



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(11): 967-969
© 2022 TPI

www.thepharmajournal.com

Received: 16-07-2022

Accepted: 15-10-2022

Raveender Kumar

Assistant Development Officer,
Department of Agriculture,
Balrampur, Government of
Uttar Pradesh, Uttar Pradesh,
India

D Ram

Associate Professor, Department
of Horticulture, ND University
of Agriculture and Technology,
Ayodhya, Uttar Pradesh, India

Awadhesh Kumar

Technical Assistant, Department
of Agriculture Ayodhya,
Government of Uttar Pradesh,
Uttar Pradesh, India

Rajeev Kumar

Assistant Professor, Department
of Agronomy, School of
Agriculture, Sanskriti
University, Chhata Mathura,
Uttar Pradesh, India

Pragya Ojha

Subject Matter Specialist, Krishi
Vigyan Kendra Banda, Banda
University of Agriculture and
Technology, Banda, Uttar
Pradesh, India

Viseshwar Dayal

M.Sc. Horticulture, Babasaheb
Bhimrao Ambedkar University,
Lucknow, Uttar Pradesh, India

Effect of micro nutrients and plant growth regulator on fruit setting of *Psidium guajava* L. cv. Lucknow-49

Raveender Kumar, D Ram, Awadhesh Kumar, Rajeev Kumar, Pragya Ojha and Viseshwar Dayal

Abstract

The present experiment was carried out to effect of micro nutrients and plant growth regulator on fruit setting of *Psidium guajava* L. cv. Lucknow-49. Number of flowers per shoot, fruit set, fruit retention percentage were influenced significantly with different micro nutrients and plant growth regulator as compared to control. The maximum fruit set (66.33 per cent) was noted with foliar spray of 0.5 per cent ZnSO₄ + 0.4 per cent borax + 50ppm GA₃ (T₇) followed by (63.18 per cent) fruit set with foliar spray of 0.4 per cent borax + 50ppm GA₃ (T₅). Maximum fruits retention (61.58 per cent) was noted with foliar application of 0.5 per cent ZnSO₄ + 0.4 per cent borax + 50ppm GA₃ (T₇) followed by (55.30 per cent) fruits retention with foliar spray of treatment (T₅) 0.4 per cent borax + 50ppm GA₃ respectively. The maximum average fruit weight (106.35 gm) fruit length (6.93cm) and fruit width (6.28cm) were obtained with the foliar spray of 0.5 per cent ZnSO₄ +0.4 per cent borax + 50 ppm GA₃ (T₇) and minimum recorded under control (T₀).

Keywords: *Psidium guajava* L., PGR, CV. Lucknow-49, Fruit retention and GA₃

1. Introduction

Guava (*Psidium guajava* L.), is one of the most important tropical and sub-tropical fruit crop of India, which belongs to the family Myrtaceae. It is native of tropical America. Mature plants are hardy in nature and prolific bearing habit and can be stand with maximum at above 46^oC temperature and lowest at 12-14 ^oC. Fruiting on current season growing twigs and highly cross pollinated crop. Fruits of guava developed from inferior ovary and exhibited double sigmoid growth curve. The fruit takes nearly 4-5 months from flowering to maturity. The fruit is highly perishable and seasonal in nature. In India it has been introduced in early 17th century and gradually become a commercial crop all over the country. Guava is 5th important fruit of India after mango, banana, citrus and papaya. The quality of guava fruit is greatly affected by temperature, humidity and rainfall. The development of sweetness, colour and aroma on low temperature and dry atmosphere, because of these facts the fruit quality of winter season is better than the rainy season. Mature fruits of guava are rich in vitamins, minerals and other nutrients. Guava fruit is considered as one of the delicious and luscious fruit. The nutritive value of guava is very high. Therefore, it is an ideal fruit for nutritional security. In this modern era the use of plant growth regulators are becoming quite popular and effective in the field of Horticulture. Plant growth regulator and micronutrients plays a significant role in many physiological phenomena. There has been wide spread application of plant growth regulators and micronutrients in service of fruit industry. They are used in seed lessens, increase in fruit set, prevention of pre harvest drop, regulation of flowering, fruit size, inhibition of growth, thinning of flower and fruit. Various type of plant growth regulators like NAA, 2, 4-D, 2, 4, 5-T, GA₃ and TIBA are used for improving the flowering, fruit set, fruit size and quality of fruit as well as yield. Recently Kher *et al.*, 2005 ^[3] advocated that foliar application of plant growth regulator exerted favorable effect on the physico-chemical characters of guava fruits at harvesting stage.

