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# Response of pre harvest chemicals spray on fruit retention and yield of mango cv. Kesar

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**Abstract**
The present investigation was carried out on 22 year old mango orchard at the Navsari Agricultural University, Navsari during 2015-2016 and 2016-2017. The experiment was laid out in Randomised Block Design with eleven treatments *i.e.*, Control ($T_0$), CPPU 5ppm ($T_1$), CPPU 10ppm ($T_2$), $GA_3$ 25ppm ($T_3$), $GA_3$ 50ppm ($T_4$), NAA 30ppm ($T_5$), NAA 60ppm ($T_6$), $CaCl_2$ 1.0% ($T_7$), $CaCl_2$ 2.0% ($T_8$), $ZnSO_4$ 0.5% ($T_9$) and $ZnSO_4$ 1.0% ($T_{10}$). All the treatments were replicated thrice and a single tree served as a unit. Two sprays of chemicals were done on the appearance of inflorescence and pea stage of fruit, respectively. Among all the treatments, foliar application of NAA 60ppm increased the fruit retention (6.75%) and yield (74.80 kg/tree) in mango cv. Kesar as compared to rest of the treatments. Treatment $T_5$ was equally effective in this regard. The result on average weight of fruit was noted highest (284.00g) in treatment $T_4$.

**Keywords:** pre harvest spray, PGRs, calcium chloride, zinc sulphate, retention, mango

## Introduction
Inspite of profuse flowering, low fruit yield in mango orchards have been experienced because of low initial fruit set and subsequently higher fruit abscission (Singh and Singh, 1995). Naturally occurring hormones play a major role in fruit growth and fruit retention of mango. While, application of different PGRs and Chemicals *viz*., NAA (Vejendla *et al*., 2008) [11], $GA_3$ (Nkansah *et al.*, 2012) [6], CPPU (Natodimedjo, 2000) [4], $CaCl_2$ (Wahdan *et al*., 2011) [12] and $ZnSO_4$ (Jat and Kacha, 2014 and Nehete *et al*., 2011) [3, 5] have been found effective in reducing the fruit drop. The exogenous application of these growth regulators and chemicals increase their concentration in the panicle and antagonise the adverse effect of endogenous inhibitors resulting reduction in abscission which ultimately increase yield. Covering to past researches, PGRs and chemicals can promote fruit retention and yield must be tested under South Gujarat conditions for commercial cultivar Kesar. Hence, present study was undertaken to understand the fruiting behaviours of Kesar mango in response to foliar application of PGRs and chemicals.

## Material and Methods
The present investigation was carried out in 2015-16 and 2016-17 at College farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari. 22 years old grafted trees of mango cv. Kesar at spacing 7.5 m × 7.5 m with uniform size were selected for the experiment. The experiment was laid out in Randomised Block Design with eleven treatments *viz*., Control ($T_0$), CPPU 5ppm ($T_1$), CPPU 10ppm ($T_2$), $GA_3$ 25ppm ($T_3$), $GA_3$ 50ppm ($T_4$), NAA 30ppm ($T_5$), NAA 60ppm ($T_6$), $CaCl_2$ 1.0% ($T_7$), $CaCl_2$ 2.0% ($T_8$), $ZnSO_4$ 0.5% ($T_9$) and $ZnSO_4$ 1.0% ($T_{10}$). All the treatments were replicated thrice and a single tree served as a unit. Trees were sprayed on the appearance of inflorescence and it was repeated at pea stage of fruits. Five terminals per each direction were randomly tagged and counted the fruit set at pea stage and subsequently the fruits were counted at harvesting. The fruit retention per cent was calculated at harvesting stage by considering number of fruits at pea stage as 100%.

$$\text{Fruit retention (\%)} = \frac{\text{No. of fruit at harvesting}}{\text{No. of fruit at pea stage}} \times 100$$

The total produce per tree was weighed at harvest and noted treatment wise for each experimental tree. The recorded data on different parameters of the experiment were tabulated and were subjected to statistical analysis.

## Result and Discussion

Highest fruit set (17.59) at pea stage was noted in treatment $T_6$, which was statistically at par with treatment $T_5$. Similarly, the highest number of fruit (1.19) at harvest was recorded in treatment $T_6$, which was statistically at par with treatment $T_5$ compared to control ($T_0$). The treatment for exogenous application of auxin (NAA), which would be helpful in increasing auxin level and thereby resulted in reduce fruit drop. Application of exogenous auxin usually serves to augment inhibition and further delay abscission. Similar result was obtained by Osama *et al.* (2015) [7] and Nkansah *et al.* (2012) [6].

**Table 1:** Effect of pre harvest chemicals spray on fruit set, fruit retention, weight and yield of mango cv. Kesar (mean of two years)

| Treatments | No. of fruits at pea stage | No of fruits at harvesting | Fruit retention (%) | Fruit weight (g) | Fruit yield (kg/tree) |
|---|---|---|---|---|---|
| $T_0$: Control | 10.39 | 0.40 | 3.84 | 241.33 | 36.28 |
| $T_1$: CPPU 5ppm | 13.99 | 0.67 | 4.78 | 254.17 | 54.14 |
| $T_2$: CPPU 10ppm | 14.71 | 0.83 | 5.67 | 258.42 | 58.05 |
| $T_3$: $GA_3$ 25ppm | 15.43 | 0.92 | 5.96 | 279.83 | 62.07 |
| $T_4$: $GA_3$ 50ppm | 16.15 | 1.00 | 6.22 | 284.00 | 66.20 |
| $T_5$: NAA 30ppm | 16.87 | 1.12 | 6.62 | 271.33 | 70.45 |
| $T_6$: NAA 60ppm | 17.59 | 1.19 | 6.75 | 275.58 | 74.80 |
| $T_7$: $CaCl_2$ 1.0% | 12.55 | 0.78 | 6.30 | 262.75 | 46.66 |
| $T_8$: $CaCl_2$ 2.0% | 13.27 | 0.72 | 5.42 | 266.92 | 50.34 |
| $T_9$: $ZnSO_4$ 0.5% | 11.11 | 0.50 | 4.46 | 245.58 | 39.62 |
| $T_{10}$: $ZnSO_4$ 1.0% | 11.83 | 0.50 | 4.21 | 249.83 | 43.14 |
| S.Em. ± | 0.50 | 0.03 | 0.24 | 9.24 | 2.20 |
| C.D. at 5% | 1.42 | 0.09 | 0.68 | 26.26 | 6.25 |
| C.V. % | 9.70 | 9.30 | 10.30 | 9.62 | 10.29 |

