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# Effect of foliar application of micronutrients on yield and physico-chemical composition of rejuvenated guava (*Psidium guajava* L.) cv. Allahabad Safeda

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**Abstract**
The field experiment was carried out to assess the effect of foliar application of micronutrients viz. zinc, boron and copper in different combinations and concentrations on guava (*Psidium guajava* L.) cv. Allahabad Safeda for yield and physico-chemical composition of rejuvenated guava. From various combination of micronutrients maximum fruit weight, fruit length, fruit width, fruit volume, number of fruits, fruit yield/tree, fruit yield/ha was recorded with combined application of $ZnSO_4$+$CuSO_4$+Borax each at 0.4% and quality attributes like TSS, minimum acidity, reducing sugars, non reducing sugars and total sugars were found to be maximum under zinc sulphate 0.6%.

**Keywords:** *Psidium guajava*, physico-chemical, zinc sulphate, borax, copper sulphate

## Introduction
Guava is one of the most dominant and common fruit crop of India. It is also called as apple of tropics and poor man's apple. It is forth most important fruit crop in production and area after mango, banana, and citrus. It belongs to the genus *Psidium* which contains 150 species, but only *Psidium guajava* has commercial value having chromosome number 2n=2X=22. Guava is remunerative and prolific bearer. It has better nutritive value and is cheap fruit crop having low price. So it is considered to be a poor man's apple. (Zagade, *et al*., 2017) [7, 8]. It has diversified from mexico to peru and slowly become a profit oriented crop of significance. Because of its hardy nature, high vitamin C content, pleasant aroma, prolific bearing and good flavour (Ram and Kumar 2017) [4, 6]. It can be grown in soil containing $P^H$ upto 8.5, it can withstand to the maximum temperature at 46 $^0$C and even with scantly annual rainfall of less than 25 cm (Yadav, *et al.,* 2018). In India, the guava cultivation can be seen in Uttar Pradesh, Chhattisgarh, Tamil Nadu, Karnataka, Bihar, West Bengal, Maharashtra, Madhya Pradesh, Gujarat and Andhra Pradesh. However, with the development of horticulture industry in India in processing sector now guava is growing up as a important fruit crop. Guava fruit is viewed as one of the delicious fruit. These fruits are consumed either fresh or processed in the form of products like jam, jelly, cheese, juice, nectar, ready to serve (RTS) etc. (Yadav, *et al.,* 2018). The yield attributing parameter like average fruit weight, fruits per tree and yield per tree are accrued by the foliar spray with micronutrients (Rakesh, *et al*., 2013). However, limited work is done on the use of micronutrients for improving fruit size and quality in India as well as in different parts of the world. In guava, flowering can be seen three times a year in eastern and southern India. The respective bahars are called as Ambebahar (Feb), Mrigbahar (June-July) and Hasthbahar (October). Among these three bahars "Mrigbahar" crop gives fruits during winter i.e. November-January, has superior quality. The fruits are finer in vitamin C content, better in quality and taste. (Parmar, *et al*., 2014) [3]. The investigation was carried out to assess single or combined effect of application of micronutrients on yield and quality of guava.

## Materials and methods
Field experiment was carried out at Rejuvenated Guava Block, Horticultural Instructional Farm, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C. G.) during the year 2018-19. On one year old trees of rejuvenated guava plants spaced 6×6 m were

Selected. The experimental findings were analysed in Randamized Block Design with nine treatments which are replicated three times. The treatments consisted of $T_0$: control (water spray), $T_1$: $ZnSO_4$ @ 0.4%, $T_2$: $ZnSO_4$ @ 0.6%, $T_3$: Borax @ 0.5%, $T_4$: Borax @ 1%, $T_5$: $CuSO_4$ @ 0.3%, $T_6$: $CuSO_4$ @ 0.6%, $T_7$: $ZnSO_4$+Borax+$CuSO_4$ each @ 0.2% and $T_8$: $ZnSO_4$+Borax+$CuSO_4$ each @ 0.4%. Required quantity of micronutrients were weighed and dissolved in required quantity of water along with shampoo for sticking purpose. Spraying was done by backpack sprayer. Both the upper leaves and lower leaves were thoroughly sprayed. Spraying was done on clear sunny days. Spraying was given at two stages. First spray was given at 50% flowering and second spray was given three weeks after the first spray. The fruits were tagged to take various observation. The data obtained on different parameters were statistically analysed.