2. Materials and Methods

The present investigation entitled effect of micro nutrients and plant growth regulator on fruit setting of *Psidium guajava* fruit cv.L-49 was carried out at the Main Experiment Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology Kumarganj, Faizabad (U.P.) during the year 2014-15. Geographically it is situated 26.47 ^oN latitude and 80.12^oE longitude and an altitude of 113 meter mean sea level.

Corresponding Author:

Raveender Kumar

Assistant Development Officer,
Department of Agriculture,
Balrampur, Government of
Uttar Pradesh, Uttar Pradesh,
India

The treatments were consisted 7 treatments i.e. T₀- control (water spray), T₁ - Zinc sulphate @ 0.5 %, T₂- Borax @ 0.4 %, T₃- GA₃ @ 50 ppm, T₄- Zinc sulphate @ 0.5 % + GA₃ @ 50 ppm, T₅- Borax @ 0.4 % + GA₃ @ 50 ppm, T₆ - Zinc sulphate @ 0.5 % + Borax @ 0.4 %, T₇ - Zinc sulphate @ 0.5 % + Borax @ 0.4 % + GA₃ @ 50 ppm. The observations were recorded i.e. number of flowers per shoot, fruit set, fruit retention, fruit size, fruit length, fruit width, and fruit weight with Randomized Block Design. First spraying of micro nutrients was done before flowering (first week of August) and second after fruit set (second week of September) number of flowers per shoot was calculated by count method from selected branches in each direction and in each treatment and their average was expressed as number of flowers per shoot. Fruit set was calculated as number of fruits set, divided by number of flowers appeared. Fruit retention was computed as number of fruits retained at observation recorded time of plant, divided by number of fruit set and expressed in percentage. The length and width of fruits from each treatment were measured with the help of Vernier Calipers and expressed in centimeter. Fruit weight was recorded by 5 fruits were randomly taken from each treatment and weighted on electronic balance. The average fruit weight was expressed in gram of guava fruit.

3. Results and Discussion

Micronutrients and plant growth regulator plays a vital role in growth and development of fruit trees. Foliar spray of micronutrients and plant growth regulator is comparatively more effective for rapid recovery of plant, affected with high pH conditions. The foliar feeding of fruit trees has gained much importance in recent years. The fertilizers applied through soil are required in higher quantities, because some portion leaches down and some portion become unavailable to the plant due to complex soil reaction. Micronutrients and plant growth regulator spray can be manipulated through foliar feeding for the exploitation of plant to obtain higher yield and quality of guava fruits.

3.1. Number of flowers

The term flowering means appearance of flower on fruit plant after flower bud differentiation the term “fruit setting” is referred to the initial and appreciable swelling of the ovary occurring shortly after the period of petal fall. The essential organs of the flower concerned to fruit setting and fruit production are the pistils and stamens though other parts may enter in to structure of fruit. The embryo results from the segmentation and growth of the embryo cells and the endosperms in the tissue developing from the nuclei. Fertilization is usually followed by the growth of the surrounding ovarian tissue.

3.2. Fruit Setting and fruit retention

From the Table-1 clearly reflected that the maximum number of fruit set (66.33 per cent) and fruit retention (61.58 per cent) was recorded with foliar spray of 0.5 % ZnSO₄ + 0.4 % borax + 50ppm GA₃ (T₇) followed by foliar sprays of 0.4% borax + GA₃ 50 ppm (T₅). The GA₃ prove to be very effective in increasing cell division and cell size in guava fruits. The GA₃, borax and ZnSO₄ response was also more positive because GA₃, borax and ZnSO₄ play an important role in translocation of carbohydrate and auxin synthesis to the sink and increased in pollen variability and fertilization. The minimum fruit set

and fruit retention were recorded of guava fruit under control (water spray). Similar results were also observed by Rubi and Brahmachari (2004)^[7] in mango, Kumar *et al.* (2013)^[5] in guava and Kumar *et al.* (2015)^[4] in guava *cv* Pant Prabhat which are in support of present findings.

