HortFlora Research Spectrum, 1(3): 220-224 (2012) ISSN : 2250-2823

EFFECT OF CHEMICALS ON SHELF LIFE AND QUALITY OF GUAVA (*Psidium guajava*) FRUITS CV. APPLE COLOUR

Praveen Kumar Nishad, Balaji Vikram and V. M. Prasad

Department of Horticulture Allahabad School of Agriculture, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad-211 007(U.P.)

E-mail: balaji.vikram55@gmail.com

ABSTRACT: Guava cv. Apple colour is a commercial fruit crop for the grower in India but its self life is poor and its waste causes many economic problems. The aim of this study was to improve the self life of the fruit by the use of different chemicals composition, Waxol percentages and packaging materials. There were ten post harvest treatments—Bavistin (0%), (0.1%) and (2%) and Wax (0%), (6%) and (8%), and one storage condition i.e (Room temperature). Name of chemical use – Their effects were accessed by complete randomized design with three replications. The treated fruits of guava were stored at room temperature. There was decrease in vitamin C (mg) and acidity during storage period of guava fruit under room temperature. The increase in TSS and juice pH and physiological loss in weight of fruit was noticed in storage period irrespective of post harvest treatment and room temperature. All the treatments were found better in respect of TSS & ascorbic acid content over control. On the basis of results obtained the treatment combination T_4 (Waxol 6% + Bavistin 0.2%) proved to be the best in terms of fruit quality and better shelf life at room temperature.

Keywords : *Guava, waxol, polythene bags, carbendazim and LDPE.*

Guava (*Psidium guajava*) is one of the common and major fruit crops of India and considered fourth most important in area and fifth in production. It is rich in vitamin 'C' (300 mg\ 100g) and good source of calcium, phosphorous, pentathenic acid, riboflavin, thiamine and niacin. It is a climacteric fruit and highly perishable in nature and should be marketed immediately after harvest. The short post-harvest life of horticultural crops is due to their highly perishable nature and physiological break down during handling, transport, storage and these losses are further enhanced by infection of post harvest diseases. Various viable technologies for improving shelf-life and storage of horticultual commodities have evolved during the post decades; antitranspirants, wax coating, growth retardants and different type of packing materials etc. increase the shelf- life of harvested fruits. The technology holds considerable promise because in many cases it has an edge over the conventional methods. It could be applied judiciously where conventional methods are inadequate, uneconomical or pose potential health risks. It can also be used as a complementary process with many new and emerging technologies. The process helps in reducing chemical burden on the commodities and also increases the packaging possibilities. But in spite of these available techniques the percentage of post harvest losses of fruit is still high. Therefore, there has to be a standardization of techniques for reducing these post harvests losses in the produce thereby, maintaining the quality of the product. The techniques should be feasible, economically viable and easily affordable to the average growers. It should also be feasible from the health point of view of human beings (Hussain *et al.,* 4). All known methods of foods processing and even storing foods at room temperature for a few hours after harvesting can lower the content of some nutrients, such as vitamins (Aradhita *et al.,* 1).

Received : 29.5.2012 *Accepted : 20.6.2012*

MATERIALS AND METHODS

The present investigation to enhance shelf life and quality of guava (*Psidium guajava*) fruit cv. Apple Colour through post harvest application of some chemicals was conducted at Post Harvest Laboratory, Department of Horticulture, Allahabad Agricultural Institute. Allahabad during the year 2008-09. The experiment was laid out in a C.R.D. with nine treatments (Table 1) each replicated

thrice, keeping unit per treatments. The treated fruits of guava were stored at room temperature.

Bavistin and waxol were applied on guava fruits and packed in a polythene bags to extend the shelf life. Regular observations were taken at 4 days interval on physiological loss in diameter of fruit, specific gravity, T.S.S., acidity and vitamin C content.

Table 1: Treatment combinations.

