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Influence of pre-harvest chemical application on fruit parameter of guava cv. 'Sardar'

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Abstract
The present investigation entitled Effect of pre-harvest chemical treatment on post-harvest quality in guava (*Psidium guajava* L.) was conducted at college of agriculture, Latur during winter season 2021-2022. The work was conducted at Instructional-cum-Research Farm, P.G. Laboratory, Department of Horticulture, College of Agriculture, Latur, V.N.M.K.V., Parbhani (M.S). Fruit crops selected and research carried out in Randomized Block Design (RBD) with three replications and nine treatments during *Kharif* season, 2021. Treatment consisted of different concentrations of calcium chloride (1 and 1.5%), calcium nitrate (1 and 1.5%), salicylic acid (500 and 750 ppm) and chelated zinc (0.5 and 1%). The experiment was conducted in Randomized Block Design (RBD) with nine treatments and three replications. Fruits were stored at room temperature up to 9 days in which significant effect of calcium chloride @ 1.5% i.e. T_2 were observed for physical attributes such as maximum yield of fruit (17.76 kg/plant) at harvest, maximum fruit weight (140.94g), fruit specific gravity (1.033g/cc) at 9th day of storage at ambient storage conditions, where control treatment was lowest in all parameters.

Keywords: Guava, physical parameters, salicylic acid, pre-harvest, $CaCl_2$

Introduction
Guava (*Psidium guajava* L.) is a delicious, nutritious, remunerative, and major commercial fruit crop in grown India, belonging to the myrtaceae family. The guava is typically thought to have originated in Central America or Mexico before being disseminated by both man and nature throughout the world. Early in the 17th century, the Portuguese brought it to India. *Psidium* is a genus of plants that evolved in Tropical America. Guava's fundamental chromosome number is 11. It belongs to the *Psidium* genus, which has 150 species. The majority of the cultivars are diploid (2n=22), however there are few triploids (2n=33) as well Known as the "Apple of the Tropics" and the "Poor Man's Apple", it is one of the most popular fruit growing in India's tropical, sub-tropical, and dry regions. After banana, mango, citrus, banana, and apple, it is the fifth most significant fruit in the area, as well as the fifth most important fruit in production.

In Maharashtra, the area under guava in 2020-2021 was over 12.18 thousand hectares, with 129.75 thousand tonnes production (https://www.indiastatagri.com) (Database of NHB, Ministry of Agriculture, Gov. of India, 2020-2021). With productivity of 10.65 MT/ha where, in 2021-2022, area under guava was 12.92 thousand hectares, production was 132.57 thousand tonnes and productivity was 10.26 MT/ha. In 2020-2021 India's total area under cultivation was 308.09 thousand hectares, Production of guava was 4582.30 thousand tonnes and total productivity was 14.87 MT/ha. Where in 2021-2022, India's total area under cultivation was increased to 306.64 thousand hectares, Production of guava was decreased to 4516.16 thousand tonnes and total productivity also decreased to 14.73 MT/ha.

Foliar application of different micro nutrients like Calcium Chloride, Calcium Nitrate, Chelated Zinc, and Salicylic Acid has been found to be beneficial, and the recommendations made by different workers for different micro nutrients appear to have a profound impact on fruit quality in terms of size, appearance, Colour, yield of fruit, specific gravity, and weight of fruit.

Materials and Methods
The present investigation entitled "Effect of pre-harvest chemical treatment on post-harvest quality in guava" was conducted during the month of November 2021. The experimental farm orchard is located at Department of horticulture, College of Agriculture, Latur, under Vasantrao Naik Marathwada Agriculture University, Parbhani.

Latur is situated between $18^0$25' North latitude and $76^0$37' East longitude has elevation of 515 meter above mean sea level. The area falls under semi-arid tropical condition. The annual precipitation mostly concentrated during the monsoon months from June to October with average rainfall.

The experiment was conducted in a well-established orchard of eight years old guava (*Psidium guajava* L.) cv. 'Sardar' plant orchard at 6m x 6m spacing. Trees selected on the basis of Randomized Block Design (RBD). Tree sprayed one month before harvest with required chemical concentrations, harvested 10 fruit from each plant and stored in P. G. Laboratory, Department of Horticulture, Latur. The observations on post-harvest were recorded after every three days at harvest, 03, 06, 09 days from harvest.

Results and Discussion

The observations recorded during study are summarized in the form of table and illustrated in table no. 1 along with statistical interpretation.

