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Influence of different chemicals and bio-mix on plant growth and physiological parameters of sapota fruits cv. Kalipatti

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Abstract
An experiment was carried out to work out the effect of 28-Homobrassinolide (0.50 and 0.75 ppm), CPPU (4 and 6 ppm), GA_3 (50 and 100 ppm), Humic Acid (1 and 2%) and Bio-mix (50, 75 and 100 ml/plant) on plant growth and fruit parameters of sapota cv. Kalipatti and observed significantly highest plant height (m), plant canopy diameter (m), lowest peel weight (g) and highest peel to pulp ratio with the application of GA_3 @ 100 ppm (T_8). The significant result in fruit parameters like the highest fruit weight (g), length of fruits (cm), diameter of fruits (cm), pulp weight (g) was recorded in the application of CPPU @ 6 ppm. However, the application of 28-Homobrassinolide @ 0.75 ppm (T_2) reported lowest fruit firmness and minimum days required for ripening of fruits after harvesting. The treatments reported non-significant effect on number of seeds per fruit and weight of seeds per fruits of sapota.

Keywords: Sapota, Kalipatti, 28-homobrassinolide, CPPU, GA_3, humic acid, bio-mix, growth regulators, *Manilkara achras*

Introduction
The sapota, *Manilkara achras* (Miller) Fosberg (Synonym: *Achras sapota*) *belonging* to the family Sapotaceae, subfamily Sapotoideae is commonly known as chiku, ciku, dilly, nasberry, sapodilla, plum and chico. It's originally from Mexico and Central America, but it's currently grown all over the tropics. India is considered to be the largest producer of sapota in the world. The sapota fruit is highly delicious in taste and good source of digestible sugar (12 to 18%) and has appreciable quantities of protein, fat, fiber and minerals like potassium, calcium and iron. The sapota growers face many problems such as lowering productivity year by year. The shelf life of the sapota fruit deteriorates as soon as the climacteric peak is attained since it is a climacteric fruit that demonstrates a fast surge in respiration after harvest. a barrier to long-distance transportation caused by a limited shelf life and rising labour costs, which lowers profit. In order to solve this issue, production must be raised by using larger, higher-quality fruits with longer shelf lives. Therefore, it is necessary to use any strategy that might aid in overcoming low productivity and short shelf life.

Materials and Method
The present investigation was carried out at the Department of Horticulture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani during 2021-2022. The experiment conducted on 25 years old plants with twelve treatments in Randomized Block Design which replicated thrice.

Details of Experiment
Crop: Sapota (*Manilkara achras* (Mill.) Forsberg)
Variety:: Kalipatti
Design: RBD
Treatment: 12
Replication: 3
Total number of plants: 36
Year of Experiment: 2021-2022
Experimental site: Department of Horticulture, V.N.M.K.V., Parbhani.

Treatment details

T_1: 28-Homobrassionoids - 0.50 ppm
T_2: 28-Homobrassionoids - 0.75 ppm
T_3: CPPU – 4 ppm
T_4: CPPU – 6 ppm
T_5: Humic Acid - 1%
T_6: Humic Acid - 2%
T_7: Gibberellic Acid – 50 ppm
T_8: Gibberellic Acid – 100 ppm
T_9: Bio-mix – 50 ml/plant
T_{10}: Bio-mix – 75 ml/plant
T_{11}: Bio-mix – 100 ml/plant
T_{12}: Control - Distilled water sprayed

No. of Sprays

The treatment of 28-Homobrassinolide, CPPU and Humic acid were sprayed twice *i.e.*, in November 2021 and January 2022. GA_3 and Bio-mix was sprayed thrice *i.e.*, in November 2021, December 2021 and January 2022.

The observations related to physical parameters of fruits were taken by selecting five fruits from harvested matured fruits. For ripening, fruits were kept in ambient temperature for observations.

Result and Discussion

The Table 1 shows that the different growth regulators and bio-mix influenced the plant growth significantly of sapota cv. Kalipatti. The highest plant height, highest plant canopy diameter in East-West and North-South direction (8.48 m, 12.06 m, and 12.10 m) was recorded in T_8 (GA_3 @ 100 ppm) over the control treatment (7.32 m, 10.64 m, and 10.51 m), respectively. This might due do gibberellic acid has tendency to increase both cell elongation and cell division as which results in increase in cell length and number of cells. Gibberellin induced growth and cell wall loosening, which results in the highest incremental tree height and canopy spread, have been linked to the activity of several cell wall enzymes. The similar results were recorded by Sahu *et al.*, (2018) [9] and Akshay *et al.*, (2020) [1] in sapota.

The Table 2 indicate that the application of different growth regulators and bio-mix shows significant result on fruits parameters. The highest weight of fruits (91.87 g) was obtained by the treatment T_4 (CPPU @ 6 ppm) as compared to control (79.68 g). It might due to that CPPU increases fruit set and significantly with ample supply of metabolites which helps in growth and development. The results were found similar with Barkule *et al.*, (2018) [2] in sapota, Smith (2008) [10] and Rafaat *et al.*, (2012) [7] in grapes.