S. No.	Symbol	Treatment combination
1	T_0	Control (Bavistin (0%)+Waxol (0%))
2	T_1	Bavistin (0.1%) + Waxol (0%)
3	T_2	Bavistin (0.2%) + Waxol (0%)
4	T_3	Bavistin (0%) + Waxol (6%)
5	T_4	Bavistin (1 %) + Waxol (6%)
6	T_5	Bavistin (2%) + Waxol (8%)
7	T_6	Bavistin (0.%) + Waxol (6%)
8	T_7	Bavistin (0.1%) + Waxol (8%)
9	T_8	Bavistin (0.2%) + Waxol (8%)

RESULTS AND DISCUSSION

Diameter of fruit (%) :

The results (Table 1) revealed that the effect of different levels of waxol, and interaction (waxol+Bavistin) was significant right from 0, 4, 8 and 12 days of storage. Minimum physiological loss in diameter was recorded with the treatment combination T_0 (Bavistin 0.% + Waxol 0%) *i.e.* 6.60%, 5.90%, 5.65% and 5.20% at 0, 4, 8 and 12 days of storage, respectively followed by T_1 (Bavistin 0.1% + Waxol 0%) i.e. 6.63, 6.23, 5.78% and 5.31%. Maximum physiological loss in diameter was recorded with the treatment combination T_5 (Bavistin 0.2% + Waxol 6%) confirming to results recorded by Jagdeesh, (5) and Teaotia *et al.* (10).

Specific gravity :

It is clear from Table 2 that the effect of different levels of waxol, and interaction (waxol+Bavistin) was significant right from 0, 4, 8 and 12 days of storage. Whereas the interaction of different levels of Waxol + Bavistin was non-significant at 0, 4, 8 and 12 days of storage. Maximum specific gravity was recorded with the treatment combination T_4 (Waxol 6%) + Bavistin 0.1%) i.e. 1.34, 1.15, 1.04 and 1.01 at 0, 4, 8 and 12 days of storage which was followed by T_5 (Waxol 6%) + Bavistin (0.2%) and minimum specific gravity was recorded in control. Similar results were also recorded by Shanker *et al*. (6).

Total soluble solids (%):

Maximum total soluble solids (Table 3) was recorded with the treatment combination T_4 (Waxol 6% + Bavistin 0.1%) *i.e.* 12.49, 11.65, 10.16 and 8.86 at 0, 4, 8 and 12 days of storage which was followed by T_7 (Waxol 1% + Bavistin 0%) and minimum total soluble solids was recorded with control. The results are inconsonance with the work of Goswami *et al.* (3) and Singh *et al.* (7).

Acidity % :

All the treatments showed significant difference for acidity content (Table 4) for different interval of storage periods. Maximum acidity (0.72%) was recorded in untreated (control) fruits followed by other treatment and minimum acidity (0.12%) was recorded with the treatment combination T_4 (waxol 6% + bavistin 0%). This finding is supported by Chen *et al.* (2) and Singh *et al.* (8).

Ascorbic acid (Vitamin C) content (mg/100g) :

It is evident from Table 5 that all the treatments showed significant difference for different interval of storage periods. Maximum vitamin C was recorded with the treatment combination T_4 (Waxol 6% + Bavistin 0.1%) *i.e.* 205.17 mg, 199.46, 173.25 and 153.92 mg at 0, 4, 8 and 12 days which was followed by T_5 (Waxol 6%) + (Bavistin 0.2%) and minimum vitamin C content was recorded with the control fruits. The findings are in support of Singh *et al.* (9) and Ylagan (11).

On the basis of results obtained, the treatment combination T_4 (Waxol 6% + Bavistin 0.2%) proved to be the best in terms of fruit quality and better shelf life at room temperature. Since these finding are based on one year trial and therefore, further experiment may be done to substantiate the results.

Table 1 : Effect of different levels of bavistin, waxol and their interaction on diameter (cm) of guava fruit cv. Apple Colour at different days of storage at ambient temperature.

Bavistin (B)	0 Day Waxol (W)				4th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	6.60	6.83	6.93	6.79	5.90	6.37	6.43	6.23
B_1 (0.1%)	6.63	7.71	7.10	7.15	6.23	6.77	6.58	6.53
B_2 (0.2%)	6.67	7.60	7.07	7.11	6.23	6.73	6.57	6.51
Mean (W)	6.63	7.38	7.03	-	6.12	6.62	6.53	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Bavistin (B)	NS				0.022			
Waxol (W)	NS				0.022			
Interaction (B W)	NS				0.038			

