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## Effect of foliar spray of borax on growth and yield of guava (*Psidium guajava* L.) cv. Gwalior-27

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### Abstract

The present experiment was carried out at College of Agriculture, Gwalior (M.P.) to find effect of spray of borax on fruits of guava. Three different concentration of borax viz., B<sub>0</sub> (control), B<sub>1</sub> (0.2%) and B<sub>2</sub> (0.4) were sprayed on guava trees and various growth and yield parameters were recorded. The data pertaining to various parameters revealed that spray of borax @ 0.4% was found effective for number of fruits per plant, fruit weight, fruit yield per tree, yield per hectare, polar diameter, radial diameter, pulp weight and spray of borax @ 0.2% was effective for length of tertiary shoots and diameter of shoots. The effect of boron on seed weight was recorded non-significant.

**Keywords:** *Psidium guajava*, Borax, Guava

### 1. Introduction

Guava (*Psidium guajava* L.), the apple of the tropics, is one of the most popular fruit plant grown in tropical, sub-tropical and some parts of arid regions of India. The fruit belongs to the family Myrtaceae. It is also a chief and very rich source of vitamin-C, carbohydrate, iron, fat and contains a fair amount of calcium, phosphorous as well. Guava fruits are also used for preparation of salad, chutney, jam, jelly, nectar etc. These qualities make guava an important and one of the most popular fruits of India. Guava fruits are rich in nutritional and medicinal properties. The fruit is an excellent source of vitamin-“C” (210-305mg/100g fruit pulp) and pectin (0.51.8%) but has low energy (66cal/100g fruit pulp). The ripe fruits contain 12.3-26.3% dry matter, and 77.9-86.9% moisture. The fruits are also rich in minerals like Phosphorus (22.5-40.0mg/100g fruit pulp), Calcium (10.0-30.0mg/100g pulp) and Iron (0.60-1.39mg/100g fruit pulp) as well as vitamins like Niacin (0.20- 2.32mg/100g fruit pulp), Thiamine (0.03-0.07mg/100g fruit pulp), Riboflavin (0.02- 0.0mg/100gm fruit pulp) and Vitamin-“A” (Bose and Sanyal, 2001) [4]. Guava fruit is relished when mature or ripe, and freshly plucked from the tree. Excellent salad and pudding are prepared from the shell of the ripe fruit. It can be preserved by canning with or without seeds. Boron is a multipurpose and crucial element for the plants. Boron is much required for cell division and development in the growth regions of the plant near the tips of shoots and roots. Boron affects pollination and the development of viable seeds which in turn affect the normal development of fruit. A shortage of boron also causes cracking and distorted growth in fruit with appearance of red spots on the newly emerged leaves. Leaves become dry and brittle. The size and quality of guava fruit can be increased greatly by foliar application of borax (Singh and Brahmachari, 1999) [8]. Gwalior-27 is a popular variety in Northern Madhya Pradesh. Gwalior-27 cultivar is a selection from Allahbad Safeda. Tree is semi-vigorous, medium height and prolific bearer. Fruits are medium, globose, each weighing on an average 225g with few soft seeds, creamy white epicarp with red spots or blush, snow-white pulp, TSS 12.5-14.00 Brix, vitamin C 300mg per 100g pulp and good keeping qualities. Fruits are attractive with good nutritive value.

### Materials and methods

The present investigation was carried out at Agrotechnology Park, Krishi Vigyan Kendra, College of Agriculture, Gwalior (M.P.) during 2016-2017. The investigation was conducted on 7 years old guava plants planted at 6 X 6 m apart under square system of planting. In order to assess the effects of various treatments, all the plants were subjected to uniform cultural practices during the period of experimentation. The experiment was laid out in Randomized Block Design with three replications with a unit of one plant in each replication of a treatment. Different concentrations of borax viz., B<sub>0</sub> (control),

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B<sub>1</sub> (0.2%) and B<sub>2</sub> (0.4) were prepared by dissolving the required amount of boric acid in required amount of water. Observations on various characters of plant *i.e.* Shoot length (cm), Shoot diameter (cm), Number of leaves per shoot, Number of fruit per plant, Average fruit weight (g), Yield of fruit per plant (kg), Yield (q/ha), Polar diameter of fruit (cm), Radial diameter of fruit (cm), Pulp weight (g) and Seed weight (g) were recorded. The data obtained from set of observation for each character were subjected to "Analysis of Variance" as advocated by Panse and Sukhatme (1985)<sup>[5]</sup>.

