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Effect on pruning intensity and foliar application of KNO 3 on plant growth, flowering and fruiting of guava cv. Allahabad Safeda

Manju Shukla and Brijpal Bisen

Abstract
The experiment was laid out in randomized block design with four replications and fifteen treatments. Pre-harvest application Potassium nitrate (1%, 2% and 3%) and Pruned at no prune, 10%, 20%, 30% and one leaf pair pruning of shoot growth. It was recorded that maximum TSS (10.960Brix), Total sugars (7.43%), Reducing sugar (4.77%), Non-reducing sugar (2.67%) and Acidity (0.333%) were found with 2% KNO3 treated plants.

Keywords: Fruit quality, guava, potassium nitrate, pruning

Introduction
Guava (*Psidium guajava* L.) belongs to family Myrtaceae. It is one of the highest fruit in area and production after citrus, mango grapes and banana. Guava fruit is often referred to as apple of tropics probably as it is the only fruit that matches the high nutritive value of more commercially important temperate fruit apple (Khan *et al*., 2013) [10]. Guava fruit is the cheapest and richest source of vitamin 'C' as well as it contains small amounts of vitamin A, B, carbohydrates, oils and proteins. The fruits are eaten fresh or made into guava jelly. Juice is also extracted from the fruit and used as the basis for a beverage, while guava paste or guava cheese are popular dishes in some parts of the world (Singh and Singh, 1998). Guava is rich in vitamin C (75–260 mg/100 g pulp), pectin (0.5–1.8%), good source of thiamine (0.03–0.07 mg/100 g pulp) and riboflavin (0.02–0.04 mg/ 100 g pulp). Besides, guava fruit is also a good source of minerals, like phosphorus 22.5–40.0 mg/100 g, calcium 10.0–30.0 mg/100 g and iron 0.60–1.39 mg/ 100 g (Singh *et al*. 2003). Guava jelly is well known to make the best jelly, beside this, jam, sherbet, ice-cream, cheese, canned fruit, RTS, nectar, squash and guava powder are also made. Two types of wines *viz*. guava juice and guava pulp wines are also prepared from guava fruits (Bardiya *et al*.1947) [4]. It normally bears two crops in a year: the first bearing in rainy season from spring flush (Ambebahar) and the second in winter from monsoon flush (Mrigbahar). The crop of spring flush gives maximum production. However the fruits are of poor quality and severely infected by fruit fly. On the other hand, fruits produced from monsoon flush are more nutritious and superior in quality but the yield is low.
At present, it is the fifth most important fruit crop in India after mango, banana, citrus, and papaya with annual production of 3.60 million tones from 0.26 million hectare area accounting to about 4.1% and 3.7% of total production and area respectively. The leading guava growing states are Madhya Pradesh, Bihar, Uttar Pradesh, Haryana, Gujarat, Maharashtra, Andhra Pradesh and Rajasthan, Madhya Pradesh is the leading guava producing state (22.9%) with 22,40 ha area, 8,41, 100m tones production and 37.6 MT/ha productivity (Anonymous 2014).
Pruning of guava is one of the most important practices that influence vigour, productivity and quality of the fruits (Gadgil and Gadgil, 1933) [8]. Pruning is one of the oldest cultural practices which are practiced in temperate and sub-tropical fruit crops to bring a balance between vegetative and reproductive growth of the plant. Lal (1983) [12] indicated that the yield of guava cv. Sardar was improved by pruning. Also, Salah, 2005 [16] produced the highest bud emergence of guava by using severe and moderate pruning. Haropinder and Bal (2006) reported that pruning may be helpful in reducing the tree size and improving the fruit quality as well. as in un pruned trees, growth becomes week and the fruit size, yield and quality of guava is reduced.
The importance of supply of nutrient elements for good growth has been largely neglected for guava plant trees. The trees grown under field condition are subjected to nutrient deficiencies

which affect the growth, tissue composition, fruit production and quality. The foliar feeding of fruit trees has gained much importance in recent year, as fertilizers applied through soil are needed in greater quanty because some portion leaches down and some does not become available to the plant due to complex chemical reactions. The composition of various plant tissues, especially in so for as their mineral composition are concerned, has been found to be influenced considerably by the character of the soil in which they grow. Foliar application of potassium during fruit development can be advantageous for fruit crops, since this growth stage often coincide with high potassium element during the time of declining root activity and nutrient uptake. Potassium increases the fruit quality and yield of fruit crops. There might be hidden hunger for macronutrients affecting growth, yield and quality of guava.

