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Influence of foliar spray of nutrients on yield, quality and economics of Sapota cv. Kalipatti

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Abstract
In the present work influence of foliar spray of nutrients on yield and quality of sapota fruits cv. Kalipatti was examined at two different locations *viz.* Regional Horticultural Research Station, ACHF, NAU, Navsari and Fruit Research Station, NAU, Gandevi, during the year 2020-21. The treatment T7 (foliar application of Novel organic liquid nutrients 2.0%) gave pragmatic results with respect to fruit's physical characters *viz.*, length, diameter, weight, pulp weight and peel weight for both the locations and pooled. The maximum pulp: peel ratio was obtained with the foliar application of Novel organic liquid nutrients 1.0% (T6) at Navsari location while for Gandevi location and pooled it was noted maximum in treatment T_7 (Novel organic liquid nutrients 2.0%). There was no significant effect of foliar spray of nutrients on specific gravity of fruit, number of seeds per fruit and weight of seeds of sapota fruit. In case of yield parameters, number of fruits per tree in grade A and B along with the fruit yield was reported maximum in the treatment T7 (Novel organic liquid nutrients 2.0%) for both the locations and pooled. Same trend was observed in case of quality parameters. From economic point of view and based on fruit yield per hectare the highest net realization was obtained in the treatment T7 (Novel organic liquid nutrients 2.0%) whereas, the maximum benefit cost ratio was obtained in the treatment T6 (Novel organic liquid nutrients 1.0%) in pooled.

Keywords: Sapota, Kalipatti, Novel Organic Liquid Nutrients, yield, quality, economics

Introduction
Sapota (*Malinkara acharas* Mill Fosberg L.) is grown throughout the tropics for its delicious fruits.It belongs to family "Sapotaceae" and is native to tropical America. It is introduced from tropical America to other countries such as Southern Florida in the United States, India, Sri Lanka, Indonesia, Burma, Guatemala, Philippines and Caribbean Islands. In India, it is not exactly known when sapota was introduced, but its cultivation was taken up for the first time in Maharashtra in 1898 in a village named Gholwad.

Many sapota varieties are grown in different parts of India. 'Kalipatti' is the popular cultivar in the Gujarat state of India, accounting about 99% of acreage. Trees have spreading branches with broad, thick and dark leaves. Fruits are in oval to round shape, good quality, mallow flesh, sweet with mild fragrance. It also appears to be the highest yielding cultivar of those tested in India (Chundawat and Bhuva, 1982) [6].

The foliar feeding of fruit trees has gained much importance in recent years, as nutrients applied through soil are needed in higher quantity because some amount leaches down and some become unavailable to the plant due to complex soil reactions. Novel Organic Liquid Nutrients is suitable for foliar and soil application developed by Navsari Agricultural University, Navsari. It has been prepared by using only organic inputs, hence suitable for use in organic farming system as liquid formulation. Novel Organic Liquid Nutrients is prepared from banana pseudostem comprising of macro and micro-nutrients along with growth promoting substances like cytokinin, GA3, *etc.* (Anon., 2014) [4]. It is used for initiation of flowering, increase fruit setting and reduce fruit drop in number of fruit and vegetable crops, which ultimately increase yield and quality as well as reduce cost of cultivation.

Material and Methods
The experiment was carried out at two different locations *i.e.* Regional Horticultural Research Station, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari and Fruit Research Station, Navsari Agricultural University, Gandevi during the year 2020-21. Uniform size sapota trees (30 years old) of cv. Kalipatti planted at spacing of 10 m x 10 m, were selected for the experiment.

As per the recommendations by Navsari Agricultural University improved cultural practices with respect to manures and fertilizers, irrigation, interculturing, plant protection measures, *etc*. were carried out in sapota orchard during the experimental period. The experiment was laid out in Completely Randomized Design with ten treatments *viz*. T1: Calcium nitrate 0.4%, T2: Potassium silicate 0.5%, T3: Calcium silicate 0.5%, T4: Zinc silicate 0.5%, T5: Boric acid 0.2%, T6: Novel organic liquid nutrients 1.0%, T7: Novel organic liquid nutrients 2.0%, T8: Seaweed extract 1.0%, T9: Seaweed extract 2.0% and T10: Control with three repetitions. Foliar spray was done twice during last week of February and March.

