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EFFECT OF FOLIAR APPLICATION OF NUTRIENTS ON YIELD AND QUALITY ATTRIBUTES OF GUAVA (*PSIDIUM GUAJAVA* L.) CV. L-49

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Abstract–The present investigation entitled "Effect of foliar application of nutrients on yield and quality of guava cv. L-49" was carried out at Department of Horticulture, VNMKV, Parbhani during the year 2018. The experiment was laid out in Randomized Block Design having eleven treatments with three replications. The details of treatments were as T_1- Urea @ 0.5%, T_2- Urea @ 1%, T_3- Potassium sulphate @ 0.5%, T_4- Potassium sulphate @ 1%, T_5- Borax @ 0.5%, T_6- Borax @ 0.5%, T_7- Zinc sulphate @ 0.5%, T_8- Zinc sulphate @ 1%, T_9- Ferrous sulphate @ 0.5%, T_{10}- Ferrous sulphate @ 1%, T_{11}- Control. The minimum days to first harvesting (103.70), maximum number of fruits per tree (174.08), yield per tree (31.03 kg and 71.68 ton/ha),TSS (12.04%), reducing sugar (5.33%), non-reducing sugar (4.15%), total sugar (9.48%), ascorbic acid (195.25 mg/100 fruit pulp), shelf life (4.50 days) and decrease acidity (0.35%)was recorded with foliar application of (T_4) Potassium sulphate @ 1%. However, the minimum values of all attributes were recorded under the (T_{11}) control.

INTRODUCTION

Guava (*Psidium gaujava* L.), the ''Apple of tropics'' and ''Poor man's apple'' is one of the most popular fruits grown in tropical, sub-tropical and some parts of arid regions of India. The fruit belongs to the family Myrtaceae. It is the fifth most important fruit in the area after mango, citrus, banana and apple and fifth most important fruit in the production after banana, mango, citrus and papaya. It's has gained considerable prominence owing to its high nutritive value and is a rich source of vitamin C along with minerals like iron, calcium and phosphorus. It also contains substantial quantities of carbohydrates, sugar and pectin, pleasant aroma, good flavor and availability at moderate price makes it an ideal fruit for nutritional security. Though this crop is hardiest in nature and adoptable to variety of soil and agro-climatic condition, it gives good response to the nutrition in increasing fruit production.

Boron is heavy non-metal micro nutrient which improves quality of fruit. It is absorbed by plant in the from boric acid for translocation of sugar, reproduction of plants and germination of pollen grains, boron is necessary. Its major role includes hormonal balance, active salt absorption and increase Ascorbic acid hence the nutrients status of the consumer. Boron also has an effect on cell elongation and root growth.

Urea is an important organic fertilizer for the plants, which stimulates shoot growth, increase the number of flowers per shoot and also increased the fruit set, fruit retention, fruit diameter and improves the total soluble solid and acidity. Urea plays an important role in the synthesis of endogenous hormone (Chander *et al*., 2017). Effect of Borax and Potassium sulphate on guava plants when applied twice once before first flowering and again after fruit setting are beneficial to get higher yield of good quality fruits from winter season crop. This practice improves flowering, fruit set, fruit retention, fruit size, fruit weight, volume, yield per plant and fruit quality parameters viz. total sugar, TSS and Ascorbic

acid significantly other practices of foliar application (Baranwal *et al.,*2017).

