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ISSN: 0974-4908
Res. Environ. Life Sci.
9(1) 52-53 (2016)

Effect of different sources of potassium on quality attributing characters of guava in rainy season crop

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(Received: April 04, 2015; Revised received: December 03, 2015; Accepted: December 06, 2015)

Abstract: The present investigation was carried out at Main Experiment Station, Department of Horticulture, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad- 224 229 (U.P.) during the year 2013-2014. The experiment was carried out on Uniform plants of guava (*Psidium guajava* L.) cv. Lucknow 49. The experiment was conducted in Randomize block Design with 7 treatments and 3 replication considering two plants as a unit per treatment. The observations were conducted for chemical attributing characters of guava fruits. Observations recorded with respect to maximum Total soluble solids, ascorbic acid, reducing sugars, non-reducing sugars and total sugars with decrease fruit acidity was obtained with the foliar application of potassium sulphate @ 1.0%, followed by potassium nitrate **@** 1.0%**,** while minimum value of all attributing characters with maximum fruit acidity was recorded under control.

Keyword: Potassium Sulphate, Total soluble solids, Ascorbic acid, Acidity and Total sugars

Introduction

Guava (*Psidium guajava* L.) commonly known as guava is native of tropical America and belong to family Myrtaceae. Guava, the apple of the tropics and available throughout the year except during summer months. It claims to be the fourth most important fruit in area and production after mango, banana and citrus. It is now widely grown all over the tropics and subtropics. It has been cultivated in India since early 17th century and widely grown in India *viz*., Uttar Pradesh, Bihar, Madhya Pradesh, Tamil Nadu, West Bengal, Assam, Orissa, Karnataka, Kerala and Maharashtra.

It is a rich source of vitamin C (260 mg/100), pectin and fibre which is the third after aonla (600 mg/100g). It is used for various purposes, raw guavas are eaten out of hand but are preferred seeded and served sliced as dessert on in salads. It can be used in preparation of Jam, marmalade and juice. Guava jelly is well known to all and it can be canned in sugar syrup of made into fruit butter. Owing to its hardy nature, guava is grown successful in tropical and subtropical region up to 1500m above mean sea level. Best quality guavas are obtained where low night temperature (10^0 C) prevails during winter season. Guava is cultivated on varied types of soils, heavy clay to very light sandy soils, nevertheless, very good quality guava are production in river-basins. It lateritic a soil pH of 4.5- 8.2. The yield of guava fruit is higher in rainy season but quality of fruit is poor due to higher water content, less Vitamin-C and sugar, fruits are insipid and do not keep well (Dutta, 2004; Wali *et al.,* 2005; Srivastava *et al.,* 2009; Bhatia and Yadav, 2005; Singh and Chauhan 1982). The problem can be minimized by the application of different sources of Potassium. Foliar application of nutrients have been found very effective in improving fruit set, fruit retention and yield of fruits. Therefore the study the main objectives; To find out the effect of Potassium on chemical attributes of fruits shown significant response with improvement of fruits quality because the Potassium is quickly absorbed by leaves and transported to different part of the plant to fulfil the functional requirement and improving the physiological activities.

Materials and Methods

The experiment material for the present investigation was carried out on Uniform plants of guava (*Psidium guajava* L.) cv. Lucknow 49. The experimental site is located at main experiment station, Horticulture, College of Horticulture and Forestry, of University during the year 2013. The experiment was laid in randomized block design (R.B.D.) wtih three replications and seven treatments, considering two plants as a unit per treatment. The details of experimental treatment plan employed in the present investigation was carried out as follow: T_1 (K_2SO_4 @ 0.5%), T_2 (K_2SO_4 @ 1.0%), T_3 (KCl @ 0.5%), T_4 (KCl @ 1.0%), T_5 (KNO_3 @ 0.5%), T_6 (KNO_3 @ 1.0%) and T_7 Control (water spray). Above solution, with different concentrations were sprayed by foot sprayer in the evening hours and the selected plants were fully drenched and the control plants sprayed with water only. The observations chemical composition of guava fruits gathered with respect to Total soluble solids (T.S.S.) of the juice was determined by using a hand refractometer of 0-32 per cent rage. The values were correctly at 20^0 C and expressed as per cent T.S.S. of fruit juice, acidity per cent obtained by using fruit pulp (5 g) was macerated and diluted in small amount of distilled water and filtered through muslin cloth. The volume was made up to 100 ml; 5 ml aliquot was taken for titration against 0.1% N sodium hydroxide (NaOH) solution using phenolphthalein as indicator. The appearance of light pink colour was marked as the end point; ascorbic acid (mg per 100g of fruit) content was estimated by grinding 5 g fruit pulp with 3.0 per cent meta-phosphoric acid as buffer. The extract was filtered with muslin cloth and 50 ml volume