## Results

The growth parameters of the guava plant were significantly influenced by the different concentration of Borax over the control. The mean maximum tertiary shoot length (6.43 cm) was recorded under B<sub>2</sub> (Borax @ 0.4%) which was superior with other treatments whereas, the mean minimum tertiary shoot length (5.34cm) was noticed under control (Table 1). Increased shoot diameter (0.34 cm) was recorded under the treatment B<sub>2</sub> (Borax @ 0.4%) and B<sub>1</sub> (Borax @ 0.2%) while, the minimum shoot diameter (0.33 cm) under control (Table 1). The mean maximum number of leaves per shoot (24.77) was recorded under the treatment B<sub>2</sub> (Borax @ 0.4%), followed by B<sub>1</sub> (Borax @0.2%), while the minimum number of leaves per shoot (19.53) was recorded under control (B<sub>0</sub>) (Table 1). The Borax has a key role in cell division and cell elongation, and there by increased vegetative growth. A notable characteristic of Borax is that it directly effect on photosynthesis activity of plants. Increase in shoot length due to spray of Borax have also been reported earlier by several workers. Bagali *et al.* (1993)<sup>[3]</sup> reported that spray of borax singly and their combinations at 0.3 per cent concentration on guava cv. Sardar during June and July (winter season crop) enhanced the shoot length, number of leaves per shoot, number of flower buds per shoot, fruit set per shoot, fruit retention per shoot, physical parameters of fruits, number of fruits per tree and fruit yield per tree in guava.

The data pertaining to various yield attributing parameters of the guava plant viz. number of fruits per plant, weight of fruit, and yield of fruit per plant, yield per hectare, polar diameter of fruit, radial diameter of fruit, pulp weight, seed weight, significantly increased by the various sprays of Borax. The increased maximum number of fruits per plant (322), fruit weight (142.28 g), fruit yield per tree (46.08 kg), yield per hectare (127.96 q), polar diameter (7.03 cm), radial diameter (6.49 cm), and pulp weight (250 g) were recorded under the treatment B<sub>2</sub> (Borax @ 0.4%) and maximum seed weight were recorded under control (B<sub>0</sub>) which were significantly superior to the other levels whereas, the minimum number of fruits per plant (302), fruit weight (134.11 g) fruit yield per tree (40.77 kg), yield per hectare (113.22 q), and radial diameter (6.05 cm) were recorded under control. The seed weight (1.74 g), pulp weight (168.00g), and pollar diameter (6.06cm) were recorded under treatment B<sub>1</sub> (Table 2). The increase in fruit yield may be attributed to the increase in vegetative growth Whole enhancement in yield and yield attributing parameters may be due to the increased auxin production and subsequent translocation from source to sink. Borax acts as catalyst in the oxidation and reduction processes and also has great importance in the sugar metabolism; it might have improved the physical characters of guava fruit and thus increased the yield per tree assumed in our finding. Heavier fruits with more fruit weight under Borax treatment might be due to the high level of auxin in the various parts of the fruit plant maintained by Borax. Borax spray increased the fruit weight because it is an essential micro nutrient and it is considered indispensable for the growth of all organisms (Arora, and Singh, 1970)<sup>[6]</sup>. Chaitanya *et al.* (1997)<sup>[1]</sup> and Pal *et al.* (2008)<sup>[7]</sup> also observed that foliar spray of borax improved the fruit yield in guava cv. L-49. Stampar *et al.* (1999)<sup>[2]</sup> observed that foliar application of borax increased yield up to 30 per cent in apple.

**Table 1:** Effect of foliar spray of borax on tertiary shoot length, shoot diameter, number of leaves per shoot, number of fruits per plant and average fruit weight of guava.

Borax	Tertiary shoot length (cm)	Shoot diameter (cm)	Number of leaves per shoot	Number of fruits per plant	Average fruit weight (g)
B <sub>0</sub> (Control)	3.70	0.33	15.65	59.80	128.67
B <sub>1</sub> (0.2%)	4.36	0.34	17.68	63.35	132.17
B <sub>2</sub> (0.4 %)	4.71	0.31	23.50	65.20	136.00
SE (m) ±	0.34	0.01	0.12	0.95	1.89
C.D. (at 5%)	0.10	0.02	0.35	2.83	5.64

**Table 2:** Effect of foliar spray of borax on fruit yield per tree, yield per hectare, polar diameter of fruit, radial diameter of fruit, pulp weight and seed weight of guava.

Borax	Fruit Yield per tree (kg)	Yield (q/ha)	Polar diameter of fruit (cm)	Radial diameter of fruit (cm)	Pulp weight (g)	Seed weight (g)
B <sub>0</sub> (Control)	37.92	105.31	5.80	5.68	150	3.63
B <sub>1</sub> (0.2%)	39.68	110.20	5.51	6.21	161	2.26
B <sub>2</sub> (0.4 %)	43.34	120.35	7.31	6.51	213	1.78
SE (m) ±	0.70	1.95	0.12	0.13	0.33	0.60
C.D. (at 5%)	2.09	5.83	0.35	0.40	1.00	0.18

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