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Effect of different plant growth regulators and bio-mix on yield and physio-chemical parameters of sapota fruits cv. Kalipatti

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Abstract
A field experiment was conducted at department of horticulture, VNMKV, Parbhani during 2021-2022 year to study the effect of different growth regulators like 28- Homobrassinolide, CPPU, GA_3 and Humic Acid and Bio-mix on yield of sapota fruits and physio-chemical parameters of sapota cv. Kalipatti. The different plant growth regulators *i.e.,* 28-Homobrassionoids @ 0.50 ppm and @ 0.75 ppm, CPPU @ 4 ppm and 6 ppm, Humic Acid @ 1% and 2%, GA_3 @ 50 ppm and 100 ppm and Bio-mix @ 50 ml, 75 ml and 100 ml/plant were applied through foliar spray. The obtained results shows that the fruit yield parameters in terms of number of fruits harvested per plant, fruit yield (kg) and yield of fruits per hectare (q) was recorded maximum (1812.19, 165.60 kg and 16.56 q respectively) in plants which were treated by GA_3 @ 100 ppm. The CPPU treatments shown significant effect on physio-chemical parameters of sapota fruits. The highest TSS (24.22 ºBrix), high reducing sugar (11.46%), highest non-reducing sugar (9.47%), high ascorbic acid (25.17 mg/100 ml) and lowest Acidity (0.0321%) was observed in treatment of CPPU @ 6 ppm as compared to control.

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

Introduction
The Sapota or Sapodilla (*Manilkara zapota*), an evergreen fruit tree that is commonly referred to as chiku in India, is a member of the Ericales order, Sapotaceae family and sub family sapotoideae. Being tropical family sapotaceae, it has 50 genera and 1200 species. The chromosome number of sapota is 2n=26. (Agrawal and Dikshit (2010) [1]. Kalipatti is the main cultivar among different cultivar and more than 99% areas under sapota in Maharashtra are of this cultivar. The fruit is native to tropical America specially the south Mexico or central America. It is a tropical fruit crop that was brought to India at the end of the nineteenth century and thrived under the patronage of Maharashtra farmers. It was planted for the first time in Maharashtra in 1898 in the village of Gholwad district Palghar. (Cheema *et al.,* 1954) [9]. The sapota fruit has a sweet and delightful flavour, as well as a lot of nutritious content. Sapodilla is one of the excellent fruits for providing rapid energy because it is high in fructose and sucrose and is considered a natural energy booster. This delicious fruit is store house of nutrients that are beneficial to one's wellbeing. The sapota is full of antioxidants, vitamins A, C, and E, copper, iron, and other minerals. Sapota is an easily digestible fruit. The productivity of Maharashtra is lower as compared to national productivity of sapota, growth regulators play an important role in increasing growth and productivity of sapota. By applying plant growth regulators, a lot of emphasis has been dedicated recently to preventing flower and fruit drop and enhancing flowering and fruit set in a variety of fruit crops which is the main problem for sapota cultivars.

Materials and Methods
An experiment was carried in 2021-22 year at Department of Horticulture, VNMKV, Parbhani to study the effect of different plant growth regulators and bio-mix at different concentrations. 25 years old plants were selected for the present experiment. Sapota trees were treated with different chemicals and bio-mix in Randomized Block Design with three replications. The treatments were T_1- 0.50 ppm 28-Homobrassinolide, T_2 -0.75 ppm 28- Homobrassinolide, T_3 – 4 ppm CPPU, T_4 – 6 ppm CPPU, T_5 - 1% Humic Acid, T_6 - 2% Humic Acid, T_7 – 50 ppm Gibberellic Acid, T_8 – 100 ppm Gibberellic Acid, T_9 - 50ml/plant Bio-mix, T_{10} – 75 ml/plant

Bio-mix, T_{11} – 100 ml/plant Bio-mix, T_{12} - Control (Distilled water sprayed). The treatment of CPPU, Humic acid and 28-Homobrassinolide was sprayed twice in November 2021 and January 2022. GA_3 and Bio-mix was sprayed thrice in November 2021, December 2021 and January 2022. The observations related to physio-chemical characters of fruits were taken by selecting randomly five fruits harvested matured fruits.

