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Studies on the response of different guava (*Psidium guajava* L.) varieties to different mulches and pruning times for quality parameters under Ultra high density planting system

Sarita Paikra and GD Sahu

Abstract
The experiment entitled "Studies on the response of different guava (*Psidium guajava* L.) varieties to different mulches and pruning times for quality parameters under Ultra High Density Planting System" was conducted during the year of 2019 and 2020 at Research Farm of Precision Farming Development Centre (PFDC), College of Agriculture, IGKV, Raipur (C.G.). The experiment was conducted under factorial randomized block design (FRBD) with three factors and their different levels, mulching materials *i.e.* M_1- Control (Non mulch), M_2- Poly mulch and M_3- Paddy straw, three varieties *i.e.* V_1- Allahabad Safeda, V_2- Lalit and V_3- Lucknow-49 and two pruning months *i.e.* P_1- February, P_2- June. The treatment comprising of 18 treatment combinations *viz*., $M_1V_1P_1$, $M_1V_1P_2$, $M_1V_2P_1$, $M_1V_2P_2$, $M_1V_3P_1$, $M_1V_3P_2$, $M_2V_1P_1$, $M_2V_1P_2$, $M_2V_2P_1$, $M_2V_2P_2$, $M_2V_3P_1$, $M_2V_3P_2$, $M_3V_1P_1$, $M_3V_1P_2$, $M_3V_2P_1$, $M_3V_2P_2$, $M_3V_3P_1$ and $M_3V_3P_2$.
The quality parameters of guava in terms of total soluble solids, TSS: acid ratio, ascorbic acid, total sugar and non-reducing sugar was proved to be highest with the treatment M_2- Poly mulch, V_2- Lalit and June pruning while, reducing sugar was recorded maximum under paddy straw and V_3- Lucknow-49 during both the year 2019 and 2020. The acidity of guava fruits recorded lowest by the application of same treatment.

Keywords: Guava, mulching, pruning, quality

Introduction
Guava (*Psidium guajava* L.) is one of the most important and popular fruit crop of tropical and sub-tropical regions of India and it's belong to Myrtaceae family with chromosome number 2n=22. It has good nutritive value, high yielding capacity and good processing quality. Guava is a fast growing evergreen shrub or small tree that can grow to a height of 3-10 m. Guava fruits are commonly eaten raw and are processed into jams, jellies and preserves. Guava tree bears flowers and fruits on the current season recently matured shoot either from lateral buds on older wood or shoot terminals (Crane and Balerdi 2005 and Thakre *et al*. 2013) [7, 19]. Therefore, increase in the number of current season new shoots has a significant impact on the production. The area under guava in India is 270 thousand ha and production is 4107 thousand metric tonnes with a productivity of 15.6 metric tonnes/ha (Anon, 2019) [2]. Uttar Pradesh is the leading state of guava production (919.94 thousand metric tonnes), as well as area (49.01 thousand ha).
Guava fruit is rich source of vitamin-C: 260-300mg/100g which varies with cultivar, season, location and stage of maturity. Guava contains highest fibre 6.9%. Fruits are fair source of vitamin A (about 250 mg/100 g) and rich source of pectin which ranges between 0.5 and 1.8% (Adsule and Kadam, 1995) [1].
Generally guava is cultivated through traditional planting system which takes long time but in Ultra high density planting system guava plant takes 4-5 years for coming into commercial bearing and thus maximizes the overall cost of production per unit area, because large plants provide low production per unit area.
Pruning practices is more important for fruit trees because it's creating a better shape and size that will help the trees to bear high-quality fruit. Studies have reported that the time and level of pruning influence growth, flowering, quality and yield of guava (Chandra and Govind, 1995) [6]. Pruning of guava shoots to increase shoot numbers and to increase yield in the winter (Bagchi *et al*., 2008) [3]. Pruned tree is more disease-free, larger fruit and structural support for

the developing fruit is improved. Jadhav *et al.* (2002) [9] recommended light annual pruning after fruit harvest to encourage growth of new shoots in which flowers and fruits are borne. Mulching of poly mulch and paddy straw helps in proper growth and development of the plants by modifying soil temperature, providing better nutrient availability and better moisture conservation (Kher *et al.* 2010) [11]. Paddy straw is the commonly used mulching material for fruit and vegetable production. Paddy straw is poor in nutrient value but after decomposition, it makes soil more fertile. However, use of plastic mulch is becoming very popular. Lalit, Allahabad Safeda and Lucknow-49 are important cultivars of guava, which are performing well in the climate of Chhattisgarh.

