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RESEARCH ARTICLE

EFFECT OF POST HARVEST TREATMENTS OF CALCIUM CHLORIDE, CALCIUM NITRATE AND GIBBERELLIC ACID ON STORAGE BEHAVIOUR AND QUALITY OF GUAVA (*PSIDIUM GUAJAVA L.*) CV. LUCKNOW -49.

***Yearly Base Heart Najiar and Dr. Rajkumar, M.**

Department of Horticulture, Annamalai University, Annamalainagar-608 002

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ABSTRACT

An experiment was conducted at department of Horticulture, Annamalai University, Chidambaram to find out the effect of post harvest treatments of calcium chloride, calcium nitrate and gibberellic acid on storage behaviour and quality of guava (*psidium guajava* L.) cv Lucknow – 49. Thefruits were given post harvest treatment s of $cacl_2$ (1%,2%,3%) calcium nitrate (1%,2%,3%) and GA_3 (25,50,75 ppm) each for 5 minutes. The fruits were dried in air and stored in ambient temperature. Among these treatment. Post harvest dipping of fruits in calcium chloride (2%) extended shelf life successfully for about 12 days.

INTRODUCTION

Guava (*Psidium guajava* L.) belong to myrtaceae family is an evergeeen tree and one of the major fruit of India. It is extensively grown in wide variety of soil and climatic conditions. A side from being eaten fresh. The lipe fruit can also be processed into Jelly, dried fruit , canned slices in syrup. In India, guava is cultivated in an area of 1.82 million hectares with an annual production of 18.23 million tonnes. If occupies fifth position in terms of area and foruth position in terms of production among fruits of India (N.H.B production profile, 2008). The characteristic of different varieties of guava vary considerably fruit shape langes from round to pear shape. The skin color of mature ripe fruit can be various shades of green or yellow. The flesh colour can barge from white to yellow to pink and red. Texture and taste of different guava as well as the seed content also vary (Brown and Paxton 1983). A report of Food and Agricultural Integrated Development Action (FAIDA) by confederation of Indian Industry (CII) showed that the toral loss of fruits and vegetables has been estimated at 50%of their current production. In order to reduce loss on farm and procurement chain and prevent loss in value destruction. Packaging and storage system will play an important role. Various chemicals have been used to hasten or delay the ripening to reduce losses and to improve and maintain the colour and quality.

***Corresponding author: Yearly Base Heart Najiar,**
Department of Horticulture, Annamalai University, Annamalainagar-608 002.

Postharvest applications with calcium chloride have been used to delay aging or ripening, consequently reducing post-harvest decay and controlling many diseases in fruits and vegatables (Cheour et al., 1990; El-Gamal et al., 2007). Postharvest calcium treatments used to increase calcium content of the cell wall were effective in delaying senescence resulting in firmer, higher quality fruit (Sams et al., 1993). Keeping these viehl point a study has been carried out with the following objectives.

- To assess the physical, physiological and biochemical changes of guava fruits during storage.
- To find out the effect of $cacl_2$, calcium nitrate and GA_3 on the quality of guava.

MATERIALS AND METHODS

An experiment was Laid out on RBD with 10 treatments and replicated three times. The fully developed, mature, unripe, healthy, good looking and uniform medium sized fruit apparently free from diseases and hruises were harvested and subjected to post harvest treatments and the observations on quality parameters were periodically recorded on 3rd, 6th, 9th and 12th day of storage. Fruits were analysed for physiological loss in weight (PLW), firmness, spoilage %, Total soluble solids (TSS), Total sugars. Titratable acidity, Ascorbic acid, Reducing and Non-reducing sugars.

T_1 - Dipping fruits in $Cacl_2$ @ 1%

T_2 - Dipping fruits in $Cacl_2$ @ 2%
T_3 - Dipping fruits in $Cacl_2$ @ 3%
T_4 - Dipping fruits in $CaNo_3$ @ 1%
T_5 - Dipping fruits in $CaNo_3$ @ 2%
T_6 - Dipping fruits in $CaNo_3$ @ 3%
T_7 - Dipping fruits in GA_3 @ 25ppm
T_8 - Dipping fruits in GA_3 @ 50 ppm
T_9 - Dipping fruits in GA_3 @ 75 ppm

RESULTS AND DISCUSSION

The Data levealed that there was a significant difference in the physiological loss in weight (PLW) of fruits under different treatments and storage intervals. The PLW of fruits gradually increased from 3rd day to 12th day of storage may be due to moisture loss through transpiration and respiration process of fruit. The decline in fruit weight during storage primarily attributed to the losses in moisture through physiological processes such as evaporation and transpiration (Roy and Pandey, 12).