## Result and discussion

The results of the present investigation presented in table 1 and 2 shows that the maximum fruit weight, fruit length, fruit width, fruit volume, number of fruits, fruit yield/tree, fruit yield/ha was recorded with foliar application of $ZnSO_4$+$CuSO_4$+Borax each at 0.4%. The positive results was due to the combined application of micronutrients having specific roles in photosynthesis and more accumulation of starch in fruits. The involvement of zinc in auxin synthesis and boron in translocation of starch to fruits. Cu is an activator of several enzyme systems in plants, lignin synthesis and required in the process of photosynthesis. Boron and zinc together take role in cell division, cell expansion and cell elongation which gives maximum fruit weight, fruit width, fruit length, fruit volume, number of fruits/tree, yield/tree and yield/hectare. The findings are in agreement with Tirkey *et al*. (2018) [5] and Bhoyar and Ramdevputra (2017) [1].

The quality parameters like TSS, minimum acidity, reducing sugars, non-reducing sugares and total sugars were found maximum under $ZnSO_4$ at 0.6%. This might be due to individual effect of zinc which plays very important role in converting into simple sugars from complex polysaccharides, metabolites synthesis and photosynthetic products and minerals are translocated from other parts of the plants to developing fruits. The findings are in agreement with Zagade *et al.* (2017) [7, 8]

**Table 1:** Effect of micronutrients on yield attributing parameters of rejuvenated guava cv. Allahabad Safeda

| Notation used | Treatments | Fruit weight (g) | Fruit width (cm) | Fruit length (cm) | Fruit volume | No. of fruits/ tree | Fruit yield/ tree | Fruit yield /ha |
|---|---|---|---|---|---|---|---|---|
| $T_0$ | Control(water spray) | 96.06 | 5.03 | 5.533 | 98.2 | 94.33 | 24.26 | 6.73 |
| $T_1$ | $ZnSO_4$-0.4% | 140.06 | 5.70 | 5.867 | 139.3 | 117.66 | 28.69 | 7.96 |
| $T_2$ | $ZnSO_4$-0.6% | 154.53 | 6.00 | 6.367 | 155.3 | 122.66 | 32.43 | 9.00 |
| $T_3$ | Borax-0.5% | 149.46 | 6.36 | 6.000 | 151.0 | 120.00 | 29.39 | 8.16 |
| $T_4$ | Borax-1% | 175.43 | 6.73 | 6.867 | 176.7 | 132.66 | 33.73 | 9.35 |
| $T_5$ | $CuSO_4$-0.3% | 125.00 | 5.40 | 5.767 | 126.5 | 105.30 | 27.36 | 7.58 |
| $T_6$ | $CuSO_4$-0.6% | 134.66 | 5.43 | 5.933 | 134.1 | 108.00 | 28.06 | 7.79 |
| $T_7$ | $ZnSO_4$+Borax+$CuSO_4$ each at 0.2% | 167.66 | 6.56 | 6.767 | 168.6 | 127.60 | 33.16 | 9.20 |
| $T_8$ | $ZnSO_4$+Borax+$CuSO_4$ each at 0.4% | 189.66 | 6.93 | 7.033 | 190.7 | 145.60 | 35.33 | 9.81 |
| SE(m)± | | 1.024 | 0.086 | 0.032 | 0.36 | 1.04 | 0.27 | 0.19 |
| CD at 5% | | 3.072 | 0.259 | 0.097 | 1.01 | 3.14 | 0.83 | 0.57 |

**Table 2:** Effect of micronutrients on chemical composition of rejuvenated guava cv. Allahabad Safeda

| Treatments | TSS | Acidity | Ascorbic acid | Reducing sugar | Non -reducing sugar | Total sugars |
|---|---|---|---|---|---|---|
| $T_0$ | 10.75 | 0.40 | 157.73 | 94.333 | 2.96 | 5.56 |
| $T_1$ | 14.43 | 0.31 | 230.68 | 117.667 | 7.17 | 10.72 |
| $T_2$ | 14.72 | 0.29 | 231.85 | 122.667 | 7.19 | 11.01 |
| $T_3$ | 12.65 | 0.36 | 222.85 | 120.00 | 7.05 | 10.17 |
| $T_4$ | 13.93 | 0.36 | 237.55 | 132.667 | 7.12 | 10.45 |
| $T_5$ | 11.89 | 0.38 | 213.84 | 105.300 | 6.84 | 9.15 |
| $T_6$ | 12.15 | 0.38 | 220.84 | 108.000 | 6.93 | 9.76 |
| $T_7$ | 12.37 | 0.37 | 231.06 | 127.600 | 7.12 | 10.05 |
| $T_8$ | 13.43 | 0.36 | 228.71 | 145.600 | 7.14 | 10.38 |
| SE(m)± | 0.22 | 0.013 | 1.01 | 0.04 | 0.03 | 0.12 |
| CD at 5% | 0.67 | 0.038 | 3.04 | 0.12 | 0.1 | 0.36 |

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