Bavistin (B)	8th Day Waxol (W)				12th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	6.60	6.83	6.93	6.79	5.90	6.37	6.43	6.23
B_0 (0.0%)	5.65	5.99	6.00	5.88	5.20	5.35	5.38	5.31
B_1 (0.1%)	5.78	6.35	6.30	6.14	5.31	5.95	5.50	5.59
B_2 (0.2%)	5.98	6.30	6.15	6.14	5.35	5.85	5.50	5.57
Mean (W)	5.80	6.21	6.15	-	5.29	5.72	5.46	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Temperature (TE)	0.011				0.040			
Time (T)	0.011				0.040			
Interaction (TE T)	0.019				0.070			

Table 2 : Effect of different levels of bavistin, waxol and their interaction on specific gravity of guava fruit cv. Apple Colour at different days of storage at ambient temperature.

Bavistin (B)	0 Day Waxol (W)				4th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	1.01	1.11	1.12	1.08	5.90	6.37	6.43	6.23
B_1 (0.1%)	1.03	1.34	1.16	1.18	6.23	6.77	6.58	6.53
B_2 (0.2%)	1.07	1.27	1.13	1.17	6.23	6.73	6.57	6.51
Mean (W)	1.05	1.24	1.13	-	6.12	6.62	6.53	-
	C.D. (P = 5%)				C.D. (P = 0.05)			
Bavistin (B)	NS				0.010			
Waxol (W)	NS				0.010			
Interaction (B W)	NS				0.017			

Bavistin (B)	8th Day Waxol (W)				12th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	0.81	0.92	0.94	0.89	0.62	0.78	0.82	0.74
B_0 (0.0%)	0.86	1.08	0.95	0.96	0.71	1.01	0.90	0.87
B_2 (0.2%)	0.88	1.06	0.94	0.96	0.75	0.99	0.89	0.87
Mean (W)	1.05	1.24	1.13	-	0.69	0.92	0.87	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Temperature (TE)	0.009				0.008			
Time (T)	0.009				0.008			
Interaction (TE T)	0.015				0.013			

Table 3 : Effect of different levels of bavistin, waxol and their interaction on total soluble solids (%) of guava fruit cv. Apple Colour at different days of storage at ambient temperature.

Bavistin (B)	0 Day Waxol (W)				4th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	10.46	11.77	11.80	11.34	10.02	11.33	11.35	10.90
B_1 (0.1%)	11.70	12.49	12.27	12.15	11.31	11.65	11.43	11.46
B_2 (0.2%)	11.70	12.49	11.85	12.01	11.32	11.65	11.37	11.45
Mean (W)	11.29	12.25	11.97	-	10.88	11.54	11.38	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Bavistin (B)			NS				0.04	
Waxol (W)			NS				0.04	
Interaction (B W)			NS				0.06	
Bavistin (B)	**8th Day Waxol (W)**				**12th Day Waxol (W)**			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	8.26	9.76	9.83	9.28	6.70	7.17	7.66	7.18
B_1 (0.1%)	9.23	10.16	10.16	9.85	6.95	8.86	8.39	8.07
B_2 (0.2%)	9.65	10.16	9.90	9.90	6.95	8.86	8.12	7.98
Mean (W)	9.05	10.03	9.96	-	6.87	8.30	8.06	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Temperature (TE)			0.04				0.07	
Time (T)			0.04				0.07	
Interaction (TE T)			0.07				0.12	

Table 4 : Effect of different levels of bavistin, waxol and their interaction on acidity (%) of guava fruit cv. Apple Colour at different days of storage at ambient temperature.

Bavistin (B)	0 Day Waxol (W)				4th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	0.89	0.60	0.57	0.69	0.86	0.56	0.53	0.65
B_1 (0.1%)	0.80	0.32	0.33	0.48	0.75	0.28	0.29	0.44
B_2 (0.2%)	0.75	0.33	0.56	0.55	0.72	0.29	0.52	0.51
Mean (W)	0.81	0.42	0.49	-	0.78	0.38	0.45	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Bavistin (B)			0.163				0.007	
Waxol (W)			0.163				0.007	
Interaction (B W)			NS				0.011	
Bavistin (B)	**8th Day Waxol (W)**				**12th Day Waxol (W)**			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	0.91	0.75	0.67	0.78	0.72	0.35	0.26	0.44
B_0 (0.0%)	0.82	0.34	0.48	0.55	0.48	0.12	0.24	0.287
B_2 (0.2%)	0.81	0.35	0.60	0.59	0.46	0.24	0.26	0.32
Mean (W)	0.85	0.48	0.58	-	0.55	0.24	0.25	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Temperature (TE)			0.008				0.005	
Time (T)			0.008				0.005	
Interaction (TE T)			0.013				0.009	

Table 5 : Effect of different levels of bavistin, waxol and their interaction on vitamin C content (ascorbic acid mg/100 g pulp) of guava fruit cv. Apple Colour at different days of storage at ambient temperature.

