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EFFECT OF SUCROSE AND NUTRIENT ELEMENTS ON FRUITING QUALITY OF KESAR MANGO

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ABSTRACT
A study was carried out to evaluate the effect of sucrose and nutrient elements on fruit quality characteristics of Kesar mango. It was performed during season 2009-2010 at Agriculture Experimental Station, Navsari Agricultural University, Paria, Ta- Pardi and Dist- Valsad. The present experiment was laid out in Randomized Block Design (RBD) with ten treatments and replicated thrice. The treatments are integrated effect of nutrients on trees was found significant on value of TSS (19.00 ^{0}Brix) and ascorbic acid (72.89 mg/100g pulp) content of fruits was noted in treatment T_8- sucrose 10% + boric acid 0.5%., it was followed by treatment T_5- sucrose 5% + boric acid 0.5%., Other quality parameters like reducing sugar, total sugar, acidity, non-reducing sugar *etc.* were not affected by different treatments.

INTRODUCTION

Mango (*Mangiferaindica* L.) is the national fruit of India and rightly known as "king of fruits", owing to its excellent flavour, attractive fragrance, beautiful shades of colour, delicious taste, nutritive value and other desirable characters. The fruit has excellent export potential in both fresh as well as processed forms. India is the major producer of mango in the world with an area of 2.516 million hectares and the annual production of 184.31 lakh tones (Anonymous, 2015). The major mango growing states are Uttar Pradesh, Andhra Pradesh, Bihar, Karnataka, Tamilnadu, Kerala, Maharashtra, Orissa, West Bengal and Gujarat. In Gujarat total area under mango cultivation is about 142.68 thousand ha and production is about 1125.61 thousand tones, while in South Gujarat the total area and production of mango are 66,910 ha and 4,88,810 MT., respectively during year 2011-12 (Anonymous, 2013).

Some nutrients like sucrose, boron and potassium are play a vital role in various enzymatic activities and synthesis of assimilates and hormones. Sucrose has a gives best positive response at fruit quality parameters. According to researchers, only application of major nutrients could not bear out triumphant to generate high quality fruit in mango trees, the application of micronutrients is compulsory as well. Major elements/ macronutrients are quickly taken up and utilized by the tissues of the plants by the catalyzing effect of micronutrients suggested by Phillips 2004. The reasons dispersed for less production due to some genetical, climatical, cultural and hormonal factors responsible for these problems, the scientists have worked for regular cropping through different cultural practices like application of chemical fertilizers. It resulted also in improving the fruit quality parameters *i.e.* total soluble solids, total sugars and coloration (Eliwa, 2003 and Dutta, 2004). These effects may be enthusiastic to the potassium role in increasing tolerance to stresses and improving the formation and accumulation rates of sugars (Saleh and Abd El-Moneim, 2003 and Wahdan, 2011). The increase in the fruit quality by application of micronutrient on guava has also been reported by Gaur *et al*., 2014. To overcome the nutritional problems in mango, the experiment was carried out with respect to find out the suitable nutrient elements on fruit quality of mango cv. Kesar.

MATERIALS AND METHODS

The experiment was conducted at Agricultural Experimental Station, Navsari Agricultural University, Paria, during year 2009-2010.The investigation was conducted on 10 years old mango trees planted at 8 × 8 m apart under square system of planting. In order to assess the effects of various treatments, all the trees were managed with uniform cultural practices as per the standard recommendations with respect to manures and fertilizers, irrigation, plant protection measures *etc.* The experiment was laid out in Randomized Block Design with ten treatments combinations *viz*., T_1-sucrose 5%, T_2- sucrose 10%, T_3- sucrose 5% + potassium citrate 0.2%, T_4- sucrose 5% + potassium citrate 0.3%, T_5- sucrose 5% + boric acid 0.5%, T_6- sucrose 10% + potassium citrate 0.2%, T_7- sucrose 10% + potassium citrate 0.3%, T_8- sucrose 10% + boric acid 0.5%, T_9- control (water spray only), T_{10}- control (without water

spray).The treatments were replicated thrice. Spray was carried once at full bloom stage. However, marketable percentage, total soluble solids (^{0}Brix), pulp:peel ratio, reducing sugar (%), non reducing sugar (%) and total sugars (%), acidity (%), PLW (%) and shelf life (Days) was recorded after ripening of fruits during three days of interval and then finally done the average. The data collected were analyzed statistically as per the procedure (Panse and Sukhatme, 1967) appropriate for Randomized Block Design and the treatment means were compared by means of critical differences at 5 per cent level of probability.