Results and Discussion

The results and the significant findings of the current research have been adequately discussed under relevant headings.

Physical parameters

The persual of the data (Table 1) revealed that the trees sprayed with Novel organic liquid nutrients 2% (T7) beared the fruits with maximum length (6.07, 5.60 and 5.83 cm); diameter (5.73, 5.33 and 5.53 cm) and weight (87.67, 80.73 and 84.20 g) at both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. Whereas the minimum fruit length (5.27, 4.80 and 5.07 cm); fruit diameter (5.07, 4.60 and 4.83 cm) and fruit weight (68.33, 64.13 and 66.23 g) were obtained in T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. The increase in fruit physical parameters such as fruit length, diameter and weight was probably due to higher accumulation of carbohydrates in plant treated with Novel organic liquid nutrients which resulted in a better nutrient supply, which cause an increase in fruit size and there by an increase in its length. The presence of growth regulator like cytokinins in Novel organic liquid nutrients resulting in cell division, cell elongation and increased volume of intercellular spaces in the mesocarpic cells which inturn increased the diameter of the fruit (Sharma *et al.*, 2005) [17]. The increase in cell size and intercellular spaces coupled with accumulation of water and nutrients in greater amount increases the weight of fruit (Garhwal, 2015) [7]. The present results are in accordance with Patil *et al.* (2017) [14] in banana; Patel *et al.* (2018c) [13] in mango; Parmar *et al.* (2018) [10] in papaya and Rathod *et al.* (2017) [15] in pomegranate.

The sapota trees sprayed with foliar application of Novel organic liquid nutrients 2.0% (T7) (Table 2) produced the fruits having higher pulp weight (72.89, 69.23 and 71.05 g); peel weight (9.40, 10.13 and9.77 g) at both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. The pulp: peel ratio was found maximum (7.88) in treatment T6 (Novel organic liquid nutrients 1.0%) for Navsari location but for Gandevi location and pooled maximum pulp: peel ratio (6.83 and 7.29, respectively) was observed with treatment T7 (Novel organic liquid nutrients 2.0%). The minimum pulp weight (50.48, 47.03 and 48.75 g); peel weight (7.67, 8.13 and 7.90 g) and pulp: peel ratio (6.58, 5.78 and 6.18) was recorded in treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. The significant increase in pulp weight, peel weight and pulp: peel ratio of sapota fruit in treatments T7 (foliar spray of Novel organic liquid nutrients 2.0%) and T6 (foliar spray of Novel organic liquid nutrients 1.0%) might be due to the direct involvement of growth regulators *viz*., gibberellins and cytokinins present in Novel organic liquid nutrients in the acceleration of biochemical activities in plant parts and translocation of mineral nutrients during the process of fruit development. The increase in pulp weight could also be attributed to increase in size and weight of fruits. Moreover, probably there would be a greater diversion of photosynthates to sink (fruit) which ultimately added to the pulp of fruit (Garhwal, 2015) [7]. Similar results were also reported by Patel *et al.* (2018c) [13] in mango and Parmar *et al.* (2018) [10] in papaya.

Yield parameters

Number of Fruits/ Tree (As Per Grades)

Among the different foliar application treatments (Table 3), T_7 *i.e.* Novel organic liquid nutrients 2.0% recorded significantly maximum number of grade-A fruits per tree (565.23, 583.63 and 574.43) at Navsari, Gandevi and in pooled, respectively. With respect to grade-B fruits, maximum number of fruits per tree (1410.33, 1365.67 and 1388.00) were obtained due to foliar application of Novel organic liquid nutrients 2.0% (T7) at Navsari, Gandevi and in pooled, respectively. While the lowest number of fruits per tree in grade- A (425.00, 458.37 and 441.68) and grade- B (970.55, 1068.90 and 1019.73) were obtained in treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