The recorded data indicated that the highest length of sapota fruit (6.31 cm) and diameter of fruits (6.12 cm) is observed in treatment T_4 (CPPU @ 6 ppm) whereas lowest length of fruit and diameter of fruit was recorded in control (4.49 cm and 4.26 cm) respectively. These results found might due to beneficial effects of CPPU on promoting cell elongation and division as well as its important role in triggering protein, RNA, and DNA biosynthesis. The results are true with the results of Gondaliya (2017) [3] in sapota, and Rafaat *et al.*, (2012) [7] in grapes.

The treatment T_2 (28-Homobrassionoids @ 0.75 ppm) reported the lowest fruit firmness (3.96 kg/cm^2). While the highest fruit firmness (5.42 kg/cm^2) was reported by the application of T_4 (CPPU @ 6 ppm). Barkule *et al.*, (2018) [2] was also reported same result in sapota as well as Sabaghnia and Nahandi (2019) [8] found in guava. The higher fruit firmness by foliar application CPPU may be due to reduced rate of respiration ultimately loss of weight percentage was less with maximum fruit firmness. The lower fruit firmness was resulted because of 28-Homobrassinolide may be enhance rate of ethylene biosynthesis with more respiration rate turned to become more softened ripens the fruits faster ultimately decrease firmness of fruits.

The days required for ripening is significantly reduced days (4.07 days) due to the treatment T_2 (28-Homobrassionoids @ 0.75 ppm). While the longest period of days (7.13 days) required for ripening recorded in treatment T_{12} (control). Homobrassinolide enhance rate of ethylene biosynthesis which result in more respiration rate. High respiration rate results in early ripening of fruits. Hence application of 28-Homobrassionoids ripens the fruit early among all treatments. Similar nature of early ripening was also reported by Pujari *et al.*, (2010) [6] banana cv. Grand Naine and Barkule *et al.*, (2018) [2] in sapota.

The higher pulp weight of sapota fruit (80.42 g) was reported in the treatment T_4 (CPPU @ 6 ppm) as compared to control. The results are aligned with the findings of Barkule *et al.*, (2018) [2] and Patil *et al.*, (2011) [5] in sapota, it might be due to higher accumulation and translocation of extra metabolites from other parts of the tree towards developing fruits.

The treatment T_8 (GA_3 @ 100 ppm) shows the lowest peel weight (9.97 g) as well as peel to pulp ratio (8.27) of fruit over the control treatment which resulted highest peel weight (12.49 g) and higher peel to pulp ratio was recorded by T_{10} (Bio-mix @ 75 ml/plant). This might The fruit continued to accumulate the necessary assimilates after the application of GA_3, especially on the phloem, where cell division and cell elongation increased pulp percentage and decreased peel weight. These results were conformity with the results of Barkule *et al.*, (2018) [2] in sapota. Mulagund *et al.*, (2015) [4] in Banana.

The effect of treatment on the number of seeds per fruit and weight of seeds per fruit were reported non-significant effect. These findings are close conformity with Barkule *et al.*, (2018) [2].

Table 1: Effect of different chemicals and bio-mix on plant growth parameters.

Tr. No.	Treatments	Plant Height (m)		Plant canopy diameter East-West		Plant canopy diameter North-South	
		Initial	Final	Initial	Final	Initial	Final
T_1	28-Homobrassionoids-0.50 ppm	7.88	8.28	10.65	11.53	10.83	11.63
T_2	28-Homobrassionoids-0.75 ppm	7.94	8.36	10.98	11.86	10.93	11.76
T_3	CPPU-4ppm	7.61	7.94	10.36	11.17	10.53	11.28
T_4	CPPU-6ppm	7.80	8.12	10.50	11.34	10.57	11.33
T_5	Humic Acid-1%	7.25	7.64	10.11	10.86	10.20	10.91
T_6	Humic Acid-2%	7.36	7.72	10.24	11.02	10.27	11.00
T_7	Gibberellic Acid-50 ppm	7.96	8.39	11.12	12.02	11.17	12.03

T_8	Gibberellic Acid-100 ppm	8.03	8.48	11.14	12.06	11.21	12.10
T_9	Bio-mix-50 ml/plant	7.09	7.34	10.07	10.76	9.93	10.58
T_{10}	Bio-mix-75 ml/plant	7.12	7.38	10.13	10.83	9.96	10.62
T_{11}	Bio-mix-100 ml/plant	7.20	7.49	10.22	10.94	10.07	10.76
T_{12}	Control	7.09	7.32	9.70	10.64	9.89	10.51
S.Em.±		0.26	0.26	0.29	0.09	0.11	0.19
C.D. at 5%		NS	0.77	0.86	0.27	0.34	0.56

Table 2: Effect of different chemicals and bio-mix on physiological parameters of sapota fruits cv. Kalipatti