Materials and Methods

The experiment was conducted under factorial randomized block design (FRBD) with three replications. The present investigation was carried out during the year of 2019 and 2020 at Research Farm of Precision Farming Development Centre (PFDC), College of Agriculture, IGKV, Raipur (C.G.). Raipur is situated near the central part of Chhattisgarh and lies at 21°25' N latitude and 81° 63' E longitude at an altitude of 298.15 meter above the mean sea level. Raipur district comes under dry, sub-humid agro-climatic region. The maximum temperature during the experimental period in the year of 2019 and 2020 ranged from 42.9 ºC to 26.8 ºC and 40.9 ºC to 26.6 ºC respectively, whereas minimum temperature varied between 10.3 ºC to 28.2 ºC and 12 to 25.8 ºC respectively. During the experimental period in the 2019 and 2020 the total rainfall received was 1200.4 mm and 1305.1 mm, respectively. Guava plants planted at the spacing of 2m x 1m (Row to Row and Plant to Plant).

The experiment was laid out in Factorial Randomized Block Design (FRBD) with three factors with different levels *viz*., mulching materials (non-mulch, poly mulch & paddy straw), varieties (Allahabad Safeda, Lalit & Lucknow-49) and pruning months (February & June) each replicated thrice. Prepared Beds were mulched with silver-black polythene sheet and paddy straw around the plant and in the row. Control plots were kept un-mulched. Pruning is done in a month of February and June. Prune away all the previous year branches to encourage new fruit. Cut branches off at a 45º angle. The source of irrigation was drip irrigation system. During the crop period from flowering to maturity stage different water soluble fertilizer grades in splits doses were applied on guava plants as per requirements.

Results and Discussion

Total soluble solids (%)

It was observed that the maximum total soluble solids was recorded under the treatment M_2- Poly mulch (15.11 and 15.38 °B_x) and V_2- Lalit (14.47 and 14.73 °B_x) while, the minimum total soluble solids was registered under the treatment M_1-Control (13.09 and 13.27 °B_x) and V_1- Allahabad Safeda (14.19 and 14.42 °B_x) during both the years 2019 and 2020, respectively. Maximum total soluble solids (14.76 and 15.06 °B_x) were recorded under June pruning while, February pruning gave minimum total soluble solids (13.87 and 14.00 °B_x) during both the years. As regard to interaction effect, the highest total soluble solids (15.96 and 16.56 °B_x) was recorded under the treatment of $M_2V_2P_2$ followed by $M_2V_1P_2$ (15.78 and 16.08 °B_x). However, lowest total soluble solids (12.58 and 12.73 °B_x) was observed under $M_1V_3P_1$ during both the years 2019 & 2020, respectively. Similar observations were observed by Moniruzzaman *et al.* (2007) [14] and Brar *et al.* (2007) [4, 5] observed that pruning gives higher TSS than unpruned ones.

Acidity (%)

As par the data concerned, the minimum acidity in both the years 2019 and 2020 was registered under the treatment M_2-Poly mulch (0.56 and 0.56%, respectively) and V_2-Lalit (0.53 and 0.54%, respectively), while the maximum acidity was observed under the treatment M_1-Control (0.63 and 0.64%) and V_3- Lucknow-49 (0.64 and 0.65%). Among the two pruning months, June pruning recorded minimum acidity (0.55 and 0.56%) However, maximum acidity (0.62 and 0.63%) was reported under February month pruned tree during both the years 2019 and 2020, respectively. In case of interaction effect among three all factors, the treatment $M_2V_2P_2$ (0.43 and 0.43%) observed minimum acidity while, the maximum acidity was recorded under $M_1V_3P_1$ (0.72 and 0.74%) during both the years, respectively. Others treatments were found at par with each other. Similar results were reported by Paikra (2015) [16], Sahu and Sahu (2020) [18].

TSS: Acid ratio

Maximum TSS: acid ratio was recorded under the treatment M_2- Poly mulch (28.23 and 28.31) and V_2- Lalit (27.79 and 27.88) also on the basis of pooled mean data while, the minimum TSS: acid ratio was observed under the treatment M_1-Control (20.96 and 20.94) and V_3- Lucknow-49 (22.41 and 22.34) during both the years 2019 and 2020, respectively. Maximum TSS: acid ratio (27.35 and 27.47) was observed under June pruning whereas, February pruning gave minimum TSS: acid ratio (22.75 and 22.57) during both the years.