Fruit Yield

The data (Table 4) revealed that the significantly maximum fruit yield (173.21, 157.50 and 165.35 kg/tree) and (17.32, 15.75 and 16.54 t/ha) were recorded with the treatment T7 (Novel organic liquid nutrients 2.0%) for both the locations *i.e.* Navsari, Gandevi and in pooled data, respectively. Whereas, the minimum fruit yield (95.77, 98.10 and 96.94 kg/tree) and (9.58, 9.81 and 9.69 t/ha) were obtained under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

The fruit yield parameters such as number of fruits and fruit yield were found maximum in treatment T7 (Novel organic liquid nutrients 2.0%). The increase in yield and yield parameters may be attributed to the positive influence of macro and micronutrients present in novel organic nutrients by carbohydrates synthesis and their translocation to the potential storage organs resulting in better growth and a greater number of fruits per tree. The presence of plant growth regulators such as gibberellic acid, NAA, cytokinin and macronutrients (N, P, K, Ca, Mg and S) and micronutrients (Mn, Cu and Zn) which are essential for reproductive part of plant resulting in improvement of yield and yield attributing characters. Present study also corroborated with the findings of Anon. (2012) [2], Patel *et al.* (2018a) [11] and Modi *et al.* (2019) [9] in mango; Anon. (2014) [4] and Patil *et al.* (2017) [14] in banana; Parmar *et al.* (2018) [10] in papaya; Rathod *et al.* (2017) [15] in pomegranate.

Quality parameters

Total soluble solids (oBrix) and Titrable acidity (%)

Significantly higher values of TSS (22.30, 20.23 and 21.27 °Brix) was obtained in the treatment T7 (Novel organic liquid nutrients 2.0%) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. While the lowest values of TSS (18.10, 16.48 and 17.29 °Brix) were noted under the treatment T10 (Control) for both the locations and in pooled data, respectively.

Foliar application of treatment T7 (Novel organic liquid nutrients 2.0%) noted significantly lower titrable acidity (0.113, 0.105 and 0.109%) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively. While a relatively higher titrable acidity (0.145, 0.136 and 0.140%) was recorded under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

The persuals of data revealing higher values of TSS and lower values of titrable acidity (Table 5) in treatment T7 (Novel organic liquid nutrients 2.0%) might be due to Novel organic liquid nutrients contain potassium which favours the conversion of starch into simple sugars during ripening by activating the sucrose synthetase enzyme thus resulting in higher TSS and decreased acidity. The lower titrable acidity percent obtained may be due to the conversion of acid under influence of micronutrients present in Novel organic liquid nutrients by reactions involving reversal of glycolytic pathway (Ruffner *et al.*, 1975) [16]. The possible role of zinc might also be responsible in reducing acidity by activation of many enzymes (Abedy, 2001) [1]. A similar view was also shared Patel *et al.* (2018b) [12] in mango and Anon. *et al.* (2013) [3] and Parmar *et al.* (2018) [10] in papaya.

Ascorbic Acid (mg/ 100 g pulp)

Significantly maximum ascorbic acid content (Table 5) *i.e.* 18.91, 17.33 and 18.12 mg/100 g pulp was recorded under the treatment T7 (Novel organic liquid nutrients 2.0%) at both the locations *i.e.* Navsari, Gandevi and in pooled, respectively might be attributed to the fact that the potassium present as a macro nutrient in novel organic liquid nutrients plays a regulatory role in many physiological and biochemical process of plant (Bowling, 1972) [5]. It is very mobile in the plant since it is transported directly towards the meristematic tissues and participates in numerous enzymatic reactions and is an important factor in the development of fruit colour, TSS and vitamin C content. The present observation is in conformity with the results reported by Patel *et al.* (2018b) [12] in mango. While minimum ascorbic acid (14.97, 13.63 and 14.30 mg/100 g pulp) was reported under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

