AU
e ISSN-0976-6847
Agriculture Update
Volume **12** | TECHSEAR-10 | 2017 | 2702-2705
Visit us : *www.researchjournal.co.in*

RESEARCH ARTICLE :

Effect of 28-homobrassinolide, cppu, Ga3 and humic acid on quality and shelf- life of sapota (*Manilkaraachras*) cv. kalipatti harvested in august month

S.R. BARKULE, B.N. PATEL, N.I. SHAH AND T.D. GURJAR

ARTICLE CHRONICLE :
Received :
11.07.2017;
Accepted :
25.08.2017

SUMMARY : A field experiment was conducted to study the effect of28- Homobrassinolide, CPPU, GA_3 and Humic Acid on physical, chemical and physiological parameters of sapota cv. Kalipatti and observed that significantly highest fruit weigh, fruit firmness(fourth day after harvest), total soluble solids, reducing sugar, total sugar, ascorbic acid, and shelf life whereas lowest titratable acidity and physiological loss in weight were reported with foliar application of 6 ppm CPPU(T_4).However, the pulp content and pulp/peel ratio were shows higher with GA_3 @100 ppm (T_7). While lowest fruit firmness and shelf life with highest physiological loss in weight were reported in 0.75 ppm28-Homobrassinolide(T_2). Thechemical substancesreported non significant effecton ripening per cent and non reducing sugar content fruits of sapotaharvested in month of August.

How to cite this article : Barkule, S.R., Patel, B.N., Shah, N.I. and Gurjar, T.D. (2017). Effect of 28-homobrassinolide, cppu, Ga3 and humic acid on quality and shelf- life of sapota (*Manilkaraachras*) cv. kalipatti harvested in august month. *Agric. Update*, **12** (TECHSEAR-10) : 2702-2705.

KEY WORDS :
Sapota, 28-Homobrassinolide, CPPU, Humic acid and GA_3

Author for correspondence :
S.R. BARKULE
ASPEE College of Horticulture and Forestry, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA
Email : srbarkule@gmail.com
See end of the article for authors' affiliations

BACKGROUND AND OBJECTIVES

Sapota (*Manilkaraachras* (Mill) Fosberg) commonly known as '*chiku*' is an evergreen fruit tree native of Tropical America. In India,it has emerged as an important fruit crop of costal India especially the region between Mumbai and Surat in Gujarat (1).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, fibre and minerals like potassium, calcium and iron (1).

The sapota growers facing many problems such as lowering productivity year by year, hindrance in distant transportation due to short shelf life and increased labour cost which decreases profit. To overcome this problem there is need of increasing productivity with bigger sized quality fruits with higher shelf life for fetching higher returns. Hence, there is requirement of exploit

any technique which may help to overcome lower productivity and short shelf-life. The use of novel growth regulators and some chemicals is one of the choice. The 28-Homobrassinolide and CPPU are the novel growth regulators which are not tested in sapota and the humic acid which is not applied as foliar. Hence, it is decided to conduct an experiment with use of above chemicals to increase yield, quality and shelf life for higher profit.

RESOURCES AND METHODS

The present investigation was carried out simultaneously at two locations *i.e.* Agriculture Experimental Station (AES), Paria and Umarsadivillage, Tq.PardiDist.Valsad (Gujarat) during the year 2014-15. The experiment conducted on 15 years old sapota tree with eight treatments in Randomized Block Design which replicated thrice. The treatments were T_1- 0.50 ppm 28-Homobrassinolide,T_2 -0.75 ppm 28-Homobrassinolide,T_3 -4.00 ppm CPPU, T_4 -6.00 ppm CPPU,T_5 - 1 % Humic acid,T_6 - 2 % Humic acid, T_7 - 100 ppm GA_3 and T_8 - Control. The 28-Homobrassinolide, CPPU and Humic acid were sprayed twice *i.e.* in November 2014 and January 2015 whereas GA_3 was sprayed thrice *i.e.* in November, December 2014 and January 2015. For above treatments, Diamore Combine (28-Homobrassinolide 0.03 % W/W), Sitofex (CPPU0.1 % W/V), Jai Gibb ($GA_3$90 % w/w) and as Pick Up (Humic acid 98 %) were used. The observations related to physical, chemical and physiological parameters were taken by selecting randomly five fruits from harvested matured fruits. The pulp content was calculated by subtracting peel and seed weight from fruit weight in percentage. Fruit firmness was calculated 4th day after harvest.