Effect of post harvest treatments on physiological loss in weight (%) and firmness in fruit of Guava Cv. Lucknow- 49

Treatments	Physiological loss in weight (%)				Firmness (lb force)			
	3rd	6th	9th	12th	3rd	6th	9th	12th
T_1	0.56	1.50	2.70	3.50	16.51	15.78	13.18	10.22
T_2	0.32	1.12	2.01	2.80	17.49	16.58	14.09	11.15
T_3	0.63	1.58	2.81	3.63	16.12	15.25	12.52	8.89
T_4	0.72	1.66	2.92	3.76	15.69	14.79	12.06	8.47
T_5	0.42	1.38	2.45	3.15	17.02	16.15	13.67	10.68
T_6	0.64	1.56	2.83	3.63	16.26	15.47	12.61	8.70
T_7	0.73	1.65	2.93	3.77	15.52	14.52	12.19	8.32
T_8	0.59	1.55	2.73	3.55	16.60	15.65	12.75	9.84
T_9	0.80	1.74	3.04	3.96	15.27	14.11	11.48	7.40
T_{10}	0.96	2.23	4.99	5.14	14.70	12.05	8.60	5.92

Effect of postharvest treatments on total sugars (%) and titratable acidity (%) of guava fruits during storage

Treatments	Total sugars (%)				Titratable acidity (%)			
	3rd	6th	9th	12th	3rd	6th	9th	12th
T_1	5.54	6.04	5.87	5.72	0.40	0.37	0.33	0.31
T_2	5.85	6.36	6.26	6.20	0.46	0.42	0.42	0.40
T_3	5.56	5.96	5.81	5.67	0.39	0.33	0.32	0.30
T_4	5.59	6.09	5.91	5.78	0.35	0.33	0.30	0.27
T_5	5.80	6.26	6.09	5.95	0.42	0.40	0.37	0.35
T_6	5.51	5.91	5.77	5.62	0.39	0.38	0.34	0.32
T_7	5.40	5.76	5.56	5.51	0.37	0.33	0.26	0.22
T_8	5.40	5.77	5.57	5.52	0.41	0.36	0.29	0.24
T_9	5.46	5.89	5.73	5.59	0.35	0.32	0.25	0.22
T_{10}	5.36	5.70	5.23	4.80	0.33	0.26	0.23	0.19

Among these, the least PLW of 0.32 percent, 1.12 percent, 2.01 percent, 2.80 percent on 3rd, 6th, 9th and 12th days of storage were observed in T_2 (2% $Cacl_2$). The highest PLW recorded in control T_{10} of 0.96 per cent, 2.23 percent, 4.99 percent and 5.14 percent on 3rd, 6th, 9th and 12th days of storage. The firmness of fruit was gradually declined with proceeding of storage period from 3rd day to12th days may be due to breakdown of pectin substances and cell wall softening. Softening of fruits is caused either by breakdown of insoluble protopectins into soluble pectin or by hydrolysis of starch (Mattoo *et al.,* 1975). The firmness range from 5.92 to 11.15 Lb/force on the 12th day of storage. Among the various treatment the highest firmness was observed in T_2(11.15 lb/ force) and followed by T_5 (10.68 lb/force). The lowest firmness was observed in T_{10} (5.92 lb/force) control. $Cacl_2$ has merit in reducing spoilage in guava fruits which may be due to their positive role in delaying the senescence of fruits by maintaining cell wall integrity and thus lowering the spoilage. This are in conformity with the finding of Mahajan *et al.,* (2011) in guava, Sabry (1998) in apple, Cheour et al., (1990) in Strawberry. The spoilage of fruits on the 12th day of storage langed from 8.71 percent to 29.20 percent. Among the various treatments the T_2 was found to be the best with a value of (8.71 per cent) followed by T_5 (9.48 per cent). The highest spoilage is in the T_{10} (29.20 per cent) control. The treatment exhibited wide variation for TSS on the 12th day of storage which ranged from 7.02° Brix to 10.71° Brix. During the period of evaluation (12 days) the total soluble solids (TSS) content of fruits enhanced with the progress of ripening as a consequence of conversion of starch into sugars,which is in line with the report made by Thumbhar and Desai (1986). The performance of T_2 was found to be the best with the value of (10.71° brix). The treatment T_{10} have exhibited the least performance with the value of (7.02° Brix) in control. The accumulation of total sugars during the process of ripening is a consequence of starch hydrolysis. The activity of α-amylase and β-amylase and starch phosphorylase leads to conversion of starch into sugars (Chundawat and Raghava Rao, 1981).

In the present study, the total sugar and reducing sugar of guava fruits increased slowly and steadily upto 6 days of storage and thereafter a sharp decling was noticed due to rapid metabolic breakdown in these fruits. The highest total sugar percentage was observed in the treatment of T_2 (6.20 percent). The lowest total sugar percentage was observed in T_{10} (4.80 percent) control. The highest reducing sugar was observed in T_2 (3.68 percent) and the lowest reducing sugar was in T_{10} (2.77 per cent) control. Upsurge in ethylene biosynthesis in the intercellular spaces proceeds climacteric rise in respiration leading to ripening of the fruit and the acidity level decreased (Singh, 1989). The fruits acidity on the 12th day of storage varied from 0.19 percent to 0.40 per cent. The highest values for this trait is (0.40 percent) T_2. The lowest value is in T_{10} (0.19 percent). The decrease in ascorbic acid may be due to utilization of lesser amount of organic acids in metabolic activities which reduce the level of acidity with the progress in

storage period. This are in conformity with the finding of Lal *et al.,* (2015) in citrus, Ismail et al., (2010) in guava, Jain and Dashora, (2011) in guava, Yadav et al., (2001) in guava fruits. The ascorbic acid content langed from 103.02mg/100g to 119.70 mg / 100g on the 12th day of storage. Among the various treatments the performance of T_2 was found to be the best with a value of 119.70 mg/100g. The least performance with a value of (103.02 mg/100g) T_{10} control.

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