3.3. Fruits length and width

Data as embodied in Table 3&4 clearly reflected that the foliar spray of micro nutrients and PGR was benefited for increasing length and width and of guava fruit in comparison to control. The maximum fruit length (6.93) and width (6.28) was recorded with 0.5 % ZnSO₄ + 0.4 % borax + 50ppm GA₃ (T₇) which was closely followed by 0.4 % borax+ GA₃ 50ppm (T₅). The increase in, length and width of guava fruit by foliar spray might be due to rapid cell division, cell elongation, translocation of sugars and highest fruit size as well as fruit weight, which ultimately increase the yield of guava fruit. The increase in fruit weight by ZnSO₄, borax and GA₃ spray might be due the accumulation of more food material in tree. However, borax spraying provides boron to the plant and role of boron in the formation of hormone is little under stood yet it was believed that boron brings about in activation of superfluous growth hormone by formation of complex compound. The results are in close conformity with findings of Awasthi and Lal (2009)^[1] in guava, Kumar *et al.* (2010)^[6] in guava, Kumar *et al.* (2013)^[5] and Byas (2014)^[2] in ber and Kumar *et al.* (2015)^[4] in guava.

3.4. Fruit weight

Data incorporated in Table-5 indicated that foliar spray of various micro nutrients and plant growth regulator proved maximum fruit weight (106.35g), was recorded with 0.5 % ZnSO₄ + 0.4 % borax + 50ppm GA₃ (T₇) which was closely followed by 0.4 % borax+ GA₃ 50ppm (T₅).The increase in, weight of guava fruit by foliar spray might be due to rapid cell division, cell elongation, translocation of sugars and highest fruit size as well as fruit weight, which ultimately increase the yield of guava fruit. The increase in fruit weight by ZnSO₄, borax and GA₃ spray might be due to the accumulation of more food material in tree. However, borax spraying provides boron to the plant and role of boron in the formation of hormone is little under stood yet it was believed that boron brings about in activation of superfluous growth hormone by formation of complex compound. The results are in close conformity with findings of Kumar *et al.* (2010)^[6] in guava, Kumar *et al.* (2013)^[5] and Byas (2014)^[2] in ber, Saroj *et al.* (2018)^[8] in guava.

Table 1: Effect of foliar spray of micronutrients and plant growth regulator on fruits set of guava

Treatments	Fruits set (%)
T ₀ - Control (water spray)	48.68
T ₁ - ZnSO ₄ @ 0.5 %	51.95
T ₂ - Borax @ 0.4 %	54.05
T ₃ - GA ₃ @ 50ppm	58.15
T ₄ - ZnSO ₄ @ 0.5 % + GA ₃ @ 50 ppm	61.58
T ₅ - Borax @ 0.4 % + GA ₃ @ 50ppm	63.18
T ₆ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 %	59.23
T ₇ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 % + GA ₃ @ 350ppm	66.33
S.E.M ±	0.74
CD at 5%	2.14

Table 2: Effect of foliar spray of micronutrients and plant growth regulator on fruits retention

Treatments	Fruits retention (%)
T ₀ - Control (water spray)	40.93
T ₁ - ZnSO ₄ @ 0.5 %	46.95
T ₂ - Borax @ 0.4 %	49.55
T ₃ - GA ₃ @ 50 ppm	51.93
T ₄ - ZnSO ₄ @ 0.5 % + GA ₃ @ 50 ppm	54.40
T ₅ - Borax @ 0.4 % +GA ₃ @50ppm	55.30
T ₆ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 %	52.43
T ₇ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 % + GA ₃ @ 350ppm	61.58
S.E.M ±	0.64
CD at 5%	1.84

Table 3: Effect of foliar spray of micronutrients and plant growth regulator on, fruits length (cm) of guava

Treatments	Fruits length (cm)
T ₀ - Control (water spray)	4.75
T ₁ - ZnSO ₄ @ 0.5 %	5.45
T ₂ - Borax @ 0.4 %	5.83
T ₃ - GA ₃ @ 50 ppm	6.00
T ₄ - ZnSO ₄ @0.5% + GA ₃ @ 50 ppm	6.50
T ₅ - Borax @ 0.4% +GA ₃ @ 50ppm	6.78
T ₆ - ZnSO ₄ @ 0.5% + Borax @ 0.4%	6.25
T ₇ - ZnSO ₄ @ 0.5% + Borax @ 0.4% + GA ₃ @350ppm	6.93
S.E.M ±	0.20
CD at 5 %	0.57

Table 4: Effect of foliar spray of micronutrients and plant growth regulator on fruits width (cm) of guava.