Materials and Methods

The present investigation was carried out on Four year old plants of uniform, healthy and young bearing tree of guava at Fruit Research Station, Imalia, Department of Horticulture, J.N.K.V.V, Jabalpur during 2015-16.The selected plants were pruned at No pruning, 10%, 20%, 30% and One leaf pair pruning of current seasons shoot growth and plant selected for spray sprayed with Potassium nitrate (1%, 2% and 3%) solutions in last week of July and control (without any treatment). The sprays were conducted until total saturation of foliage. Which were replicated four in a randomized block design along with the Fifteen treatments. (No pruning-control)+1%KNO3, T2 (No pruning-control)+2%KNO3, T3 (No pruning-control)+3%KNO3, T4 (Shoot pruning-10cm)+1%KNO3, T5 (Shoot pruning-10cm)+2%KNO3, T6 (Shoot pruning-10cm)+3%KNO3, T7 (Shoot pruning-20cm)+1%KNO3, T8 (Shoot pruning-20cm)+2%KNO3, T9 (Shoot pruning-20cm)+3%KNO3, T10 ((Shoot pruning-30cm)+1%KNO3, T11 (Shoot pruning-30cm)+2%KNO3, T12 (Shoot pruning-30cm)+3%KNO3, T13 (One leaf pair pruning)+ 1% KNO3,T14 (One leaf pair pruning)+ 2% KNO3 and T15 (One leaf pair pruning)+ 2%KNO3.The total soluble solid TSS of filtered juice was measured by Hand Refractrometer of 0-320Brix range few drops of juice were put on prism of refractrometer with the help of clean glass rods. The cover of refractrometer was folded lightly and looked through eye piece with projection inlet facing towards light. The point where the boundary line of shaded area interacts with the unshadedarea of the scale was noted down .The specimen chamber was cleaned with muslin cloth after every use. The readings were taken at room temperature.

The ascorbic acid and acidity was estimated by the method described by Ranganna (1997). Total sugar content was determined by 'Fehling solution method' and expressed in percentage. The data collected during the investigation were analyzed statistically by the method of analysis of variance. The significance of various treatments was judged and Suggested by Fisher (1937) [6] applying 'F' test.Least significant difference at 5% level was used for finding the significant differences among the treatment means. The objective of present study was to determine the best treatment combination for quality enhancement in guava.

Results and Discussion

The results presented in show that the response of pruning intensity and foliar application of KNO3 in increasing the TSS however, The maximum TSS B3 has shown the maximum T.S.S (10.96) 0Brix which showed superiority over B2 (KNO3 2%) and B1 (KNO31%), respectively. The minimum amount of T.S.S 10.49 0Brix were found in B1 (KNO31%). In foliar application 3% KNO3 has shown maximum T.S.S. which showed superiority over 2% KNO3 and 3% KNO3 respectively. The minimum amount of T.S.S. found in 1% KNO3.The higher T.S.S. might be due to potassium has prominent role in translocation of photo-assimilates, sugars and other soluble solids which are responsible for increased T.S.S. Present results regarding TSS are in accordance with finding of Mitra *et al*.1982, Singh 1986. Gaur 1996 [9] and Ahlawat and Yamdagni (1981) [1].

The result clearly shows foliar spray of KNO3 significantly influenced the acidity. (B3) showed the minimum acidity % of (0.333) which was superior over B2 (KNO32%) and B1 (KNO31%) respectively. The maximum acidity % (0.339) was found in B1 (KNO31%) Minimum titrable acidity 3% KNO3 was recorded in application of lower acidity in fruits results due to higher accumulation of sugars, better translocation of sugar into fruit tissues and conversion of organic acid into sugar.