Bavistin (B)	0 Day Waxol (W)				4th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	181.38	191.66	191.80	188.28	176.66	184.49	187.59	182.91
B_1 (0.1%)	183.83	205.17	199.68	196.23	178.83	199.46	193.33	190.54
B_2 (0.2%)	190.22	200.10	198.27	196.20	183.83	193.75	191.25	189/61
Mean (W)	185.14	198.98	196.58	-	179.77	192.57	190.72	-
	C.D. (P = 0.05)				C.D. (P = 0.05)			
Bavistin (B)			NS				1.81	
Waxol (W)			NS				1.81	
Interaction (B W)			NS				3.13	

Bavistin (B)	8th Day Waxol (W)				12th Day Waxol (W)			
	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)	W_0 (0.0%.)	W_1 (6.0%.)	W_2 (8.0%.)	Mean (B)
B_0 (0.0%)	146.08	161.69	163.08	156.95	6.70	7.17	7.66	7.18
B_1 (0.1%)	153.95	173.25	170.19	1.65.80	6.95	8.86	8.39	8.07
B_2 (0.2%)	157.73	171.84	164.26	164.61	6.95	8.86	8.12	7.98
Mean (W)	152.59	168.93	165.84	-	6.87	8.30	8.06	-
	C.D. (P=0.05)				C.D. (P = 0.05)			
Temperature (TE)			1.55				1.29	
Time (T)			1.55				1.29	
Interaction (TE T)			2.69				2.23	

REFERENCES

1. Aradhita, B., Gupta, O.P. and Dhawan, S.S. (1995). Evaluation of guava (*Psidium guajava* L.) hybrids for making nectar. *Haryana* J. *Hortic. Sci.*, **24**(20): 102-109.
2. Chen, W. and Zhang, F. (2001). The formed and physiological changes of guava fruit juice during post-harvest storage. *Plant Physiol. Communi.,* **37**(1): 25-26.
3. Goswami, A.K., Shukla, H.S., Kumar, P. and Mishra, D.S. (2012). Effect of pre-harvest of application of micronutrients on quality of guava (*Psidium guajava* L.) cv. Sardar, *HortFlora Res. Spectrum,* **1**(1) : 60-63.
4. Hussain, A. and Shah, W.H. (1991). Preparation and evaluation of guava products (squash, cheese, jelly, pickle and chutney). *Pakistan J. Agric. Res.,* **12**(2): 106-111.
5. Jagdeesh, S.L. (1994). Studies on the storage of guava fruit. *M.Sc (Agri) Thesis,* Univ. Agric. Sci., Dharwad.
6. Shanker, G., Srivastava, K.K. and Das, C.O. (1967). Physico-chemical studies of guava varieties of Uttar Pradesh. *Allahabad Farmer*, **41:** 7-16.
7. Singh, K.D., Islam and Verma, O.P. (1976). Processing and storage of carbonated guava beverage. *J. Food Process, and Preserv.* (USA), **20**(1): 79-86.
8. Singh, Rita, Kapoor, A.C. and Gupta, O.P. (1985). The effect of cultivars, seasons and storage on the nutritive value and keeping quality of guava cheese. *Indian Food Packer*, 71-77.
9. Singh, A.K. (1989). Studies on preparation and storage of guava (*Psidium guajava* L.) beverage. *Ph.D. Thesis,* N.D. Univ. of Agri. and Tech. Faizabad.
10. Teaotia, S.S., Pandey, I.C., Agnihotri, B.N. and Kapour, K.L. (1968). Studies on some guava varieties (*Psidium guajava* L.) of U.P. *Indian Agriculturist,* **VI** (1-2): 47-53.
11. Ylagan, M.M. (1961). Ascorbic acid content of some guava fruit juice. *Philippine Agric.,* **44** : 477-478.