Table-1: Effect of different sources of potassium on quality attributing characters of guava in rainy season crop

Treatments	Total soluble solids (°Brix)	Ascorbic acid (mg/100g pulp)	Acidity (%)	Reducing sugars (%)	Non-reducing sugar (%)	Total Sugars (%)
T_1 - K_2SO_4 @0.5%	11.71	33.41	0.43	4.28	4.18	7.10
T_2 - K_2SO_4 @ 1.0%	14.91	38.21	0.36	5.55	4.55	8.05
T_3 - KCL @ 0.5%	11.42	28.39	0.48	4.71	3.88	7.00
T_4 - KCL @ 1.0%	12.25	31.78	0.43	4.43	4.20	7.78
T_5 - KNO_3 @ 0.5%	12.20	28.50	0.45	4.46	4.15	7.36
T_6 - KNO_3 @ 1.0%	12.51	35.46	0.41	5.05	4.35	7.78
T_7 - Control (water)	11.10	25.35	0.64	3.80	3.80	6.26
S.Em. +	0.43	1.28	0.01	0.23	0.22	0.23
CD at 5%	1.35	3.97	0.05	0.73	NS	0.72

was made. A suitable 5 ml aliquot was titrated against 2, 6-dichlorophenol indophenols dye solution till the light pink colour appeared, reducing sugar per cent were estimated by Fehling solution method, non-reducing sugar per cent was estimated by deducting quantity of reducing sugar from total invert sugar and multiplied by factors 0.95 and total sugars were estimated by adding reducing and non-reducing sugar per cent. Statistical analyses of the data obtained in the different sets of experiments were calculated, as suggested by Panse and Sukhatma (1985) and observations were evaluated at 5 per cent significance.

Results and Discussion

Influence of potassium sulphate, potassium chloride and potassium nitrate under study on chemical attributes of guava under different treatments is described. It is recorded from data presented in table-1 gathered that maximum (14.91 °Brix) total soluble solids, ascorbic acid (38.21 mg/100g pulp), reducing sugars (5.55%), non-reducing sugar (4.55%) and total sugars (8.05%) with minimum (0.36 %) acidity content was obtained with the foliar application of potassium sulphate @ 1.0 % followed by potassium nitrate @ 1.0%. While, the minimum (11.10% °Brix) total soluble solids, ascorbic acid (25.35 mg/100g pulp), reducing sugars (3.80%), non-reducing sugar (3.80%) total sugars (6.26%) with maximum (0.64%) acidity were recorded with water spray (control). 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 during the fruit development and maturity of fruits. The water soluble compounds in developing fruits might increase due to various levels of nutrients. The present findings are also agreement with the observations recorded in other fruits crop by Singh (2004) in Aonla, Dutta. (2004) on guava cv. Sardar, Wali *et al.* (2005) on phalsa cv. Purple Round and Srivastava *et al.* (2009) in aonla fruits cv. 'NA-6'. Vitamin-C (Ascorbic acid) content in guava fruit is one of the prime active chemical compounds, which is significantly influenced due to endogenous nutritional status of plants and environmental factors. The present investigation is also conformity with the finding of Bhatia and Yadav (2005) in ber cv. gola and Singh and Chauhan (1982) in guava cv. L-49. It is evident from the present observations that the total sugars content in guava fruit is maximum being a climatric fruit, in which the synthesis of polysaccharides and their derivatives is not too much prominent due to presence of high amount of fibre content, phenolic compounds, vitamin-C content and also lack of hydrolyzing enzymes, which inhibits the efficiency of photosynthesis. Similar observations were also recorded by Singh *et al.* (1979) found that spray of 1.0 per cent potassium sulphate after berry setting and subsequently seven sprays at weekly interval, increased total sugar in grape cv. Perlette, and Sandhu and Bal (2012) reported that foliar spray of K_2SO_4 @ 8% proved to be most effective in improving the fruit quality on lemon cv. Baramasi. The reduction acidity content due to increase the level of nutrients, sugars and other chemical compounds, which might have shown beneficial role in improving the quality of fruits by reducing the acidity content. The present observations are in conformity with findings of Ali *et al.* (1993) noted that the foliar application of urea (2%), potassium sulphate (1%), zinc sulphate (0.4%) and Boric acid (0.2%) was applied once before flowering, second at fruit set and third a week after fruit set improved the fruit quality *viz.,* TSS, ascorbic acid, total sugars and reducing sugars content in guava fruits.

Based on present investigation it can be concluded that foliar application of potassium sulphate @ 1.0 % from the overall experimental finding was proved to be most effective chemical character attributes of guava fruits.

Acknowledgement

The author is grateful to Major Advisor and the Head, Department of Horticulture for providing necessary facilities.

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