Agric. Sci. Digest., 38 (1) 2018 : 68-70
Print ISSN:0253-150X / Online ISSN:0976-0547

AGRICULTURAL RESEARCH COMMUNICATION CENTRE
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Effect of chemicals on shelf life of (S*yzygium cuminii* Skeels) CV. Local

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Received: 28-03-2017 Accepted: 03-08-2017 DOI: 10.18805/ag.D-4601

ABSTRACT

An experiment was conducted at Department of Horticulture, Junagadh during the year 2015 to determine the effect of post harvest treatments on shelf life and quality of jamun (*Syzygium cuminii* Skeels.) cv. Local. A sum total of six post harvest treatments were given as T_1-GA_3 50 mg/l, T_2-GA_3 100 mg/l, T_3-$CaCl_2$ 1 %, T_4-$CaCl_2$ 1.5 %, T_5-$Ca(NO_3)_2$ 1.5 % and T_6-Control (water). The fruits treated with $CaCl_2$ 1.5 % showed significantly reduced physiological loss in weight, spoilage loss and the same treatment reported the significant result and taken maximum days to shrivelling initiation and maximum firmness, marketable fruits.

Key words: Jamun, Physical parameters, Quality, Shelf life.

The Jamun (*Syzygium cuminii* Skeels) belonging to family myrtaceae is a nutritious fruit with a variety of uses. The fruit is good source of iron, sugars, minerals, protein, and carbohydrate etc. Fully ripe fruits are consumed as fresh fruit and also processed into beverages like jelly, jam, squash, wine, vinegar, and pickles. The fruits which are not suitable for table use, can be used in the beverage industry as they contained a high amount of acidity, tannins and anthocyanins (Anonymous 1986). Leaf extract of jamun reduces the radiation induced DNA damage in the cultured human peripheral blood lymphocytes. (Prince *et al*., 2003). Jamun fruits are highly perishable, ripen fast during summer and become inconsumable very soon. Various plant growth regulators and chemicals have been used to delay ripening, reduce losses to improve and maintain color and quality by slowing down the metabolic activities of fruit which ultimately leads to an increased shelf life and maintain the quality marketability of the fruit for a longer period.

Mature fruits with uniform size and shape were selected. The experiment was conducted during the year 2015 with CRD statistical design. The experiment consisting of six treatments. The treatment for jamun *i.e.* T_1-GA_3 50 mg/l, T_2-GA_3 100 mg/l, T_3-$CaCl_2$ 1 %, T_4-$CaCl_2$ 1.5 %, T_5-$Ca(NO_3)_2$ 1.5 % and T_6-Control (water). The fruits were dipped for 10 minutes and shed dried. Treated fruits were packed as such without wrapping in Corrugated Fibre Board (CFB) Boxes and stored in the laboratory at room temperature. The fruits were selected from each lot at a time and used for biochemical analysis and organoleptic taste. A biochemical analysis was done up to 4 days from day one of storage.

Physiological loss in weight (%) and Spoilage loss (%): The mean data on per cent physiological loss in weight as influenced by various post harvest treatments were recorded at 1st, 2nd, 3rd and 4th day after storage are presented in Table 1. Treatment (T_4) $CaCl_2$ 1.5 % recorded significantly the lowest physiological loss in weight (6.08, 11.54, 18.04 and 22.32 %) at 1st, 2nd, 3rd and 4th day after storage, respectively. which was at par with T_3 (18.29 %) on 3rd day. Treatment (T_6) control recorded the maximum physiological loss in weight (11.23, 17.12, 26.35 and 34.65 %) at 1st, 2nd, 3rd and 4th day after storage, respectively. The mean data on per cent spoilage loss as influenced by various post harvest treatments were recorded at 1st, 2nd, 3rd and 4th day after storage are presented in Table 1. Treatment (T_4) $CaCl_2$ 1.5% recorded significantly the lowest spoilage loss (3.85, 6.34, 24.65 and 34.85 %) at 1st, 2nd, 3rd and 4th day after storage, respectively which was at par with T_3 (25.06 %) on 3rd day. Control (T_6) recorded the maximum per cent spoilage loss (9.86, 11.50, 37.26 and 47.18 %) at 1st, 2nd, 3rd and 4th day after storage, respectively.

Days to shrivelling initiation: The mean data on days to shrivelling initiation as influenced by various post harvest treatments were recorded at 1st, 2nd, 3rd and 4th day after storage are presented in Table 1. The data pertaining to days to shrivelling initiation (Days) at 1st, 2nd, 3rd and 4th day after storage were observed and found significantly influenced by various post harvest treatments. Treatment T_4 ($CaCl_2$ 1.5 %) recorded significantly the late shrivelling initiation (3.25 days) after storage compared to rest of the treatments. Control (T_6) recorded early shrivelling initiation (1.00 day) after storage.