OBSERVATIONS AND ANALYSIS

The Table 1 indicated that the different chemical substances significantly influenced the physical and physiological parameters of sapota fruits cv. Kalipatti. The fruit weight was obtained highest (76.94g) with application of CPPU @ 6ppm (T_4) as compared with control (66.27g).It might be due to influence of CPPU(acytokinin type growth regulator) which positively encourage movement of nutrients towards leaves from other parts of tree ultimately helps in increasing production of more photosynthates. This treatment increases the ability of the fruits to attract carbohydrates and the plant is able to allocate a higher amount of photosynthetic products to the fruits which helps in gaining weight of fruits.Similar results were reported by (2).

The highest fruit firmness (4.56kg/ cm^2) was reported withtreatment T_4while lowest (3.31kg/ $cm^{2)}$in treatment T_2 (28-Homobrassinolide @.75 ppm) which was lower than control. The higher value of fruit firmness withCPPU may be due toreduced rate of respiration ultimately less weight loss percentage with maximum fruit firmness.Similar finding reported by (3). While application of 28-Homobrassinolide @0.75 ppm (T_2) may be enhance rate of ethylene biosynthesis with more respiration rate turned to become fruit more soften, ripe fasterand ultimately decrease firmness of fruits.

The higher pulp content(%) and pulp /peel ratio with lower peel (%) content(91.92%, 8.08and 11.40%) were

Table 1 : Effect of 28- Homobrassinolide, CPPU, GA_3 and Humic Acid on physical and physiological parameters of sapota fruit cv. Kalipatti harvested in August Month

Treatments	Fruit weight (g)	Fruit firmness (kg/cm^2)	Pulp content (%)	Peel content (%)	Pulp/peel ratio	Ripening (%)	Shelf life (days)	P L W (%)
T_1	75.13	3.40	89.92	10.09	8.92	94.27	6.37	9.18
T_2	75.22	3.31	90.42	9.58	9.44	92.79	6.35	9.21
T_3	76.82	4.39	91.42	8.58	10.66	93.83	9.81	7.01
T_4	76.94	4.56	90.91	9.09	10.02	95.28	10.04	6.96
T_5	67.48	3.75	88.91	11.09	8.02	92.69	6.65	8.93
T_6	68.11	3.89	89.41	10.59	8.45	93.22	6.55	9.00
T_7	75.74	4.17	91.92	8.08	11.40	94.80	8.53	7.81
T_8	66.27	3.54	88.41	11.59	7.62	92.17	6.44	9.12
Mean (C)	72.71	3.88	90.17	9.84	9.32	93.63	7.59	8.40
S. Em ±	1.95	0.14	0.39	0.39	0.45	2.45	0.24	0.23
C.D. (P=0.05)	5.64	0.41	1.13	1.13	1.30	NS	0.70	0.67
CV %	6.56	9.03	1.06	9.68	11.79	6.40	7.80	6.76

Table 2 : Effect of 28- Homobrassinolide, CPPU, GA_3 and Humic Acid on chemical parameters of sapotafruit cv. Kalipatti harvested in August Month

Treatments	TSS (°B)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)	Titratable Acidity (%)	Ascorbic acid (mg/100 g pulp)
T_1	19.15	8.70	7.01	15.71	0.0459	12.05
T_2	19.42	8.74	6.98	15.72	0.0448	12.19
T_3	19.97	8.88	7.01	15.89	0.0428	12.51
T_4	20.24	8.93	7.03	15.96	0.0420	12.62
T_5	18.00	7.69	6.40	14.09	0.0471	10.11
T_6	18.30	7.82	6.37	14.19	0.0466	10.21
T_7	19.69	8.79	7.00	15.78	0.0437	12.36
T_8	17.33	7.60	6.35	13.94	0.0482	10.02
Mean (C)	19.01	8.39	6.77	15.16	0.0451	11.51
S. Em ±	0.39	0.23	0.25	0.38	0.0011	0.35
C.D. (P=0.05)	1.14	0.68	NS	1.09	0.0032	1.02
CV %	5.07	6.84	9.10	6.10	6.05	7.48

reported by 100 ppm GA_3(T_7),respectively compared to control.It might be due to higher accumulation and translocation of extra metabolites from other parts of the tree towards developing fruits.Similar finding noted by (4).