Result and Discussion

The results of effect of different chemicals and Bio-mix sprayed on sapota cv Kalipatti is presented in given table 1. The observations indicate that the application of chemical treatments affected significantly influenced the yield and physio-chemical parameters of sapota fruits cv. Kalipatti.

The highest number of fruits (1841.53), highest yield of fruits in kg (169.18 kg) and par hectare yield (16.92 q) was recorded in treatment T_4 (CPPU @ 6 ppm) over the T_{12} (control) (1286.36, 102.50 kg, and 10.25 q) respectively. This might be because CPPU treatments affects fruit set, fruit retention, fruit growth, and fruit development, which causes a greater quantity of large-sized fruits to mature and be ready for harvest. Similar results were recorded by Gondaliya (2017) [2] and Barkule *et al.,* (2018) [3] in sapota, Nimbolkar *et al.,* (2015) [4] in grapes.

The treatment T_6 (CPPU @ 6 ppm) shows the significantly reduction in fruit drop (28.56) over the T_{12} (control) which resulted in higher fruit drop (64.44) and other treatment. These results corroborate with the findings of Nimbolkar *et al.,* (2015) [4] in pear fruit cv. Gola and Kassem *et al.,* (2011) [5] in grapes. It might be due to that CPPU (a synthetic cytokinin of the phenyl urea group) increases fruit set and significantly decreases fruit drop though resulted in increase in number of fruits per plant.

Among the all chemical treatments, the highest TSS (24.22 ºBrix) was noticed in the treatment T_4 (CPPU @ 6 ppm). The lowest (TSS 19.57 ºBrix) was noticed in treatment T_{12} (control). The CPPU application @ 6 ppm improved significantly TSS content of sapota and This could be caused by the growth of more leaves, each of which contains considerably more chlorophyll, increasing the quantity of metabolites produced by photosynthesis and speeding up the movement of photosynthetic products (mostly carbohydrates) towards fruits. The results were similar with Malshe *et al.,* (2020) [6] in Mango.

The data presented in table reported that, the highest reducing sugar (11.46%) and non-reducing sugar (9.47%) were also seen in treatment T_4 (CPPU @ 6 ppm). Reducing sugar was boosted by CPPU foliar spray this might be due to the starch was converted to sugars more quickly and was transported into the fruits. And results of non-reducing sugar could be due to hydrolysis of starch during ripening resulting in accumulation of sucrose. The results obtained in the present investigation are in close conformity with those of Barkule *et al.,* (2018) [3] in sapota, Paradva (2021) [7] in Banana.

The lower titratable acidity (0.0321%) and higher ascorbic acid (25.17 mg/ 100g pulp) were exhibited with treatment T_4 (CPPU @ 6 ppm) over the control (0.0591% and 20.36 mg/ 100g pulp). The lower titratable acidity due to CPPU might be due to the metabolic changes with fast conversation of organic acids into sugars and their derivatives by the reactions involving reversal of glycolytic pathway or be used in respiration. However, high ascorbic acid may be due to production of higher metabolites in tree which sent towards developing fruits ultimately increase content of ascorbic acid in fruits of treated tree. Similar results were also obtained by Kumar *et al.,* (2013) [8] in kiwi fruit, Barkule *et al.,* (2018) [3] in sapota.

Table 1: Effect of different plant growth regulators and bio-mix on yield and physio-chemical parameters of sapota fruits