Reducing sugars, Total sugars and Non-reducing sugars (%)

The maximum reducing sugars content (9.94, 9.23 and 9.59%) was noted in the fruits harvested from the trees received the treatment T7 (Novel organic liquid nutrients 2.0%) the same result was observed in total sugars content (17.96, 16.37 and 17.17) and non-reducing sugars content (8.02, 7.14 and 7.58%) (Table 6) this might be attributed to the presence of macro and micronutrients in Novel organic liquid nutrients resulting in quick metabolic transformation of starch and pectin into soluble compounds, and rapid translocation of starch and pectin into soluble compounds from leaves to developing fruits and ultimately enhanced conversion of starch and pectin into soluble sugar. Moreover, the presence of zinc in Novel organic liquid nutrients plays an important role in photosynthesis and related enzymes, which leads to increasing sugars. Potassium content in Novel organic liquid nutrients could be involved to enhance the photosynthetic efficiency of the leaves and a possible increase in translocation of assimilates into the fruit. It is also functional in the transport of carbohydrates and translocation of sugars which leads to increase in metabolism of the plant and high metabolic changes in the fruits, leading to conversion of complex polysaccharides into simple sugars this might have increased both reducing and non-reducing sugars contents of the fruit. Similar observations were also reported by Anon. (2012) [2] and Patel *et al.* (2018b) [12] in mango. The minimum reducing sugars content (8.00, 7.43 and 7.72%), total sugars content (14.88, 13.55 and 14.21%) and non-reducing sugars content (6.88, 6.10 and 6.49%) was recorded under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

Physiological Loss in Weight (%)

The minimum physiological loss in weight was noted with treatment T7 (Novel organic liquid nutrients 2.0%) (Table 5) at Navsari (35.78%), Gandevi (32.73%) and pooled (34.26%) which might be due to different macro and micronutrients available in Novel organic liquid nutrients which might have caused chemical changes within the fruits so the fruits could retain more water against the force of evaporation and it may form some of the proteinaceous constituents of the cell so as to increase the affinity for water and thereby lowering the physiological loss in weight of the fruit. The finding is in agreement with the results reported by Gurjar *et al.* (2015) [8] in mango. Whereas the maximum physiological loss in weight *i.e.* 64.29, 59.90 and 62.10% of sapota was noted under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

Shelf Life (Days)

The shelf life of sapota fruits was significantly affected due to different treatments of foliar application of nutrients (Table 6). The maximum shelf life of sapotafruits was recorded in treatment T7 (Novel organic liquid nutrients 2.0%) for both the locations *i.e.* Navsari (8.27 days), Gandevi (8.40 days) and in pooled (8.33 days) which might be due to Novel organic liquid nutrients contain gibberellic acid that could enhance shelf life as it acts as an anti-ethylene and ultimately delays the ripening process. The calcium in it helps in building the structural integrity of both the cell wall and plasma membrane which delays the ripening and extends the storage life. The binding action of calcium in the cell wall suppresses ethylene production and retard ripening (Patel *et al*., 2017) [14]. Effect of calcium was found to be most effective to prolong shelf life by decreasing the respiration rate and improving the shelf life. The finding is in agreement with the results reported by Patel *et al.* (2018b) [12] and Gurjar *et al.* (2015) [8] in mango and Anon., (2013) [3] in papaya. The minimum shelf life (5.80, 6.20 and 6.00 days) of sapota fruits was reported under the treatment T10 (Control) for both the locations *i.e.* Navsari, Gandevi and in pooled, respectively.

Economics

In pooled results (Table 7), the highest net realization (₹ 210221) was obtained in the treatment T7 (Novel organic liquid nutrients 2.0%) which was closely followed by treatment T6 (Novel organic liquid nutrients 1.0%). However, the maximum benefit cost ratio (1.77) recorded in the treatment T6 (Novel organic liquid nutrients 1.0%) followed by treatment T7 (Novel organic liquid nutrients 2.0%).