The maximum ascorbic acid (233.21) mg/100 was recorded under B3 and the minimum ascorbic acid (232.72) mg/100 was recorded under B1. Increased ascorbic acid content in the fruits may be because potassium could have helped to slow down the enzyme system that encouraged the oxidation of ascorbic acid, thus helping the plants to accumulate more ascorbic acid content in the fruits (Ananthi *et al*., 2004) [2]. The high energy status in crops well supplied with K also promotes synthesis of secondary metabolites, like Vitamin C (Mengel, 1997). The application of mineral nutrients has positively influenced the metabolic activities probably due to their improved endogenous level following external application. These may have enhanced the process of synthesis, translocation and accumulation of quality constituents like TSS, sugars and ascorbic acid following strong source sink relationship (Goswami *et al*., 2014) [7]. The data showed that foliar spray of KNO3 significantly increased the total sugar. The maximum total sugar (7.43) % was recorded under B3 and the minimum total sugar (7.14) % was in B1.

Higher fruit quality especially higher sugar content can be explained as potassium plays a major role in carbohydrate synthesis, breakdown and translocation and synthesis of protein and neutralization of physiologically important organic acids (Tisdale and Nelson, 1966). Data indicate the maximum reducing Effect of pruning levels and spraying of chemical on quality of guava Research in Environment and Life Sciences 1064 September, 2016 Lal *et al*. The maximum reducing sugar (%) of 4.77 was recorded under B3 comprising 3% KNO3, which showed significant superiority over rest of treatments and the minimum reducing sugar (%) of (4.60) was recorded under B1. Regarding reducing, non reducing and total sugars data obtained, indicated that reducing, non-reducing and total sugars contents in guava fruits increased significantly as affected by all foliar spray treatments over than that the control. An increase in reducing sugar content with these nutrients may be due to the improvement of photophosphorylation and dark reaction of photosynthesis by potassium and hence resulted in addition of more carbohydrates to the fruits, which results the enhanced accessibility of nutrition for development of fruits and at long last increases the reducing sugar level of fruits. Similar findings have been reported by Bhat *et al*. (2012) in pear fruit

cv. Bartlett and Singh *et al*. (2002) in peach cv. Flordasun. These results are also supported with the findings of Akhuat and Yamdagni (1981); Mitra (1987) [13];
Ghosh (1994) and Al-Taweel (2001) [3] they reported that total sugars were increased as nitrogen and potassium increased. The maximum non-reducing sugar of recorded under 3% KNO3 which showed significant effect over rest of the treatments and minimum non-reducing sugar of 2.54 was recorded under B1(1%KNO3). The results corroborate the earlier records the possible reason for increase in non reducing sugar content of fruits with the application of nutrients might be due to hydrolysis of polysaccharides to simpler form i.e. mono and disaccharides and better transportation of nutrients to plant by potassium application as it plays an important role in the transportation of assimilates and nutrients to the plant from leaves to their place of utilization, which increase availability of nutrients and eventually resulting in better quality of fruits. There results Kaur (2006). With regards to the pruning intensity, showed significant effect on the non-reducing sugar and maximum non-reducing sugar percentage was recorded when it is subjected to one pair leaf pruning which was significantly superior to rest of the treatments whereas minimum non-reducing sugar percentage was recorded under no pruning. The finding was supported by Rajput *et al*. (1997).
The probable reason for increase in content of non reducing sugar in fruits with the application of nutrients may be attributed to the hydrolysis of polysaccharides into simpler form, that is, mono and disaccharides and better transportation of nutrients to plant through potassium due to their major role in the transportation of assimilates and other nutrients to the plant from leaves to their place of consumption, which helps to increase accessibility of nutrition and conclusively better quality advancement in term of non reducing sugar content of fruits. These results agree with the earlier records of Kumar *et al*.