Tr. No.	Treatments	Yield parameters			physio-chemical parameters					
		Yield of fruit per plant	Yield of fruit (kg)	yield of fruit per hectare (q)	Fruit drop	TSS (ºB)	Reducing Sugar (%)	Non-reducing sugar (%)	Acidity (%)	Ascorbic Acid (mg/100 ml)
T_1	28-Homobrassionoids-0.50 ppm	1641.16	143.55	14.36	51.57	21.96	9.91	8.39	0.0438	23.56
T_2	28-Homobrassionoids-0.75 ppm	1688.24	151.23	15.12	46.86	22.49	10.27	8.61	0.0412	23.93
T_3	CPPU-4ppm	1837.47	168.61	16.86	30.46	24.16	11.22	9.21	0.0337	25.07
T_4	CPPU-6ppm	1841.53	169.18	16.92	28.56	24.22	11.46	9.47	0.0321	25.17
T_5	Humic Acid-1%	1534.91	131.50	13.15	57.17	21.27	9.44	7.87	0.0488	22.38
T_6	Humic Acid-2%	1571.84	135.58	13.56	55.63	21.63	9.72	7.82	0.0465	22.79
T_7	Gibberellic Acid-50ppm	1783.54	162.08	16.21	39.57	23.33	10.69	9.41	0.0391	24.41
T_8	Gibberellic Acid-100ppm	1812.19	165.60	16.56	35.32	24.04	11.03	9.29	0.0365	23.14
T_9	Bio-mix-50ml/plant	1354.28	108.01	10.80	63.82	19.74	8.83	8.19	0.0547	21.26
T_{10}	Bio-mix-75ml/plant	1427.61	116.87	11.69	61.74	20.48	8.97	8.28	0.0527	21.68
T_{11}	Bio-mix-100ml/plant	1466.43	120.97	12.10	60.81	20.83	9.12	8.37	0.0506	21.83
T_{12}	Control	1286.36	102.50	10.25	64.44	19.57	8.75	8.13	0.0591	20.36
S.Em.±		14.2852	1.15	0.11	1.11	0.39	0.18	0.1656	0.0001	0.60
C.D. at 5%		41.8996	3.38	0.33	3.28	1.15	0.53	0.4857	0.0003	1.77

Conclusion

Based on the results of the investigation, it can be concluded that among the all treatments of different chemicals and Bio-mix at different concentrations the treatment of CPPU @ 6 ppm has shown the most effective and significant treatment for yield of sapota which resulted in decrease in fruit loss by fruit drop, high number of fruits per plant, highest yield in kg and high yield per hectare.

It is also found that CPPU treatment @ 6 ppm resulted significant in physio-chemical properties of sapota fruits cv. Kalipatti like high TSS, high reducing and non-reducing sugar, high ascorbic acid and lower acidity.

References

1. Agrawal S, Dixit SN. Studies on the effect of plant growth regulators on growth and yield of sapota (*Achras sapota* L.) cv. Cricket ball. Indian J Agril Res. 2010;42(3):207-211.
2. 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.
3. 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;Special Issue-6:962-967.
4. Nimbolkar PK, Rai PN, Mishra DS, Singh Saurabh K. Influence of plant bio-regulators on yield, physico-chemical attributes and post-harvest quality of pear cv. Gola under Terai region of Northern India. Indian J Hort. 2015;72(4):485-488.
5. Kassem HA, Al-Obeed RS, Ahmed MA, Omar AKH. Productivity, fruit quality and profitability of trees improvement by preharvest application of agro-chemicals. Middle-east journal of scientific research. 2011;9(5):628-637.
6. Malshe k, Pujari KH, Khandekar RG. Effect of CPPU (FROCHLORFENURON) On Yield and Yield Attributing Characters of Mango cv. Alphonso. Ann. Plant Physiol. 2020;32(1):8-10.
7. Paradva DR, Patel MJ, Kacha HL. Influence of Post Shooting Spray and Bunch Bagging on Per Day Productivity and Fruit Quality of Banana (*Musa paradisiaca* L.) Journal of Scientific Research & Reports. 2021;27(11):129-136.
8. Kumar J, Thakur D. Effect of different concentration of CPPU and fruit thinning on yield and quality of Kiwifruit cv. Allison and Hayward. The asian journal of horticulture. 2013;8(2):701-705.
9. Cheema CS, Bhat SS, Naik KC. Commercial fruits of India with special to West India. Mac Millan and Co. Bombay, 1954.
10. Shanmugavelu KG, Shrinivasan. Proximate composition of fruits of sapota (*Achras zapota* L.) cultivars. South Indian Hort. 1973;21:107.