Interaction effect between three all factors showed that the maximum TSS: acid ratio (37.55 and 38.78) was recorded under the treatment of $M_2V_2P_2$ however, the minimum TSS: acid ratio (17.48 and 17.28) was noted under the treatment $M_1V_3P_1$ during both the years 2019 and 2020, respectively. Other treatments found at par with each other at 5% level of significance during the both the year. Pruning in guava resulted in increased TSS: acid ratio might be due to better sunlight distribution, diseased free canopy and more photosynthetic rate etc. Similar findings are also reported with the findings of Pilania *et al.* (2010) [17], Nikumbhe (2014) [15] and Hiremath *et al.* (2017) [8].

Ascorbic acid (mg/100g)

In this study, it was observed that the main effect of mulching, varieties and pruning times showed significant effect on increase in ascorbic acid. Maximum ascorbic acid was recorded under the treatment M_2- Poly mulch (193.81 and 195.24 mg/100 g) and V_2- Lalit (187.77 and 188.63 mg/100 g) while, the minimum ascorbic acid was observed under the treatment M_1-Control (180.23 and 181.02 mg/100 g) and V_1- Allahabad Safeda (185.83 and 186.87 mg/100 g) during both the years 2019 and 2020, respectively. Treatment V_1 & V_3 having respective ascorbic acid of 185.83 & 186.34 mg/100 g in the year of 2019 and the treatment V_1, V_2 & V_3 having respective ascorbic acid of 186.87, 188.63 & 187.45 mg/100 g in the year of 2020 found at par with each other. Among pruning months, maximum ascorbic acid (190.24 and 191.47 mg/100 g) was recorded under June pruning whereas, February pruning resulted in minimum ascorbic acid (183.05 and 183.83 mg/100 g) during both the years.

Combination effect between three all factors showed that the maximum ascorbic acid was recorded from the $M_2V_2P_2$ (213.00 and 214.53 mg/100 g) while, the minimum ascorbic acid (175.32 and 177.05 mg/100 g) was noted under the treatment $M_1V_1P_1$ during both the years 2019 and 2020, respectively. The treatment $M_3V_1P_2$, $M_2V_3P_2$ & $M_2V_2P_2$ having respective ascorbic acid of 196.29, 203.49 & 213.00 in the year of 2019 and 197.35, 207.12 & 214.53 mg/100 g in the year of 2020 showed significant differences with each other while, rest of treatments found at par with each other. Similar findings are also reported with the findings of Mali *et al.* (2016) [13], Nikumbhe (2014) [15] and Hiremath *et al.* (2017) [8].

Total Sugar (%)

The main effect of mulching, varieties and pruning times found to be significant effect on increase in total sugar. Maximum total sugar was recorded under the treatment M_2- Poly mulch (9.60 and 9.68%), V_2- Lalit (9.48 and 9.56%) and June pruning (9.73 and 9.82%) whereas, the minimum total sugar was registered under the treatment M_1-Control (8.76 and 8.79%), V_1- Allahabad Safeda (9.18 and 9.24%) and February pruning (8.83 and 8.95%) during both the years 2019 and 2020, respectively. As regard to interaction effect between three factors, the highest total sugar (10.48 and 10.56%) was recorded under the treatment of $M_2V_2P_2$ followed by $M_2V_3P_2$ (10.27 and 10.38%). Lowest total sugar (8.09 and 8.11%) was recorded under the treatment $M_1V_1P_1$ during the both year. while, in the year of 2020 the treatment $M_3V_1P_2$ observed lowest total sugar (12.35%). Influence of interaction effect on total sugar was much more than main effect of treatment. The similar findings are noted by Kumar and Rattanpal (2010) [12].