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Marketable fruits (%): The observations were recorded on per cent marketable fruits as influenced by various post harvest treatments and noticed significantly influenced at 1st, 2nd, 3rd and 4th day after storage are presented in Table 1. Treatment T_4 ($CaCl_2$ 1.5%) recorded significantly the maximum marketable fruits (94.75, 90.00, 70.25 and 63.25 %) at 1st, 2nd, 3rd and 4th day after storage, respectively as compare to rest of the post harvest treatments, which was at par with T_2 (69.75) and T_3 (69.50) on 3rd day. Control (T_6) recorded the minimum marketable fruits (86.50, 80.25, 58.75 and 50.25 %) at 1st, 2nd, 3rd and 4th day after storage, respectively.

Treatment T_4 ($CaCl_2$ 1.5 %) recorded significantly the lowest physiological loss in weight (6.08 %, 11.54 %, 18.04 % and 22.32 %) at 1st, 2nd, 3rd and 4th day after storage, respectively as compared to rest of the post harvest treatments. This might be due to the role of calcium on limiting respiration, which was attributed to altered membrane permeability (Bangerth, 1979) in grape. Bangerth *et al.* (1972) stated that calcium could have reduced the endogenous substrate catabolism during respiration by limiting the diffusion of substrate from the vacuole to the cytoplasm and favoured the uptake of sorbitol, thus disallowing its involvement in reactions related to internal breakdown in apple. Treatment T_4 ($CaCl_2$ 1.5%) recorded significantly the lowest spoilage loss (3.85 %, 6.34 %, 24.65 % and 34.85 %) at 1st, 2nd, 3rd and 4th day after storage as compared to rest of the post harvest treatments. The reduction in fruit spoilage with the application of calcium may possibly be due to its effect on firmness of fruit tissue by retarding rate of respiration and preventing cellular disintegration by maintaining synthesis, which leads to delayed senescence reported by Singh *et al.* (1993). The results obtained in present study are supported by the findings of several researchers, Chundawat *et al.* (1976) in guava and Scott and Wills (1975) in apples.

Treatment T_4 ($CaCl_2$ 1.5 %) recorded significantly the late days to shriveling initiation (3.25 days) after storage as compared to rest of the post harvest treatments might be because of additional contributory strength of cell wall. Irrespective of in vivo calcium content of tissue cell wall, substantially increased concentration might have provided additional strength facilitating delayed degradation followed by increased permeability of cell wall. The net result of such type of intermediary modified structural features of cell wall might have suppressed the metabolic activities in the rind portion and rest of the constituent morphological parts of whole fruit (Santosh *et al*. 2002) in mango. Similar findings were reported by Singh *et al*. (2000) in litchi. Treatment T_4 ($CaCl_2$ 1.5%)recorded significantly the maximum marketable fruits (94.75 %, 90.00 %, 70.25 % and 63.25 %) at 1st, 2nd, 3rd and 4th day after storage respectively as compared to rest

Table 1: Effect of post harvest treatments on physiological loss in weight, spoilage loss, days to shrivelling and marketable fruits of jamun (*Syzygium cuminii* Skeels) Cv. Local

Treatments	Physiological loss in weight (%)				Spoilage loss (%)				Days to shrivelling initiation(Days)	Marketable fruits (%)			
	1st Day	2nd Day	3rd Day	4th Day	1st Day	2nd Day	3rd Day	4th Day		1st Day	2nd Day	3rd Day	4th Day
T_1- GA_3 50 mg/l	8.34	15.86	25.13	30.85	6.93	11.02	36.58	45.76	1.50	89.50	84.75	59.25	48.75
T_2-GA_3 100 mg/l	7.64	12.93	22.63	27.96	6.02	10.62	26.06	37.59	2.25	90.25	85.50	69.75	59.50
T_3- $CaCl_2$ 1 %	6.53	11.83	18.29	22.83	4.84	9.14	25.06	36.19	2.75	92.25	85.75	69.50	60.75
T_4- $CaCl_2$ 1.5 %	6.08	11.54	18.04	22.32	3.85	6.34	24.65	34.85	3.25	94.75	90.00	70.25	63.25
T_5- $Ca(NO_3)_2$ 1.5 %	7.91	12.32	20.74	24.71	5.51	9.78	26.05	38.12	2.65	92.00	86.75	68.25	59.25
T_6- Control(Water treatment)	11.23	17.12	26.35	34.65	9.86	11.50	37.26	47.18	1.00	86.50	80.25	58.75	50.25
S.Em. (±)	0.08	0.09	0.22	0.27	0.14	0.16	0.31	0.31	0.10	0.50	0.66	0.45	0.42
C. D. at 5%	0.24	0.28	0.67	0.81	0.44	0.49	0.93	0.94	0.31	1.49	1.98	1.34	1.25
C. V. %	2.03	1.40	2.08	2.01	4.84	3.45	2.15	1.59	9.56	1.11	1.56	1.37	1.48

of the post harvest treatments. This might be due to the unsealing of lenticels that are responsible for higher rate of transpiration and respiration, which are subjected to the physiological activities. This finding was in line with Haribabu *et al*. (1990) in custard apple.

CONCLUSION

It is concluded that post harvest treatment of jamun fruits treated with $CaCl_2$ 1.5 % significantly reduces physiological loss in weight, spoilage loss, late shrivelling initiation and the highest marketable fruits.

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