MATERIALS AND METHODS

The present investigation entitled "Effect of foliar application of nutrients on yield and quality of guava (*Psidium guajava* L.) cv. L-49. The experiment was conducted on well-established orchard of 5 year old orchard which are planted at 2.5 X 3 m spacing under high density planting was carried out 2018 during mrig bahar season at Department Horticulture, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. The experiment was laid out in Randomized Block Design (RBD) with three replication and eleven treatments viz., T_1- Urea @ 0.5%, T_2- Urea @ 1%, T_3- Potassium sulphate @ 0.5%, T_4- Potassium sulphate @ 1%, T_5- Borax @ 0.5%, T_6- Borax @ 0.5%, T_7- Zinc sulphate @ 0.5%, T_8- Zinc sulphate @ 1%, T_9- Ferrous sulphate @ 0.5%, T_{10}- Ferrous sulphate @ 1%, T_{11}- Control**.** The foliar application of these treatments as per plan sprayed first week of August and repeat in second week of September was made at 35 and 70 days after flowering. Observation were recorded for days to first harvesting (103.70), number of fruits per tree (174.08), yield per tree (31.03 kg and 71.68 ton/ha), TSS (12.04%), reducing sugar (5.33%), non-reducing sugar (4.15%), total sugar (9.48%), ascorbic acid (195.25 mg/100 fruit pulp), shelf life (4.50 days) and acidity (0.35%). The data so obtained were analysed stastically. (Panse and Sukhatme1985).

RESULT AND DISCUSSION

Presented in Table 1 reveled that significantly minimum days to first harvesting (103.70) was recorded in (T_6) Borax @ 1% which was statistically at par with treatment T_7 (112.90), T_{10} (113.10), T_4 (117.70), T_3 (118.40) and T_2 (119.10) maximum days to first harvesting (120.40) was recorded in control.

Highest number of fruits per tree (174.08) were observed with the treatment of (T_4) potassium sulphate @ 1% which was found statistically at par with treatment T_{10} (171.95) while lowest number of fruits (132.92) per tree was recorded in control. The highest fruit yields per tree (31.03 kg and 124.14 tons/ha) was recorded in (T_6) Borax @ 1% which was statistically at par with treatment T_8 (28.79 kg and 115.16 tons/ha) lowest yield per tree (17.92 kg and 71.68 ton/ha). It means foliar application of nutrients play a vital role in fruit set, fruit retention and fruit development and ultimately fruit harvesting. The harvesting in flowering might be due to borax reduce maturity duration which is enzymatic reaction, cell division as well in growth. The increase in yield was obviously due to promotion of starch formation followed by rapid transportation of carbohydrates in plants activated by micronutrients like boron. Borax to their stimulatory effect on plant metabolism and production of auxin like chemicals which helps to increase fruit set, fruit retention and fruit size and yield per tree and yield per hectare. Similar results were also found in mango (Gurjar *et al*., 2015) and (Chander *et al.,* 2017) in guava.

Influence of potassium sulphate and boron under study on quality attributes of guava under different treatments is described. It is evident from data presented in Table 2 revealed that maximum TSS (12.04%), ascorbic acid (195.25 mg/100 fruit pulp), reducing sugar (5.33%), non-reducing sugar (4.15%), total sugar (9.48%),with minimum acidity (0.35%)

Table 1. Effect of foliar application of nutrients on yield attributes of guava cv. L-49

Tr.no.	Treatments	Days to 1st harvesting	No. of fruits /tree	Fruit yield/ tree(kg)	Fruit yield (tonne/ha)
T_1	Urea @ 0.5%	119.30	159.53	23.61	94.45
T_2	Urea @ 1%	119.10	165.86	24.5	98.00
T_3	Potassium sulphate @ 0.5%	118.40	161.53	22.48	89.92
T_4	Potassium sulphate @ 1%	117.70	174.08	25.33	101.33
T_5	Borax @ 0.5%	110.30	136.98	24.55	98.21
T_6	Borax @ 1%	103.70	148.35	31.03	124.14
T_7	Zinc sulphate @ 0.5%	112.90	140.81	23.56	94.24
T_8	Zinc sulphate @ 1%	108.6	153.87	28.79	115.16
T_9	Ferrous sulphate @ 0.5%	111.30	168.44	23.97	95.90
T_{10}	Ferrous sulphate @ 1%	113.10	171.95	27.18	108.73
T_{11}	Control	120.40	132.92	17.92	71.68
	S.E.±	2.75	3.43	1.18	4.75
	C.D at 5%	8.12	10.14	3.51	14.04