Reducing sugar (%)

Maximum percentage of reducing sugar was reported under the main effect of M_3- Paddy straw (4.90 and 4.93%), V_3- Lucknow-49 (4.82 and 4.84%) and P_2- June (5.02 and 5.05%) However, the minimum percentage of reducing sugar was observed under the treatment M_1-Control (4.52 and 4.54%), V_1- Allahabad Safeda (4.64 and 4.68%) and February pruning (4.47 and 4.50%) during both the years 2019 and 2020, respectively. As regard to interaction effect between three all factors, the highest percentage of reducing sugar was recorded under the treatment of $M_2V_2P_2$ (5.41 and 5.44%) followed by $M_2V_3P_2$ (5.34 and 5.36%). Lowest percentage of reducing sugar (4.02 and 4.07%) was recorded under the treatment $M_1V_1P_1$ during the both year. The treatment $M_1V_3P_1$ (4.34%) and $M_2V_1P_2$ (4.95%) and $M_3V_1P_2$ (5.21%) in the year of 2019 and the treatment $M_1V_3P_1$ (4.34%) and $M_3V_1P_1$ (4.85%) and $M_3V_1P_2$ (5.25%) in the year of 2020 showed significant differences with each other while, rest of the treatments found at par with each other. The results are found similar with Nikumbhe (2014) [15].

Non-reducing sugar (%)

Regarding main effect, maximum percentage of non-reducing sugar was recorded under the treatment M_2- Poly mulch (4.79 and 4.82%), V_2- Lalit (4.70 and 4.76%) and June pruning (4.71 and 4.77%) while, the minimum non-reducing sugar was reported under the treatment M_1-Control (4.24 and 4.25%), V_3- Lucknow-49 (4.37 and 4.51%) and February pruned tree (4.36 and 4.45%) during both the years 2019 and 2020, respectively. Treatments M_3 (4.76%) & M_2 (4.82%) and the treatment V_3 (4.51%) & V_1 (4.56%) found at par with each other in the year of 2020. Interaction effect of $M_2V_2P_1$ recorded maximum percentage of non-reducing sugar (5.15 and 5.15%) while, minimum percentage of non-reducing sugar (3.47 and 3.49%) was noted under the treatment $M_1V_3P_2$ during both the years. Other treatments found statistically at par with each other in the year of 2020. Similar findings are also reported with the findings of Pilania *et al.* (2010) [17] and Nikumbhe (2014) [15].

Table 1: Main effect of different mulching, varieties and pruning times on TSS (°B_x), acidity (%), TSS: acid ratio and ascorbic acid (mg/100 g) of guava

Treatments	TSS (°B_x)			Acidity (%)			TSS: Acid ratio			Ascorbic acid (mg/100 g)		
Mulching	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**
M_1	13.09	13.27	13.18	0.63	0.64	0.64	20.96	20.94	20.96	180.23	181.02	180.62
M_2	15.11	15.38	15.25	0.56	0.56	0.56	28.23	28.31	28.27	193.81	195.24	194.52
M_3	14.73	14.94	14.84	0.57	0.58	0.58	25.96	25.81	25.88	185.91	186.70	186.31
SE(m)±	0.04	0.04	0.04	0.004	0.005	0.004	0.23	0.32	0.26	0.45	0.42	0.40
C.D. at 5%	0.11	0.12	0.10	0.010	0.016	0.012	0.67	0.93	0.75	1.30	1.20	1.15
Varieties												
V_1	14.19	14.42	14.31	0.58	0.59	0.59	24.96	24.84	24.90	185.83	186.87	186.36
V_2	14.47	14.73	14.60	0.53	0.54	0.54	27.79	27.88	27.84	187.77	188.63	188.20
V_3	14.28	14.45	14.36	0.64	0.65	0.65	22.41	22.34	22.38	186.34	187.45	186.89
SE(m)±	0.04	0.04	0.04	0.004	0.005	0.004	0.23	0.32	0.26	0.45	0.42	0.40
C.D. at 5%	0.11	0.12	0.10	0.010	0.016	0.012	0.67	0.93	0.75	1.30	1.20	1.15
Pruning times												
P_1	13.87	14.00	13.94	0.62	0.63	0.63	22.75	22.57	22.66	183.05	183.83	183.44
P_2	14.76	15.06	14.91	0.55	0.56	0.56	27.35	27.47	27.41	190.24	191.47	190.86
SE(m)±	0.03	0.03	0.03	0.003	0.004	0.003	0.19	0.26	0.21	0.37	0.34	0.33
C.D. at 5%	0.09	0.10	0.08	0.008	0.013	0.010	0.54	0.76	0.61	1.06	0.98	0.94

M_1- Control (Non mulch) M_2-Poly mulch M_3- Paddy straw
V_1- Allahabad Safeda, V_2- Lalit V_3- Lucknow-49
P_1- February P_2- June

Table 2: Interaction effect of different mulching, varieties and pruning times on TSS (°B_x), acidity (%), TSS: acid ratio and ascorbic acid (mg/100 g) of guava

