guava fruits on the day of storage revealed 8.50% sugar against 7.07% under control. However, NAA treatments retained significantly greater sugar followed by GA_3. The sensory evaluation of the fruits was done to ascertain if any objectionable taste and flavour change occurs during storage. A five member consumer panel was used to evaluate the fruits by visual observation and taste. The 8.8 marks were scored by 90ppm GA_3 treatment followed by 8.7 marks by 20ppm NAA treatment. Untreated fruits on the other hand, remained unacceptable expressing a score of 5.0. In general NAA proved most effective in this respect closely followed by GA_3.

Omni present microorganism impaired the flavour

of guava fruits, odour, appearance and above all the nutritive value. Fruits need relatively high humidity during storage and in its absence shrinkage and loss in weight, appearance and deterioration in quality are obvious.

Authors' affiliations:
J.P. SINGH, P.C. SINGH AND A.P.S. GANGWAR, Department of Horticulture, Chandra Shekhar. Azad University of Agriculture and Technology, KANPUR (U.P.) INDIA

REFERENCES

A.O.A.C. (1990).Official Method of Analysis, Association of Agricultural chemists. 14th edn. Washington. D.C. (U.S.A.)

Gautam, S.K., Chundawat, D.S. and Singh, K.S. (1979). Effect of various post-harvest treatments on the storage of Umran cultivar of ber. *Haryana J.Hort. Sci.*, **8** : 181-85.

Rao, M.M. (2001). Use of bio regulators in the production of some tropical and subtropical fruits. *Indian J. Hort.*, **50** : 70-77.

Silva, E., Bausta, P.B. and Velasco, M.A.G. (1990). Fruit development, harvest index and ripening changes of guava produced in central Mexico *Post harvest Biol. Tech.*, **13** : 143-50.

Some, E.C. (1999). Pre-harvest factors affecting post harvest texture. *Post-harvest Bio. Tech*., **15** : 240-54.

Tondon, D.K., Singh, B.P. and Kalra, S.K. (1989). Strong behaviour and specific gravity of guava fruits. *Sci. Hort*., **41** : 35-41.

****