Table 1: Effect of foliar application of nutrients on physical parameters of sapota

Treatments	Fruit length (cm)			Fruit diameter (cm)			Fruit weight (g)		
	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled
T1	5.40	5.07	5.23	5.13	4.80	4.97	73.87	67.47	70.67
T2	5.67	5.13	5.40	5.33	4.93	5.13	77.13	70.47	73.80
T3	5.47	5.07	5.27	5.20	4.87	5.03	75.40	69.00	72.20
T4	5.33	4.87	5.10	5.20	4.80	5.00	71.60	65.20	68.40
T5	5.33	4.87	5.10	5.13	4.67	4.90	70.87	64.60	67.73
T6	5.93	5.40	5.67	5.53	5.13	5.33	84.33	76.87	80.60
T7	6.07	5.60	5.83	5.73	5.33	5.53	87.67	80.73	84.20
T8	5.73	5.20	5.47	5.33	5.00	5.17	78.53	71.53	75.03
T9	5.67	5.27	5.03	5.53	5.07	5.30	81.13	73.93	77.53
T10	5.27	4.80	5.07	5.07	4.60	4.83	68.33	64.13	66.23
S.Em. ±	0.12	0.15	0.09	0.11	0.12	0.07	2.21	1.80	1.30
C.D. at 5%	0.34	0.44	0.25	0.33	0.34	0.21	6.51	5.30	3.70
C.V. %	3.58	5.09	4.34	3.70	4.07	3.87	4.97	4.42	4.74
S.Em. ±(L x T)	-	-	0.13	-	-	0.12	-	-	2.01
C.D. at 5% (L x T)	-	-	NS	-	-	NS	-	-	NS

Table 2: Effect of foliar application of nutrients on pulp and peel weight and their ratio in sapota

Treatments	Pulp weight (g)			Peel weight (g)			Pulp: Peel ratio		
	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled
T1	56.96	52.90	54.92	8.40	8.73	8.57	6.78	6.05	6.42
T2	60.19	56.38	58.28	8.07	8.93	8.50	7.46	6.32	6.89
T3	60.46	54.30	57.38	8.40	8.93	8.67	7.19	6.08	6.64
T4	54.21	50.57	52.38	7.80	8.47	8.13	6.95	5.97	6.46
T5	53.42	49.77	51.59	8.00	8.47	8.23	6.68	5.87	6.28
T6	68.31	64.43	66.38	8.67	9.67	9.17	7.88	6.67	7.27
T7	72.89	69.23	71.05	9.40	10.13	9.77	7.75	6.83	7.29
T8	62.48	58.03	60.28	8.00	9.20	8.60	7.81	6.31	7.06
T9	65.33	60.50	62.92	8.67	9.40	9.03	7.54	6.45	6.99
T10	50.48	47.03	48.75	7.67	8.13	7.90	6.58	5.78	6.18
S.Em. ±	1.73	1.38	1.02	0.15	0.22	0.13	0.10	0.12	0.08
C.D. at 5%	5.11	4.07	2.89	0.44	0.65	0.38	0.29	0.34	0.23
C.V. %	4.96	4.26	4.65	3.08	4.25	3.76	2.33	3.23	2.91
S.Em. ± (L x T)	-	-	1.57	-	-	0.19	-	-	0.11
C.D. at 5% (L x T)	-	-	NS	-	-	NS	-	-	NS

Table 3: Effect of foliar application of nutrients on number of fruits/ tree of sapota