Treatments	TSS (°B_x)			Acidity (%)			TSS: Acid ratio			Ascorbic acid (mg/100 g)		
Interaction Effect	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**
M_1 V_1 P_1	12.84	12.92	12.88	0.64	0.65	0.64	20.17	19.98	20.07	175.32	177.05	176.19
M_1 V_1 P_2	13.15	13.61	13.38	0.61	0.62	0.62	21.56	22.07	21.82	183.54	184.19	183.87
M_1 V_2 P_1	12.62	12.80	12.72	0.66	0.67	0.67	19.12	19.11	19.12	177.43	178.40	177.91
M_1 V_2 P_2	13.48	13.65	13.56	0.51	0.52	0.52	26.43	26.32	26.38	185.07	185.22	185.15
M_1 V_3 P_1	12.58	12.73	12.66	0.72	0.74	0.73	17.48	17.28	17.38	179.32	179.71	179.51
M_1 V_3 P_2	13.88	13.94	13.91	0.66	0.67	0.67	21.03	20.91	20.97	180.68	181.54	181.11
M_2 V_1 P_1	13.96	14.06	14.01	0.70	0.71	0.71	19.95	19.72	19.83	181.72	182.37	182.05
M_2 V_1 P_2	15.78	16.08	15.93	0.47	0.49	0.48	33.59	33.03	33.31	185.59	186.92	186.25
M_2 V_2 P_1	14.75	14.89	14.82	0.53	0.54	0.54	27.84	27.61	27.73	185.32	186.30	185.81
M_2 V_2 P_2	15.96	16.56	16.26	0.43	0.43	0.43	37.55	38.78	38.17	213.00	214.53	213.76
M_2 V_3 P_1	14.65	14.78	14.71	0.63	0.63	0.63	23.26	23.35	23.31	193.71	194.19	193.95
M_2 V_3 P_2	15.58	15.93	15.75	0.57	0.58	0.58	27.19	27.34	27.27	203.49	207.12	205.31
M_3 V_1 P_1	14.42	14.56	14.49	0.51	0.53	0.52	28.11	27.49	27.80	192.54	193.37	192.96
M_3 V_1 P_2	15.01	15.29	15.15	0.57	0.57	0.57	26.37	26.71	26.54	196.29	197.35	196.82
M_3 V_2 P_1	14.89	15.06	14.98	0.53	0.54	0.54	27.93	27.76	27.85	182.62	183.21	182.91
M_3 V_2 P_2	15.09	15.41	15.25	0.54	0.56	0.55	27.86	27.70	27.78	183.17	184.14	183.66
M_3 V_3 P_1	14.09	14.20	14.15	0.67	0.68	0.68	20.93	20.80	20.87	179.49	179.87	179.68
M_3 V_3 P_2	14.90	15.11	15.01	0.61	0.62	0.61	24.57	24.38	24.47	181.36	182.23	181.80
SE(m)±	0.09	0.10	0.09	0.009	0.013	0.010	0.57	0.79	0.64	1.11	1.02	0.98
C.D. at 5%	0.27	0.29	0.25	0.025	0.038	0.030	1.63	2.27	1.84	3.18	2.93	2.82

M_1- Control (Non mulch) M_2-Poly mulch M_3- Paddy straw
V_1- Allahabad Safeda, V_2- Lalit V_3- Lucknow-49
P_1- February P_2- June

Table 3: Main effect of different mulching, varieties and pruning times on total sugar (%), reducing sugar (%) and non-reducing sugar (%) of guava

Treatments	Total Sugar (%)			Reducing Sugar (%)			Non-reducing Sugar (%)		
Mulching	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**
M_1	8.76	8.79	8.77	4.52	4.54	4.53	4.24	4.25	4.25
M_2	9.60	9.68	9.64	4.82	4.86	4.84	4.79	4.82	4.81
M_3	9.49	9.68	9.59	4.90	4.93	4.92	4.58	4.76	4.67
SE(m)±	0.01	0.04	0.02	0.01	0.01	0.01	0.02	0.04	0.03
C.D. at 5%	0.03	0.11	0.06	0.04	0.04	0.04	0.06	0.12	0.07
Varieties									
V_1	9.18	9.24	9.21	4.64	4.68	4.66	4.54	4.56	4.55
V_2	9.48	9.56	9.52	4.78	4.80	4.79	4.70	4.76	4.73
V_3	9.22	9.36	9.27	4.82	4.84	4.83	4.37	4.51	4.44
SE(m)±	0.01	0.04	0.02	0.01	0.01	0.01	0.02	0.04	0.03
C.D. at 5%	0.03	0.11	0.06	0.04	0.04	0.04	0.06	0.12	0.07
Pruning times									
P_1	8.83	8.95	8.89	4.47	4.50	4.49	4.36	4.45	4.41
P_2	9.73	9.82	9.78	5.02	5.05	5.04	4.71	4.77	4.74
SE(m)±	0.01	0.03	0.02	0.01	0.01	0.01	0.02	0.03	0.02
C.D. at 5%	0.03	0.09	0.05	0.03	0.03	0.03	0.05	0.10	0.06