RESULTS AND DISCUSSION

The higher percentage of total soluble solid (19.00°Brix) and ascorbic acid (72.89mg/100g) content were recorded with application of sucrose 10% + boric acid 0.5% (T_8) than control treatment. However, Sanna 2005 reported that application of sucrose 10% + potassium citrate 0.3% at once during at full bloom stage gives best result with respect to quality parameters in Fagri Kalan mango. Singh (2013) reported that boric acid (0.02%) with sorbitol (2.0%) proved to be most effective for enhancing TSS content (18.59°B), total sugar (14.92%) and ascorbic acid (20.32 mg 100 g -1). While, Yadav *et al.* (2013) proved that it was spraying with 0.1 % H_3BO_3 + 0.5 % $ZnSO_4$ at two times *i.e* .during last week of February at after petal fall stage and again at 15 days after the first spraying during observed that foliar spraying of peach trees was the promising treatment for improvement of fruit growth, fruit length and fruit diameter. It might be due to the adequate amount of boron improves the auxin content and it also acts as a catalyst in oxidation-reduction processes in plants. Besides, it also helps in other enzymatic reactions like transformation of carbohydrates, activity of hexokinase and formation of cellulose and change in sugar are considered due to its action on zymohexose (Dutta, 2004) in mango. However, (Sourour, 2000) said that foliar application of boron resulted to increase cell division, cell elongation, sugar metabolism and accumulation of carbohydrates on the fruits so that increase fruits quality. It might be increased chlorophyll content in leaf which is associated with high production of photosythate in plant. Similarly, the combine application of the some nutrient elements at lower level increased total soluble solids and ascorbic acid contents. Foliar spray of micronutrients might have increased rate of photosynthesis, enzymatic activities and translocation of photosynthates leading to improvement in quality parameters in mangoSingh and Maurya (2003), Saraswathy*et al.*(2004) in sapotaBhatt *et al.* (2012) in mango and Jeyabaskaran and Pandey (2008) in banana.The treatment ZnSO4 1% + FeSO4 1% + borax 0.5% significantly favourable effect on fruit quality in terms of TSS, total sugars, reducing sugar and ascorbic acid Nehete *et al.* (2011) and Tulsi Gurjar *et al.* (2015). But, other fruit quality characters like marketable percentage (Table 1) and (Table 2) non-reduc-

Table 1: Influence of various chemicals on Marketable fruit percentage (3 Days interval) of mango fruits cv. Kesar

Treatment	Marketable percentage of mango fruits cv. Kesar.(3 day interval)					
	0	3rd	6th	9th	12th	15th
T_1 : Sucrose 5 %	100	85.4	62.5	37	22.9	19.1
T_2 : Sucrose 10 %	100	87.2	63.8	38	23.3	20
T_3 : Sucrose 5 % + Potassium citrate 0.2 %	100	88.4	64.2	38.6	24.1	21
T_4: Sucrose 5 % + Potassium citrate 0.3 %	100	91.2	66.5	38.9	25	21.7
T_5 : Sucrose 5 % + Boricacid0.5 %	100	99.4	67.8	42.8	26.8	22
T_6 : Sucrose 10 % + Potassium citrate 0.2 %	100	92.1	67	41.2	25.2	21.7
T_7: Sucrose 10 % + Potassium citrate 0.3 %	100	94	67.2	42.1	25.2	21.9
T_8: Sucrose 10 % + Boricacid 0.5 %	100	99.9	67.9	45.5	28.7	24
T_9 : Control (Water spray only)	99.9	85.2	54	35.6	22.8	18.7
T_{10}: Control (Without Water Spray)	99.7	85.1	53.2	35.5	22.5	18.7
S.Em.+	0.10	3.56	3.61	2.11	1.26	1.11
CD. at 5 %	NS	NS	NS	NS	NS	NS

Table 2: Influence of sucrose and nutrient elements on fruit quality of Kesarmango

Treatments	TSS (^{0}Brix)	Pulp: Peel ratio	Reducing Sugar (%)	Non reducing sugar (%)	Total Sugar (%)	Acidity (%)	Ascorbic acid (mg /100g)	PLW (%)	Shelf Life (Days)
T_1 : Sucrose 5 %	17.00	2.97	3.30	9.70	13.0	0.33	67.28	15.70	12.98
T_2 : Sucrose 10 %	17.62	2.94	3.32	9.78	13.10	0.33	67.60	15.66	13.03
T_3 : Sucrose 5 % + Potassium citrate 0.2 %	18.11	2.90	3.38	9.82	13.20	0.32	67.96	15.63	13.20
T_4 : Sucrose 5 % + Potassium citrate 0.3 %	18.22	2.87	3.39	9.84	13.23	0.30	69.33	15.57	13.40
T_5 : Sucrose 5 % + Boricacid 0.5 %	18.77	2.96	3.42	10.12	13.54	0.30	71.22	15.17	13.87
T_6 : Sucrose 10 % + Potassium citrate 0.2 %	18.27	2.88	3.40	9.91	13.33	0.32	70.30	15.53	13.43
T_7 : Sucrose 10 % + Potassium citrate 0.3 %	18.58	2.94	3.40	10.00	13.40	0.31	71.12	15.34	13.73
T_8: Sucrose 10 % + Boricacid0.5 %	19.00	3.00	3.45	10.13	13.58	0.30	72.89	15.12	14.07
T_9 : Control (Water spray)	16.08	2.94	3.43	9.54	12.97	0.32	65.77	16.60	12.16
T_{10}: Control (Without water spray)	15.66	2.92	3.00	8.90	11.90	0.33	64.86	17.20	11.40
S. Em. ±	0.94	1.81	0.13	0.35	0.33	0.01	1.57	0.77	0.52
C D at 5 %	2.20	NS	NS	NS	NS	NS	4.87	NS	NS

ing sugars (%), total sugars (%), reducing sugar (%) and acidity (%),Physiological loss of weight (%) and Shelf life (Days)were not altered significantly by the application of different nutrient elements.

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