Treatments	Navsari		Number of fruits/tree			
			Gandevi		Pooled	
Grade A		Grade B	Grade A	Grade B	Grade A	Grade B
T1	463.87	1159.25	462.73	1097.33	463.30	1128.30
T2	490.01	1245.18	481.00	1198.40	485.50	1221.79
T3	478.75	1226.88	473.67	1169.93	476.21	1198.41
T4	442.00	1071.54	462.03	1075.37	452.02	1073.45
T5	435.20	1028.68	460.47	1071.90	447.84	1050.29
T6	558.98	1404.49	541.33	1331.80	550.16	1368.14
T7	565.23	1410.33	583.63	1365.67	574.43	1388.00
T8	508.97	1302.13	498.17	1230.87	503.57	1266.50
T9	531.09	1350.59	524.63	1276.47	527.86	1313.53
T10	425.00	970.55	458.37	1068.90	441.68	1019.73
S.Em. ±	20.67	57.04	22.96	57.80	14.47	38.76
C.D. at 5%	60.99	168.28	67.72	170.51	41.15	110.24
C.V. %	7.31	8.12	8.04	8.42	7.69	8.27
				L x T: S.Em ±	21.84	57.42
				L x T: C.D. at 5%	NS	NS

Table 4: Effect of foliar application of nutrients on yield of sapota

Treatments	kg/ tree			t/ha		
	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled
T1	120.87	105.13	113.00	12.09	10.51	11.30
T2	133.27	118.17	125.72	13.33	11.82	12.57
T3	128.72	113.64	121.18	12.87	11.36	12.12
T4	108.78	100.27	104.53	10.88	10.03	10.45

T5	103.09	99.03	101.06	10.31	9.90	10.11
T6	165.71	143.70	154.71	16.57	14.37	15.47
T7	173.21	157.50	165.35	17.32	15.75	16.54
T8	142.72	123.33	133.03	14.27	12.33	13.30
T9	152.02	133.37	142.69	15.20	13.34	14.27
T10	95.77	98.10	96.94	9.58	9.81	9.69
S.Em. ±	5.48	5.51	3.86	0.55	0.55	0.39
C.D. at 5%	16.15	16.25	10.99	1.61	1.62	1.10
C.V. %	7.16	8.00	7.56	7.15	8.00	7.55
S.Em. ± (L x T)	-	-	5.49	-	-	0.55
C.D. at 5% (L x T)	-	-	NS	-	-	NS

Table 5: Effect of foliar application of nutrients on TSS, acidity, ascorbic acid content and physiological loss in weight of sapota fruits

Treatments	TSS (°Brix)			Terrible acidity (%)			Ascorbic acid content (mg/ 100 g pulp)			PLW (%)		
	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled
T1	19.34	17.57	18.45	0.129	0.120	0.125	16.10	14.67	15.38	49.84	46.70	48.27
T2	19.92	18.10	19.01	0.125	0.116	0.120	16.67	15.17	15.92	45.34	42.60	43.97
T3	19.60	17.90	18.75	0.127	0.119	0.123	16.35	14.93	15.64	47.82	45.03	46.43
T4	18.76	17.10	17.93	0.132	0.124	0.128	15.61	14.23	14.92	53.39	49.27	51.33
T5	18.62	16.97	17.79	0.138	0.128	0.133	15.44	14.07	14.75	56.76	54.03	55.40
T6	21.40	19.43	20.42	0.117	0.109	0.113	18.13	16.53	17.33	39.09	36.13	37.61
T7	22.30	20.23	21.27	0.113	0.105	0.109	18.91	17.33	18.12	35.78	32.73	34.26
T8	20.22	18.37	19.29	0.122	0.113	0.118	17.00	15.53	16.26	43.62	40.63	42.13
T9	20.81	18.82	19.82	0.119	0.110	0.114	17.37	15.83	16.60	40.21	37.30	38.76
T10	18.10	16.50	17.30	0.145	0.136	0.140	14.97	13.63	14.30	64.29	59.90	62.10
S.Em. ±	0.53	0.45	0.31	0.003	0.003	0.002	0.35	0.29	0.21	1.47	1.23	0.87
C.D. at 5%	1.55	1.32	0.89	0.010	0.008	0.007	1.04	0.86	0.59	4.32	3.63	2.48
C.V. %	4.57	4.28	4.45	4.440	4.164	4.320	3.66	3.33	3.51	5.33	4.79	5.09
S.Em. ± (L x T)	-	-	0.49	-	-	0.003	-	-	0.32	-	-	1.35
C.D. at 5% (L x T)	-	-	NS	-	-	NS	-	-	NS	-	-	NS