Table 4: Interaction effect of different mulching, varieties and pruning times on total sugar (%), reducing sugar (%) and non-reducing sugar (%) of guava

Treatments	Total Sugar (%)			Reducing Sugar (%)			Non-reducing Sugar (%)		
Interaction Effect	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**	**2019**	**2020**	**Pooled mean**
M_1 V_1 P_1	8.09	8.11	8.10	4.02	4.07	4.05	4.07	4.04	4.06
M_1 V_1 P_2	9.36	9.38	9.37	4.66	4.69	4.68	4.69	4.69	4.69
M_1 V_2 P_1	8.76	8.78	8.77	4.57	4.59	4.58	4.19	4.19	4.19
M_1 V_2 P_2	9.44	9.46	9.46	4.74	4.75	4.75	4.70	4.71	4.71
M_1 V_3 P_1	8.65	8.71	8.68	4.34	4.34	4.34	4.31	4.37	4.34
M_1 V_3 P_2	8.24	8.27	8.26	4.77	4.78	4.78	3.47	3.49	3.48
M_2 V_1 P_1	8.45	8.55	8.50	4.17	4.21	4.19	4.28	4.34	4.31
M_2 V_1 P_2	9.83	9.91	9.87	4.95	5.01	4.99	4.88	4.90	4.89
M_2 V_2 P_1	9.25	9.28	9.27	4.10	4.13	4.12	5.15	5.15	5.15
M_2 V_2 P_2	10.48	10.56	10.52	5.41	5.44	5.43	5.07	5.12	5.10
M_2 V_3 P_1	9.34	9.40	9.37	4.92	5.00	4.96	4.43	4.40	4.42
M_2 V_3 P_2	10.27	10.38	10.33	5.34	5.36	5.35	4.93	5.02	4.98
M_3 V_1 P_1	9.16	9.21	9.19	4.83	4.85	4.84	4.34	4.36	4.35

$M_3 V_1 P_2$	10.19	10.27	10.23	5.21	5.25	5.23	4.98	5.02	5.00
$M_3 V_2 P_1$	8.94	9.09	9.02	4.75	4.78	4.77	4.19	4.31	4.25
$M_3 V_2 P_2$	10.03	10.17	10.10	5.10	5.12	5.12	4.93	5.05	4.99
$M_3 V_3 P_1$	8.84	9.41	9.13	4.51	4.52	4.52	4.33	4.89	4.62
$M_3 V_3 P_2$	9.75	9.95	9.86	5.02	5.04	5.03	4.73	4.91	4.82
SE(m)±	0.03	0.09	0.05	0.03	0.04	0.03	0.05	0.10	0.06
C.D. at 5%	0.08	0.27	0.15	0.10	0.10	0.09	0.14	0.28	0.18

M_1- Control (Non mulch) M_2-Poly mulch M_3- Paddy straw
V_1- Allahabad Safeda, V_2- Lalit V_3- Lucknow-49
P_1- February P_2- June

Conclusion

On the basis of experimental findings, it is concluded that among the mulching materials and different varieties, poly mulch and Lalit were found to be best followed by paddy straw and to increase the quality of fruit *i.e*. total soluble solids, TSS: acid ratio, ascorbic acid total sugar and non-reducing sugar as compared to without mulch (control). In terms of reducing sugar, paddy straw and Lucknow-49 were found best. Similarly, among the pruning months, June pruned plants gave best result to increase the quality of guava fruits. While, the acidity of fruit minimized under the same treatment. Combination effect of poly mulch with Lalit variety and pruning in June month gave best result compared to main effect of all three factors. Hence the treatment $M_2V_2P_2$ (poly mulch + Lalit + June pruning) recommended for better quality fruits under Chhattisgarh region.

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