Tr. No.	Treatments	Weight of Fruit (g)	Length of Fruit (cm)	Diameter of fruit (cm)	Fruit Firmness (Kg/cm^2)	Days required for ripening	Pulp weight (g)	Peel weight (g)	Peel to pulp ratio	Number of seeds per fruit	Weight of seeds
T_1	28-Homobrassionoids-0.50 ppm	87.47	5.33	5.14	4.07	4.13	75.49	10.79	7.00	2.33	1.19
T_2	28-Homobrassionoids-0.75 ppm	89.58	5.57	5.36	3.96	4.07	77.87	10.58	7.36	2.20	1.13
T_3	CPPU-4 ppm	91.76	6.10	6.08	5.37	4.67	79.77	10.26	7.83	2.47	1.18
T_4	CPPU-6 ppm	91.87	6.31	6.12	5.42	4.20	80.42	9.97	8.09	2.13	1.21
T_5	Humic Acid-1%	85.67	4.99	4.79	4.74	6.20	73.33	11.14	6.58	2.20	1.20
T_6	Humic Acid-2%	86.27	5.11	4.92	4.40	5.93	73.40	11.68	6.28	2.47	1.19
T_7	Gibberellic Acid-50 ppm	90.88	5.81	5.58	5.26	5.40	80.32	9.88	8.07	2.13	1.23
T_8	Gibberellic Acid-100 ppm	91.38	5.92	5.72	5.09	5.07	80.69	9.72	8.27	2.27	1.24
T_9	Bio-mix-50 ml/plant	79.76	4.58	4.39	4.27	7.13	66.08	12.45	5.31	2.60	1.23
T_{10}	Bio-mix-75 ml/plant	81.86	4.78	4.55	4.23	6.53	67.75	12.90	5.25	2.40	1.21
T_{11}	Bio-mix-100 ml/plant	82.49	4.98	4.73	4.11	6.27	68.98	12.37	5.58	2.27	1.14
T_{12}	Control	79.68	4.49	4.26	4.19	7.13	66.03	12.49	5.29	2.53	1.16
S.Em.±		0.17	0.15	0.06	0.16	0.15	0.20	0.05	0.03	0.11	0.07
C.D. at 5%		0.52	0.46	0.20	0.47	0.46	0.60	0.16	0.10	NS	NS

Conclusion

The result of present investigation brings to the conclusion that among all the treatments application of GA_3 @ 100 ppm was most effective and significant treatment for plant growth which resulted in highest plant height and maximum spread of plant canopy diameter in East-West and North-South diarection. The fruit parameters like weight of fruits, length and diameter of fruits, fruit firmness, high pulp weight, peel to pulp ratio and lower peel weight, was most effective by the application of CPPU @ 6 ppm.

References

1. Akshay, Devender C, Rathee M, Tomar D. Influence of Plant Growth Regulators on Flowering, Fruiting, Yield and Quality of Sapota [*Manilkara zapota* (L.) P. Royen] cv. Cricket Ball. Ind. J Pure App. Biosci. 2020;8(4):499-508.
2. Barkule SR, Patel BN, Baghele RD. Effect of 28-Homobrassinolide, CPPU, GA3 and Humic Acid on Quality and Shelf-Life of Sapota (*Manilkara achras*) cv. Kalipatti. International Journal of Current Microbiology and Applied Sciences. 2018;6:962-967.
3. Gondaliya PJ, Tandel YN, Rathiva K, Gangode A. Influence of preharvest spray on physical charaacteristics of sapota cv. Kalipatti fruits. Trends in Biosciences, 2017, 10(28). Print: ISSN 0974-8431.
4. Mulagund J, Kumar S, Soorianathasundaram K, Porika, H. Influence of post shooting sprays of sulphate of potash and certain growth regulators on bunch characters and fruit yield of banana cv. Nendran (French plantain *Musa* AAB). The Bioscan. 2015;10(1):153-159.
5. Patil MB, Munde GR, Nainwad RV, Mane SS. Studies on effect of plant growth regulators on physical characters of sapota. The Asian Journal of Horticulture. 2011;6(1):98-100.
6. Pujari CV, Marbhal SK, Pawarand RD, Badgujar CD. Effect of bio regulators and different levels of N and K on the finger size and yield and banana cv. Grand Naine (AAA). The Asian J of Hortic. 2010;5(2):453-457.
7. Rafaat, Ghada SS, Ola AA. Effect of foliar spraying with gibberellic acid and/or sitofex on bud behavior, vegetative growth, yield and cluster quality of Thompson Seedless grapevines. Journal of American Science. 2012;8(5):21-34.
8. Sabaghnia Z, Nahandi FZ. Effects of Forchlorofenuron (CPPU) treatment on fruit properties in the fruit of common guava. *Pobranez czasopisma* Annales C – Biologia, 2019, 22(2).
9. Sahu CK, Patel MK, Panda CM. Effect of Pruning and Plant Growth Regulator on Plant Growth and Fruit Yield of Sapota (*Manilkara zapota* L.) cv. Cricket Ball. Int. J Curr. Microbiol. App. Sci. 2018;7(9) 1352-1357.
10. Smith Rhonda. The use of CPPU in wine grapes to increased fruit set. UC co-operative extention Sonoma country, 133aviation blvd, suite 109, santa rosa, ca. 2008;94503:1-4.