Treatments	Fruits width (cm)
T ₀ - Control(water spray)	4.10
T ₁ - ZnSO ₄ @ 0.5 %	4.80
T ₂ - Borax @ 0.4 %	5.25
T ₃ - GA ₃ @ 50 ppm	5.55
T ₄ - ZnSO ₄ @ 0.5 % + GA ₃ @ 50 ppm	5.85
T ₅ - Borax @ 0.4 % +GA ₃ @50ppm	5.90
T ₆ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 %	5.70
T ₇ - ZnSO ₄ @ 0.5 % + Borax @ 0.4 % + GA ₃ @ 50ppm	6.28
S.E.M ±	0.09
CD at 5 %	0.26

Table 5: Effect of foliar spray of micronutrients and plant growth regulator on fruits weight (g) of guava

Treatments	Fruits weight (gm)
T ₀ -Control(water spray)	75.93
T ₁ -ZnSO ₄ @0.5%	84.30
T ₂ -Borax @0.4%	88.88
T ₃ -GA ₃ @50ppm	93.33
T ₄ -ZnSO ₄ @0.5% + GA ₃ @ 50 ppm	100.20
T ₅ -Borax @0.4% +GA ₃ @50ppm	103.73
T ₆ -ZnSO ₄ @0.5% + Borax@ 0.4%	95.80
T ₇ -ZnSO ₄ @0.5% + Borax@ 0.4% + GA ₃ @50ppm	106.35
S.Em ±	2.14
CD at 5%	6.16

4. Conclusion

It is concluded from the present investigation that the maximum fruit set, fruit length, fruit width, fruit retention and fruit weight was observed with foliar application of 0.5 per cent ZnSO₄ + 0.4 per cent borax + 50 ppm GA₃.

5. References

- Awasthi P, Lal S. Effect of calcium, boron and zinc foliar spray on the yield and quality of guava (*Psidium guajava* L). Pantnagar journal Research. 2009;7(2):223-225.
- Byas PN. Studies on foliar application of micronutrients and GA₃ on yield and quality of ber (*Zizyphus mauritiana* Lamk.) fruits cv. Gola. Thesis submitted to the Master of Science in Horticulture to N. D. University of Agriculture and Technology Faizabad, (UP); c2014.
- Kher R, Baht S, Wali VK. Effect of foliar application of GA₃, NAA and CCC on physico-chemical characteristics of guava cv. Sardar. Haryana Journal of Horticulture. 2005;34(1/2):31-32.
- Kumar J, Kumar R, Rai R, Mishra DS. Effect of nutrients and plant growth regulators on physico-chemical parameters and yield of guava (*Psidium guajava* L.) cv. Pant Prbhat. The Bioscan. 2015;10(2):495-498.
- Kumar R, Tiwari R, Kumawat BR. Quantities and qualitative enhancement in guava (*Psidium guajava* L.) cv. Chittidar through foliar feeding. International Journal of Agricultural Science. 2013;2(9):177-181.
- Kumar S, Singh AK, Yadav AL. Effect of foliar application of GA₃, NAA, KNO₃ and Borax on fruit quality of rainy season guava cv. Lucknow-49. Plant Archives. 2010;10(1):317-319.
- Ruby R, Brahmachari VS. Effect of growth substance and calcium compounds on fruit retention, growth and yield of Amrapali mango. Orissa Journal Of Horticulture. 2004;32(1):15-18.
- Saroj NL, Verma RS, Prakash S, Verma SS, Kumar V. Studies on the effect of foliar spray of micronutrient and plant growth regulator on physical parameter of guava (*Psidium guajava* L.) cv. Allahabad Safeda. Journal of Pharmacognosy and Phytochemistry. 2018;7(5):01-02.