Table 1: Effect of pre harvest chemical application on physical parameter of fruit in guava cv. Sardar

Treatments	Yield (kg/plant)	Fruit weight (g/fruit)	Length (cm)	Diameter (cm)	Volume (cc)	Spe. gravity (g/cc)
T_1 - $CaCl_2$ @ 1.0%	17.10	136.70	4.53	5.28	135.00	1.02
T_2 - $CaCl_2$ @ 1.5%	17.76	140.94	5.05	5.39	137.55	1.03
T_3 - $Ca(NO_3)_2$ @ 1.0%	13.96	138.33	4.33	5.16	120.75	0.98
T_4 - $Ca(NO_3)_2$ @ 1.5%	14.21	142.35	4.75	5.12	127.63	1.01
T_5 - SA @ 500ppm	16.16	128.96	4.69	5.05	127.69	1.02
T_6 - SA @ 750ppm	16.33	134.92	5.24	5.16	133.33	1.02
T_7 - Chel. Zn @ 0.5%	14.57	131.05	4.97	5.29	133.72	0.98
T_8 - Chel. Zn @ 1%	15.22	130.67	4.64	5.05	131.97	0.99
T_9 – Control	13.64	111.16	4.21	4.38	114.58	0.97
SE (m)	0.63	1.65	0.23	0.27	3.28	0.01
C.D. @ 5%	1.89	4.95	0.69	0.82	9.86	0.03

Data relevant to effect of pre-harvest treatments on yield of guava cv. Sardar fruit was presented in Table 1. Yield of fruit per treatment was observed significantly maximum in fruits under treatment T_2 (17.76 kg/plant) at harvest which was at par with treatment T_1 (17.10 kg/plant) at harvest whereas, minimum fruit yield per treatment was obtained under treatment T_9 i.e. control (13.64 kg/plant) at harvest. Calcium is useful for guava fruit since it can increase their length, diameter, weight, circumference, and volume. This could be as a result of calcium's involvement in increasing root growth and improving cell division, both of which increase nutrient absorption. Also calcium increases fruit production by lowering fruit drops. Ultimately increase in yield of fruit crop.

Data on how pre-harvest treatments affected the fruit weight in guava cv. Sardar while they were stored was reported in Table no.1. The fruit weight was observed significantly maximum in fruits under treatment T_2 (140.94g), which was at par with treatment T_1 (136.70g), whereas, minimum fruit weight was observed under treatment T_9 i.e. control (111.16g) at 9^{th} day of storage. Calcium raised the quantity of fruit by minimum fruit drops, reduced abscission level. This could be as a result of calcium's role in promoting root growth and enhancing cell division, both of which increase nutrient absorption. Numerous enzymes, including phospholipase, arginine kinase, amylase, and adenosine tri-phosphatase, are activated by calcium in plant systems (ATP ase) The results obtained in present study are in agreement with results reported by Qasim *et al*. (2020) [6] in guava fruit..

Data on the impact of pre-harvest effect on length of guava cv. Sardar fruit during storage conditions were provided in Table no. 1. Maximum fruit length was found in treatment T_6 - SA @ 750ppm (5.24cm) at 9^{th} day of storage which was at par with T_2-$CaCl_2$ @ 1.5% (5.05cm) at 9^{th} day. However, minimum specific gravity was found under treatment T_9 i.e. control (0.97 g/cc) at 9^{th} day of storage. Calcium is useful for guava fruit since it can increase their length, diameter, weight, volume, and specific gravity. Similar findings were also reported by, Qasim *et al*. (2020) [6] in guava fruit.

Data on the impact of pre-harvest effect on diameter of guava fruit during storage conditions were provided in Table no. 1. Maximum fruit diameter was found in treatment T_2-$CaCl_2$ @ 1.5% (5.39cm) at 9^{th} day of storage which was at par with T_7 - Chel. Zn @ 0.5% (5.29cm) at 9^{th} day. However, minimum specific gravity was found under treatment T_9 i.e. control (4.38cm) at 9^{th} day of storage. Calcium is useful for guava fruit since it can increase their length, diameter, weight, volume, and specific gravity. Similar findings were also reported by, Qasim *et al*. (2020) [6] in guava fruit.

Data on how pre-harvest treatments affected the volume of guava cv. Sardar fruit while they were in storage reported in Table no. 1. Maximum volume was found in treatment T_2-$CaCl_2$ @ 1.5% (137.55cc) at 9^{th} day of storage which was at par with T_1- $CaCl_2$ @ 1% (135.00cc) at 9^{th} day. However, minimum volume was found under treatment T_9 i.e. control (114.58cc) at 9^{th} day of storage. Calcium is useful for guava fruit since it can increase their length, diameter, weight, volume, and specific gravity. Similar findings were also reported by, Qasim *et al*. (2020) [6] in guava fruit.

Guava (*Psidium guajava* L.) fruits treated with different shelf life improving chemicals showed impact on fruit specific gravity data represented in table no: 1. Maximum fruit specific gravity was found in treatment T_2-$CaCl_2$ @ 1.5% (1.03 g/cc) at 9^{th} day of storage which was at par with T_1-$CaCl_2$ @ 1% (1.02 g/cc) at 9^{th} day. However, minimum specific gravity was found under treatment T_9 i.e. control (0.97 g/cc) at 9^{th} day of storage observations. Calcium is useful for guava fruit since it can increase their length, diameter, weight, volume, and specific gravity. Calcium is useful for guava fruit since it can increase their length, diameter, weight, volume, and specific gravity. Similar findings were also reported by, Qasim *et al*. (2020) [6] in guava fruit.

Conclusion

The experiment entitled "Effect of pre-harvest chemical treatment on post-harvest quality in guava" may be concluded that, Foliar application of $CaCl_2$ @ 1.5% one month before harvesting was found superior in physical parameter like fruit weight, fruit yield, fruit length, fruit diameter, fruit volume and fruit specific gravity which was closely at par with application of $CaCl_2$ @ 1%.

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