

Effect of post flowering foliar sprays of nutrients on physico-chemical properties of kokum (*Garcinia indica* Choisy)

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ABSTRACT

The material for the present study consisted of twenty eight year old bearing kokum trees. The experiment was conducted in RBD with seven treatments of foliar application of nutrients like urea, KNO_3 and monopotassium phosphate at the Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri during 2006-07 to improve the physico-chemical properties of kokum. Results revealed that foliar application of urea (0.5% twice) influences the length (3.98 cm), breadth (4.24 cm), circumference (13.22 cm) and fruit weight (32.67 g) as compared to others while in chemical composition highest TSS 15.93 °B was recorded by urea (0.5% twice) spray and lowest acidity (3.73%) was noticed by monopotassium phosphate (0.5% twice) spray. Highest reducing sugar (6.05%) non-reducing sugar (5.54%) and total sugar (11.59%) was found in the fruits of plants treated with monopotassium phosphate (0.5% twice).

Key words : Kokum tree, Foliar spray, Monopotassium phosphate, Urea

Kokum (*Garcinia indica* Choisy) belongs to the genus *Garcinia*, a large genus of polygamous evergreen trees. Fruits of kokum have many medicinal properties. The fruit juice is given in bilious infections. Kokum butter extracted from seed is considered nutritive. Kokum rind is a rich source of 8-hydroxycitric acid (HCA) which is unique acid lowers the blood lipids, such as cholesterol and glycerides. In spite of various beneficial properties of kokum, it is neglected by the farmers for various reasons and the most important one is the premonsoon rains that adversely affect the quality of fruits. Large quantities of fruits are required for processing to meet rapidly increasing demand for kokum products. The quality of kokum products is directly related to the quality of fruits. Hence, the present study was conducted at Department of Horticulture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri during 2006-07 with an objective to improve quality of fruits through post-flowering sprays of chemicals.

MATERIALS AND METHODS

The experiment was conducted at Experimental Farm of the Department of Horticulture, College of Agriculture, Dapoli. The material for the present study consisted of twenty eight year old bearing kokum trees. This plantation was established at spacing of 8 x 5 m. The experiment was conducted in Randomized Block Design with seven treatments viz., T_1 : (Urea-0.5%), T_2 : (Urea-0.5% twice), T_3 : (KNO_3 -0.5%), T_4 : (KNO_3 -0.5%) twice), T_5 : (Monopotassium phosphate 0.5%), T_6 : (Monopotassium

phosphate 0.5% twice) and T_7 : Control (No spray). All the treatments were replicated thrice with two trees per treatment per replications. The sprayings were undertaken at pea grain stage *i.e.* when fruits were of pea grain size (3.5 mm) and the second one 20 days after the first spray. Observations of fruit length (cm), fruit breadth (cm), fruit circumference (cm), fruit weight (g), T.S.S. (°Brix), acidity (%) and sugars (%) were recorded. The statistical analysis was conducted as per the methods suggested by Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The data on effect of post flowering foliar sprays of nutrients on physical parameters of kokum fruit are presented in Table 1.

The maximum fruit length (3.98 cm) was noticed in T_2 (urea twice), which was significantly superior over rest of the treatments, while the lowest fruit length (3.24 cm) was noticed in T_6 (MPP twice). The treatment T_2 (Urea twice) resulted in the highest fruit breadth (4.24 cm) and was minimum (3.93 cm) in T_6 (MPP twice). Similarly, the maximum fruit circumference was noticed in T_2 (13.22 cm) and minimum in T_6 (12.32 cm). The maximum fruit weight was noticed in T_2 (32.67 g) whereas, minimum was recorded in T_6 (24.63 g). Nitrogen is believed to give impetus to the formation of new cells and, therefore, the growth in size, volume and mass are associated with nitrogen. Similar increase in fruit weight by foliar application of one per cent urea and KNO_3 were reported by Vijayalakshmi and Srinivasan (1998) in mango