Highest fruit retention (6.75 %) was noted in treatment $T_6$, which was statistically at par with treatment $T_5$, $T_7$ and $T_4$. The enhancement effect of NAA sprays on fruit set and fruit retention percentage may be due to auxin is well known as inhibitors for abscisic acid and ethylene which cause fruit drop. This result is in confirmation with result obtained by Osama *et al*. (2015) [7] and Nkansah *et al.* (2012) [6].

Maximum fruit weight (284.00g) was noted in treatment $T_4$ which was statistically at par with treatment $T_3$, $T_6$ and $T_5$. The role of $GA_3$ was to multiply and to lengthen the meristem cells, which results in increase fruit volume and weight (Nkansah *et al.*, 2012) [6]. The similar results were obtained by Zaeneldeen (2014) [13], Wahdan *et al.* (2011) [12], Shaban (2009) [8] and Shrivastava and Jain (2006). The minimum fruit weight was recorded in treatment $T_0$ (Control).

The highest fruit yield (74.80 kg) was obtained in treatment $T_6$, which was on the same bar with treatment $T_5$ compared to control. The increasing in yield may be due to reduction in fruit drop, higher fruit retention and higher fruit weight. Treatments of growth regulating chemicals were more effective in increasing the fruit production mainly through increasing in fruit number (Chavan *et al.*, 2009) [1]. The highest fruit yield in NAA treated plants was due to highest fruit retention (Ghosh *et al*., 2009). This result is accompaniment by Zaeneldeen (2014) [13], Nkansah *et al.* (2012) [6], Wahdan *et al.* (2011) [12], Shaban, (2009) [8] and Vejendla *et al*. (2008) [11].

## Conclusion

Based on the results obtained from the present investigation, it can be concluded that the foliar application of NAA 60 ppm was superior in enhancing number of fruits, fruit retention and yield. While 50 ppm $GA_3$ was found effective with respect to weight of fruit.

## References


1. Chavan SR, Patil MB, Phad GN, Suryawanshi AB. Effect of growth regulators on yield attributes and quality of sapota [*Manilkara achras* (Mill.) Forsberg] cv. Kalipati. Asian Journal of Horticulture. 2009; 4(1): 176-177.
2. Ghosh SN, Bera B, Roy S, Kundu A. Effect of plant growth regulators in yield and fruit quality in pomegranate cv. Ruby. Journal of Horticultural Science. 2009; 4(2):158-160.
3. Jat G, Kacha HL. Response of guava to foliar application of urea and zinc on fruit set, yield and quality. Journal of Agrisearch. 2014; 1(2):86-91.
4. Natodimedjo S. Effect of $GA_3$, NAA and CPPU on fruit retention, yield and quality of mango (cv. Arumanis) in East Java. Acta Horticulturae. 2000; 509:587-600.
5. Nehete DS, Padhiar BV, Shah NI, Bhalerao BN, Kolambe BN, Bhalerao RR. Influence of micronutrient spray on flowering, yield, quality and nutrient content in leaf of mango cv. Kesar. The Asian Journal of Horticulture. 2011; 6(1):63-67.
6. Nkansah GO, Ofosu-Anim J, Mawuli A. Gibbrellic acid and Nepthalene Acetic Acid affect fruit retention, yield and quality of Keitt mangoes in the coastal Savanna ecological zone of Ghana. American Journal of plant physiology. 2012; 7(6):243-251.
7. Osama HMG, Amro SMS, Saber MMB. Effect of growth regulator, antioxidant and application date on fruiting and fruit quality of mango trees cv. Keitt. Journal of Agriculture and Veterinary Science. 2015; 8(12):87-95.
8. Shaban AEA. Effect of summer pruning and $GA_3$ spraying on inducing flowering and fruiting of Zebda mango trees. World Journal of Agricultural Sciences. 2009; 5(3):337-344.
9. Shrivastava DK, Jain DK. Effect of urea and $GA_3$ on physiochemical properties of mango cv. Langra during on year. Karnataka Journal of Agricultural Sciences. 2006; 19(3):754-756.
10. Singh Z, Singh L. Increased fruit set and retention in mango with exogenous applications of polyamines. Journal of Horticultural Science. 1995; 70(2):271-277.
11. Vejendla V, Maity PK, Banik BC. Effect of chemicals and growth regulators on fruit retention, yield and quality of mango cv. Amrapali. Journal of Crop and Weed. 2008; 4(2):45-46.
12. Wahdan MT, Habib SE, Bassal MA, Qaoud, EM. Effect of some chemicals on growth, fruiting, yield and fruit

quality of "Succary Abiad" mango. Journal of American Science. 2011; 7(2):651-658.
13. Zaeneldeen EMA. Effect of urea, gibberellic acid foliar application and pinching early panicles on productivity of "Succary Abiad" mango trees under desert conditions. Middle East Journal of Agriculture Research. 2014; 3(2):135-143.