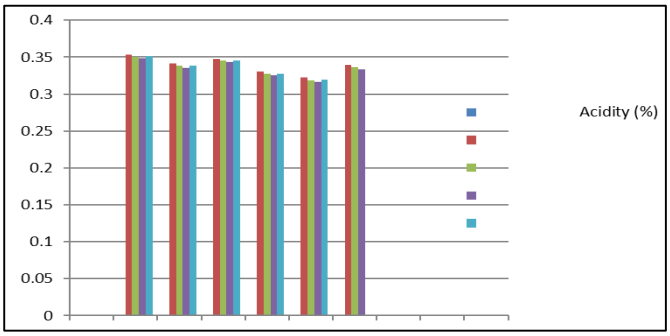

Fig 1: Effect of Pruning intensity and foliar application of KNO_3on T.S.S (^{0}Brix)

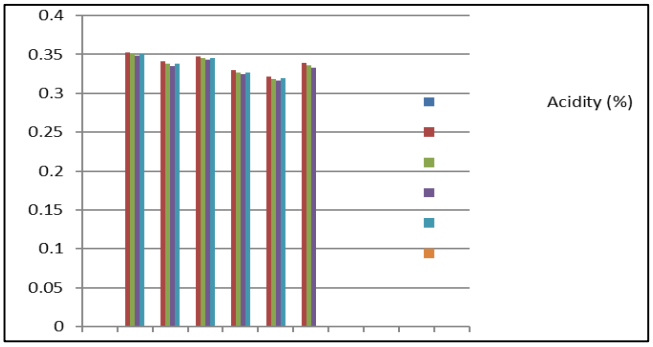

Fig 2: Effect of Pruning Intensity and Foliar Application of KNO_3 on Ascorbic Acid (mg/100g)

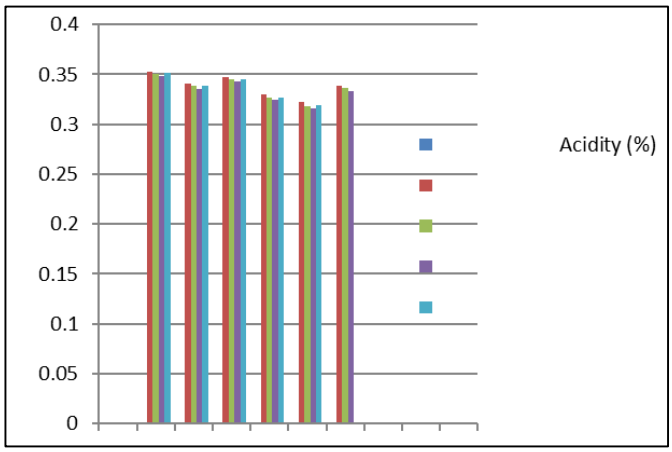

Fig 3: Effect of Pruning Intensity and Foliar Application of KNO_3 on Reducing Sugar (%)

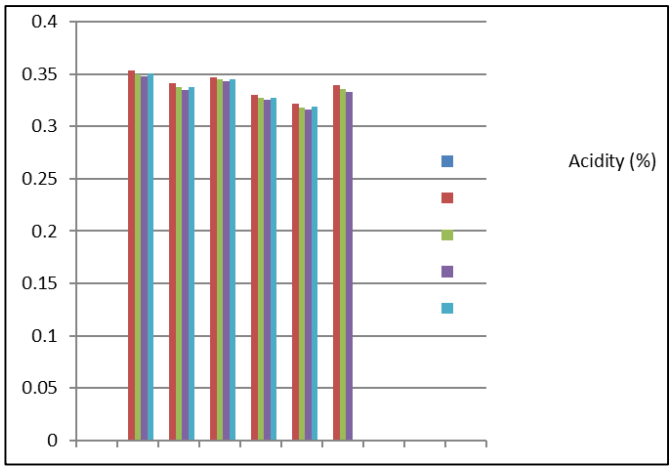

Fig 4: Effect of Pruning Intensity and Foliar Application of KNO_3 on Non Reducing Sugar (%)