was obtained with foliar application of (T_4) potassium sulphate @ 1%, which was at par with treatment TSS T_3 (11.74%), acidity T_7 (0.41%), T_6(0.42%), T_3 (0.43) andT_8 (0.44%), non-reducing sugar (3.98%) and followed by ascorbic acid T_3 (188.15mg) reducing sugar T_8 (4.44%), total sugar T_3 (7.79%) While the minimum TSS (9.10%), reducing sugar (2.59%), non-reducing sugar (2.30%), total sugar (4.89%), ascorbic acid (150.53 mg) and maximum acidity (0.47%) was recorded in control. The maximum shelf life (4.50 days) was recorded in (T_6) borax @ 1%. which was at par with treatment T_8 (4.08 days) and minimum shelf life (2.00 days) was recorded in T_{11}.The increase in TSS content of guava fruit might be due to accumulation of higher level of water soluble compounds viz., total sugars, vitamins, minerals, which were synthesized, translocated and accumulated due to chemical changes the fruit development and maturity of fruits. Increase reducing sugar due to the enhancement of photophosphorylation and dark reaction of photosynthesis by potassium which resulted in accumulation of more carbohydrates in the fruits and helps in better accessibility of nutrients of the developing fruits, increase non-reducing sugar due to activation of enzymes involved in hydrolysis of polysaccharides and better transportation of assimilates and nutrients to the fruits *i.e.*, from leaves to their place of utilization, which increase the availability of nutrients and eventually resulted in better quality of fruits. The increases in fruit total sugar might be due to conversion of starch and acid into sugars in addition to the continuous mobilization of sugars from leaves to fruits.

The reduction in acid content might be due to higher accumulation of sugars into fruit tissues and conversion of organic acids into sugars.

Maximum shelf life is due to biochemical reaction inside the fruit tissue in terms of cell division and application of micronutrients helps to synthesis of growth substance metabolism this might be reason for early ripening of fruits hence, reduces the shelf life of fruit. The result obtained in the present study are in agreement with that reported in guava (Kumar *et al.*, 2017; Singh *et al.*, 2016; Singh *et al.*, 2018; Mishra *et al.*, 2017) and in sapota (Thirpathaiah *et al.*, 2017).

CONCLUSION

Based on present investigation it can be concluded that foliar application of borax @ 1% from the overall experimental finding was proves to be most effective yield attributes and potassium sulphate @ 1% quality attributes of guava fruits.

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Table 2. Effect of foliar application of nutrients on quality attributes of guava cv. L-49

Tr no.	Treatments	T.S.S(%)	Acidity (%)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)	Ascorbic acid (mg/100 gmfruit)	Shelflife (days)
T_1	Urea @ 0.5%	9.98	0.46	3.03	2.35	5.38	153.55	2.41
T_2	Urea @ 1%	10.17	0.45	3.52	2.58	6.10	153.22	3.20
T_3	Potassium sulphate @ 0.5%	11.74	0.43	3.81	3.98	7.79	188.15	3.00
T_4	Potassium sulphate @ 1%	12.04	0.35	5.33	4.15	9.48	195.25	3.28
T_5	Borax @ 0.5%	10.98	0.47	4.12	3.35	7.47	171.26	4.50
T_6	Borax @ 1%	11.17	0.42	4.22	3.43	7.65	176.20	4.50
T_7	Zinc sulphate @ 0.5%	11.06	0.41	3.17	3.45	6.62	155.90	3.16
T_8	Zinc sulphate @ 1%	11.37	0.44	4.44	2.99	7.43	156.89	4.08
T_9	Ferrous sulphate @ 0.5%	10.46	0.43	3.34	2.54	5.88	157.90	2.11
T_{10}	Ferrous sulphate @ 1%	10.86	0.42	3.55	2.33	5.85	161.23	2.25
T_{11}	Control	9.10	0.47	2.59	2.30	4.89	150.53	2.00
	S.E.±	0.16	0.01	0.25	0.20	0.17	2.22	0.19
	C.D at 5%	0.48	0.03	0.73	0.60	0.51	6.56	0.57

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