The maximum shelf life and minimum physiological loss in weight (10.04days and 6.44%) were obtained in treatment T_4 (CPPU @ 6 ppm).It might be due to anti senescence role of CPPU which lowered rate of respiration and retard the activity of enzymes responsible to ripening which slow down process of senescence and deterioration to extend shelf life. This findings are close conformity with (5). However,the ripening percentage was reported non- significance effect.

The data presented in Table 2. reported that, The total soluble solids (20.24°Brix) was obtained higher in application of 6 ppm CPPU (T_4). The total sugar and reducing sugar (15.96 and 8.93 %) were also seen higher in treatment T_4. The upper values of total soluble solids, reducing and total sugar might be due to production of higher number of leaves with much more amount of chlorophyll content which produces more metabolites by photosynthesis process and accelerated flow of photosynthetic products (mainly carbohydrates) towards fruits resulted by CPPU foliar spray. This carbohydrates mainly contains sugar as major part of soluble solids and due to source to sink relationship, higher percentage of total soluble solids, reducing and total sugar may found in treated fruits.These results corroborate with the findings of (5), (6) and (7).While non reducing sugar reported non significance influence.

The lower titratable acidity and higher ascorbic acid (0.0420 % and 12.62 mg/ 100g pulp) were exhibited with CPPU @ 6 ppm (T_4) while (0.0482 % and 10.02 mg/ 100 g pulp) repectively, in control. The minimum acidity content in fruits 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.The present findings are in agreement with those reported by(8). The ascorbic acidcontent found higher with foliar application of CPPU @ 6 ppm, it 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.The present finding are in agreement with (9).

Authors' affiliations :

B.N. PATEL AND T.D. GURJAR, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

N.I. SHAH, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA

REFERENCES

Chundawat, B.S. (1998). Sapota. *Agrotech Publication Acadamy*, Udaipur.

Hassan, H.S.A., Mostafa, E.A.M. and Saleh, M. M. S. (2009). Effect of foliar spray with biozyme and sitofex on yield and fruit characteristics Grand Naine banana. *Green Farming*, **2** (10): 661-663.

Hua Huanga and YuemingJianga (2012). Effect of plant growth regulators on banana fruit and broccoli during storage.*Scientia Horticulturae*, **145** : 62-67.

Mulagund, J., Kumar, S., Soorianathasundaram, K. and Parika, H. (2015). 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). *Bioscan*, **10** (1): 153-159.

Al-Obeed, R. S. (2011). Enhancing the shelf life and storage ability of flame seedless grapevine by agrochemicals pre-harvest foliar applications. *Middle-East J. Scientific Res.*, **8** (2):319-27.

Kassem, H.A., Al-Obeed, R.S. and Soliman, S.S. (2011). Improving yield, quality and profitability of flame seedless grapevine grown under aird environmental by growth regulators pre-harvest applications. *Middle-East J. Scientific Res.*, **8** (1): 165-172.

Khot, A.P., Ramteke, S.D. and Deshmukh, M.B. (2015). Significance of foliar spraying with gibberellic acid (40 % WSG) and CPPU (1 % SP) on yield, quality, leaf photosynthesis and biochemical changes in grapes. *Internat. J. Tropical Agri.*, **33** (2) :221-227.

Kim, J.G., Takami, Y., Mizugami, T., Beppu, K., Fukuda, T. and Kataoka, (2006). CPPU application on size and quality of hardy kiwifruit. *Scientia Horticulturae*, **110**: 219-222.

Agrawal, S. and Dixit, S.N. (2010). Studies on the effect of plant growth regulators on growth and yield of sapota (*Achrassapota* L.) cv. Cricket ball. *Indian J.Agril Res.*, **42** (3): 207-211.