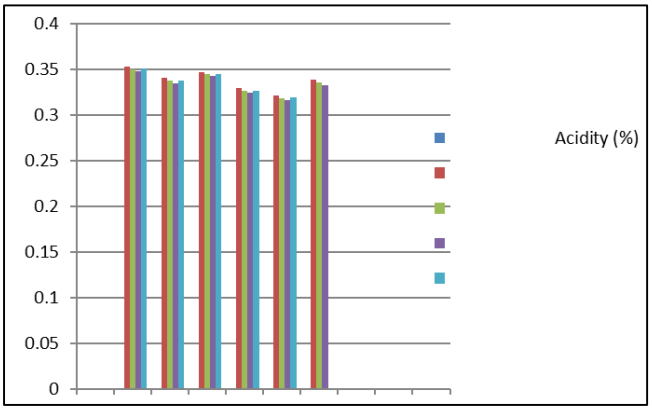

Fig 5: Effect of Pruning Intensity and Foliar Application of KNO3 on Acidity (%)

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References

1. Ahlawat VP, Yamdagni R. Effect of potassium sprays on quality of guava cv. Sardar. Agriculture Science Digest 1981;1:213-14.
2. Ananthi S, Veeraragavathatham D, Srinivasan K.

Comparative efficacy of sulphate of potash and muriate of potash on yield and quality of chilli (Capsicum annum L.). South Indian Hort 2004;52:158-63.
3. AL–Taweel AA. Studies on use of potassium for quality improvement of guava fruits. M. Sc. Thesis Fac. of Agric., Mansoura Univ 2001.
4. Bardiya, Kundu MC, BS, Tauno P. Studies on fruit wines guava wines. Haryana Journal of Horticultural Science 1947;3(3, 4):140-146.
5. Bhat MY, Hafiza A, Banday FA, Dar MA, Wani AI, Hassan GI. Effect of harvest dates, pre harvest calcium sprays and storage period on physico-chemical characteristics of pear cv. Bartlett. J. Agric. Res. Dev 2013;2:101-106.
6. Fisher RA. The wave of advance of advantageous genes. Annals of Human Genetics 1937;7(4):355-369.
7. Goswami AK, Shukla HS, Mishra DS. Influence of pre-harvest nutrients application on the physico-chemical quality and storage behaviour of guava (Psidium guajava L.) fruit cv. L-49. Prog. Hortic 2014;46:54-57.
8. Gadgil DR, Gadgil VR. A survey of the marketing of fruit in Poona. Gokhale Inst. Politics and Econ. Pub. 1933,3
9. Gaur GS. Studies on crop regulation in guava. Recent Hort 1996;8:21-23.
10. Khan JN, Jain AK, Sharda R, Singh NP, Gill PPS, Kaur S. Growth, yield and nutrient uptake of guava (Psidium Guavaja L.) affected by soil matric potential, fertigation and mulching under drip irrigation. Agric Eng Int: CIGR Journal 2013;15:17-27.
11. Kumar R, Singh SP, Chandra AS. Effect of preharvest application of different chemicals on the quality of grape cv. Delight during storage. Haryana. J. Hortic. Sci 1990;19:62-70.
12. Lal S. Effect of pruning on crop regulation in guava (Psidium guajava L.) cv. Lucknow-49. Prog. Hort. 1983;7:60-62.
13. Mitra SK, Sen SK, Maiti SC, Bose TK. Effect of growth substances on deblossoming regulation of cropping and fruit quality in guava. Horticultural Journal 1987;1:81.
14. Rajput CBS, Singh SN, Singh NP. Effect of certain plant growth substances in guava. Haryana Journal Horticulture Science 1977;6:117-119
15. Rangana S. Manual of analysis of fruit and vegetable products.Tata Mc Graw-hill Publishing Company Limited, New Delhi 1986.
16. Salah A, EL-DM. Effect of pruning on growth flowering and fruting of some guava cultivars. M.Sc. Thesis. Fac. Agric. Cario Univ 2005.