Table 1 : Effect of foliar sprays on physical parameters of kokum

Treatments (Conc. @0.5%)	Physical parameters of fruits			
	Length (cm)	Breadth (cm)	Circumference (cm)	Weight (g)
T ₁ – Urea once	3.63	4.05	12.61	30.18
T ₂ – Urea twice	3.98	4.24	13.22	32.67
T ₃ – KNO ₃ one	3.67	4.05	12.68	29.74
T ₄ – KNO ₃ twice	3.64	4.16	13.01	30.42
T ₅ – MPP once	3.53	4.06	12.74	30.08
T ₆ – MPP twice	3.24	3.93	12.32	24.63
T ₇ – Control	3.59	4.03	12.66	23.50
S.E. ±	0.09	0.03	0.102	0.780
C.D. (P-0.05)	0.27	0.09	0.313	2.402

*MPP – Monopotassium phosphate

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The effect of foliar nutrient spray on chemical parameters of kokum fruit is presented in Table 2. The highest TSS was recorded in T₂ (15.93°B) while the least was found in T₇ (14.97°B). The lowest acidity was noticed in T₆ (3.73 per cent) while the highest was recorded in T₅ (4.15 per cent). The highest reducing sugar content was recorded in T₆ (6.05 per cent), which was significantly superior over remaining treatments. The lowest reducing sugar (5.38 per cent) was found in control which was at par with T₃ (5.4 per cent). The highest non-reducing sugar content was found in T₆ (5.54 per cent), which was significantly superior over rest of the treatments. The fruits in control T₇ (control) recorded the lowest (5.11 per cent) non-reducing sugar. The highest total sugar in the kokum fruits was noticed in T₆ (11.59 per cent) while the lowest was found in control (10.49 per cent). The anthocyanin content did not vary significantly among the treatments. In the present investigation, the chemical composition of kokum trees sprayed with different foliar nutrients was significantly superior than control. This could be attributed to enhanced carbohydrate metabolism. In

foliar feeding the nutrients are applied directly to the site of metabolism. Whereas 'K' acts as a catalyst which is used as accelerator of reactions. It influences many physiological processes like cell division, photosynthesis and respiration (Jones, 1979). Treatment of KNO₃ (3 %) was a step ahead to reduce days required for harvesting by increase in total soluble solid and sugars during earlier period.

Conclusion:

An increase in physical parameters like length, breadth and circumference of fruits is a normal growth process. Nitrogen is supposed to give impetus to the formation of new cells and, therefore, the growth in size; volume and mass are associated with nitrogen. So in the present investigation the length, breadth and circumference of fruits of trees treated with nutrients like nitrogen were significantly higher than control. The fruits from trees treated with MPP twice showed reduction in size as P tends to reduction in vegetative growth and K tends to reduction of nitrogen in plants.

The study indicates that chemical composition of

Table 2 : Effect of foliar nutrient sprays on chemical parameters of kokum

Treatments (Conc. @0.5%)	Chemical parameters					
	T.S.S. (°Brix)	Acidity (%)	Reducing sugar (%)	Non reducing sugar (%)	Total sugar (%)	Antho-cynin (%)
T ₁ – Urea once	15.15	4.06	5.39	2.17	10.56	2.38
T ₂ – Urea twice	15.93	3.77	5.54	5.27	10.81	2.44
T ₃ – KNO ₃ one	15.09	4.13	5.40	5.18	10.58	2.33
T ₄ – KNO ₃ twice	15.63	3.79	5.44	5.22	10.66	2.41
T ₅ – MPP once	15.25	4.15	5.42	5.19	10.61	2.42
T ₆ – MPP twice	15.39	3.73	6.05	5.54	11.59	2.31
T ₇ – Control	14.97	4.10	5.38	5.11	10.49	2.38
SE m ±	0.173	0.124	0.010	0.014	0.02	0.12
CD (P-0.05)	0.532	0.381	0.031	0.044	0.06	NS

*MPP = Mono potassium phosphate

NS-Non significant

kokum trees, foliar spray with different nutrients was significantly superior than control. This could be attributed to enhanced carbohydrate metabolism. In foliar feeding the nutrients are applied directly to the site of metabolism. Whereas K acts as a catalyst which is used as accelerator of reactions.

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