Table 6: Effect of foliar application of nutrients on sugars and shelf life of sapota fruits

Treatments	Reducing sugars (%)			Total sugars (%)			Non-reducing sugars (%)			Shelf-life (Days)		
	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled	Navsari	Gandevi	Pooled
T1	8.54	7.95	8.25	15.73	14.32	15.03	7.19	6.37	6.78	6.53	6.73	6.63
T2	8.87	8.23	8.55	16.20	14.74	15.47	7.33	6.49	6.91	6.87	7.20	7.03
T3	8.69	8.10	8.40	15.98	14.55	15.27	7.29	6.46	6.88	6.73	6.93	6.83
T4	8.33	7.70	8.02	15.39	14.00	14.70	7.05	6.26	6.66	6.27	6.47	6.37
T5	8.24	7.70	7.97	15.24	13.90	14.57	7.00	6.24	6.62	6.07	6.40	6.23
T6	9.56	8.87	9.22	17.30	15.71	16.50	7.73	6.85	7.29	7.67	8.00	7.83
T7	9.94	9.23	9.59	17.96	16.37	17.17	8.02	7.14	7.58	8.27	8.40	8.33
T8	9.00	8.40	8.70	16.46	14.96	15.71	7.46	6.55	7.00	6.93	7.33	7.13
T9	9.22	8.60	8.91	16.76	15.38	16.07	7.54	6.80	7.17	7.27	7.60	7.43
T10	8.00	7.43	7.72	14.88	13.55	14.21	6.88	6.10	6.49	5.80	6.20	6.00
S.Em. ±	0.21	0.14	0.11	0.20	0.18	0.12	0.11	0.11	0.07	0.35	0.34	0.22
C.D. at 5%	0.61	0.42	0.32	0.58	0.53	0.35	0.33	0.31	0.20	1.04	1.01	0.63
C.V. %	4.04	2.97	3.58	2.10	2.12	2.11	2.60	2.81	2.70	8.92	8.29	8.60
S.Em. ±(L x T)	-	-	0.18	-	-	0.18	-	-	0.11	-	-	0.35
C.D. at 5% (L x T)	-	-	NS	-	-	NS	-	-	NS	-	-	NS

Table 7: Effect of foliar application of nutrients on economics of sapota (Pooled)

Treatments	Yield (t/ha)	Cost of cultivation (₹/ ha)	Treatment cost (₹/ ha)	Harvesting cost (₹/ ha)	Total cost (₹/ha)	Gross realization (₹/ ha)	Net realization (₹/ ha)	BCR
	(1)	(2)	(3)	(4)	(5) (2+3+4)	(6)	(7) (6-5)	(8) (7/5)
T1	11.30	53986	1254	33900	89140	226000	136860	1.54
T2	12.57	56784	13830	37710	108324	251400	143076	1.32
T3	12.12	55884	10680	36360	102924	242400	139476	1.36
T4	10.45	52877	3750	31350	87977	209000	121023	1.38
T5	10.11	52300	2850	30330	85480	202200	116720	1.37
T6	15.47	60520	4650	46410	111580	309400	197820	1.77
T7	16.54	62409	8550	49620	120579	330800	210221	1.74
T8	13.30	57222	4350	39900	101472	266000	164528	1.62
T9	14.27	58940	7950	42810	109700	285400	175700	1.60
T10	9.69	51469	0	29070	80539	193800	113261	1.41

Conclusion

On the basis of present study, it is concluded that foliar application of Novel organic liquid nutrients 2.0% during last week of February and March increased the physical parameters, yield and quality of sapota fruits cv. Kalipatti at both the locations *i.e.* Navsari and Gandevi. From the economic point of view, the maximum net realization was obtained with T7 (Novel organic liquid nutrients 2%). However, T6 (Novel organic liquid nutrients %) also stood statistically equivalent with T7 in most of the parameters and recorded maximum benefit cost ratio.

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