GAU Res. J. 1989. 15 (1) : 36–40

Chemical Constituents of Mango Fruits (*Mangifera indica* L.) As Influenced By Foliar Feeding of Urea and NAA

B. S. Baghel, R. K. Sharma and P. K. R. Nair

Department of Horticulture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur 482 004 India

ABSTRACT

Combined application of 6% urea and 150 ppm NAA (Naphthalene acetic acid) was found best for increasing the percentage of pulp, TSS, reducing sugar and non reducing sugar and decreasing the acidity percentage of mango fruits. But it did not differ significantly from combined application of 4% urea and 120 ppm NAA for all these parameters.

(*Received on* 15*th Febru.* 1988)

INTRODUCTION

Quality fruits are important ingredients of human diet and also useful for processing, but the quality fruits production in India is inadequate. In India where mango cultivation offers great scope, the foliage feeding could be the best and economic way of supply of nutrients and growth regulators for higher and quality fruits production. Since information about the effect of foliar feeding of urea and NAA (Naphthalene acetic acid) on quality of mango fruits is paucity. Therefore, visualizing the immense potentialities of foliar feeding, investigation was conducted to study the effect of different concentrations of urea and NAA through foliar spray on chemical constituents of mango fruits.

MATERIALS AND METHODS

The experiment was conducted on 72 uniform trees (9 year old) of Sunderja variety of mango at J.N.K.V.V. fruit research station, Imalia, Jabalpur (M.P.) during 1985-86. The climate of the region is subtropical with an annual rainfall of 1300-1400 mm. Ninety per cent of it, is received between June to September and rest is received from October to May. The soil of the experimental orchard was medium, black clay loam of average fertility and well drained. It is tenaciously sticky when wet and hard when dry. Twentyfour treatment combinations consisting of 4 concentrations of urea i.e. 0, 2, 4 and 6% (main plot) and 6 concentrations of NAA i.e. 0, 30, 60, 90, 120

and 150 ppm (sub plot) were replicated three times in split plot design. One tree was considered for each treatment in each replication. Two sprayings were done at preflowering stage of the crop as per treatments with an interval of 30 days (5th Oct. and 5th Nov.). The amount of water|solution was kept constant (2.5 lit|tree) for all the treatments to mitigate the effect of water while sprayings. Five ripe fruits per treatment were taken for recording the observations on chemical composition of fruits. TSS of plup juice was recorded with the help of hand refractometer at room temperature and acidity, reducing sugar and non-reducing sugar were estimated as per methods described by Gauri Shanker (1984).

RESULTS AND DISCUSSION

Foliar feeding of 6% urea showed (Table 1, 2 and 3) higher percentage of pulp, TSS, reducing sugar and nonreducing sugar and low acidity percentage of fruits as compared to control and 2% urea spray, but it did not differ significantly from 4% urea. Whereas, minimum percentage of pulp, TSS, reducing sugar and non-reducing sugar and higher acidity percentage were observed in control. In case of varying concentrations of NAA, the higher percentage of pulp, TSS, reducing sugar and non-reducing sugar and low acidity percentage were recorded by the application of 150 ppm NAA which was found significantly better than control and 30 and 60 ppm NAA. But 150 ppm NAA had no marked difference with 120 ppm NAA. On the other hand the minimum percentage of pulp, TSS, reducing sugar and non-reducing sugar and higher acidity percentage were found under control. As regards different interaction of urea and NAA it was found that the higher percentage of pulp, TSS, reducing sugar and non reducing sugar and low acidity percentage were estimated under combined application of 6% urea and 150 ppm NAA (U_3N_5) which did not differ significantly from U_2N_3, U_2N_4, U_2N_5, U_3N_3 and U_3N . While the minimm percentage of pulp, TSS, reducing sugar and nonreducing sugar and higher acidity percentage were noted in control (U_0N_0) which was found at par with U_0N_1 and U_1N_0 for all these parameters.

Higher pulp percentage obtained with the foliar application of both urea and NAA under this study might be due to the increase in carbohydrate and auxin contents of the treated trees which would have helped in the improvement of pulp of fruits. Increase in pulp percentage was also noted by Bal *et al.* (1984) in ber and Singh and Phogat (1984) in litchi with the application of NAA. Foliar spray of urea and NAA had also shown good response for enhancing the percentage of TSS and sugars (reducing and nonreducing) under this investigation. The possible reason for these results might be the stimulated functioning of a number of enzymes due to application of nitrogen and NAA in physiological processes which, in turn, hydrolized starch and helped in the metabolic activity during the change of available starch into sugar and TSS. Leopold (1967) also reported that growth regulators influenced the mobilization of soluble carbohydrates in fruits and thereby increased the sugar content in fruits. The findings of urea as well as NAA spray under this investigation are also supported by the findings of Chauhan and Gupta (1985) in ber.

Acidity percentage was decreased with increasing concentrations of urea and NAA, which might be due to increase in TSS (Total soluble solids) and sugars (reducing

TABLE 1

Alone and combined effect of urea and NAA on pulp and TSS percentage of mango fruits.

Treatment	*Pulp percentage Urea%*					*TSS (Total soluble solids) percentage Urea%*				
	0 (U_0)	2 (U_1)	4 (U_2)	6 (U_3)	*Mean*	0 (U_0)	2 (U_1)	4 (U_2)	6 (U_3)	*Mean*
NAA (ppm)										
0 (N_0)	69.08	69.34	70.32	70.31	69.76	18.04	18.13	18.37	18.36	18.22
30 (N_1)	69.28	69.60	70.53	70.53	69.99	18.13	18.26	18.49	18.53	18.35
60 (N_2)	69.41	69.71	70.70	70.71	70.13	18.25	18.41	18.61	18.80	18.52
90 (N_3)	69.68	70.25	71.13	71.18	70.56	18.38	18.55	19.35	19.40	18.92
120 (N_4)	69.72	70.37	71.16	71.21	70.62	18.49	18.61	19.41	19.46	18.99
150 (N_5)	69.77	70.48	71.19	71.24	70.67	18.53	18.63	19.45	19.48	19.02
Mean	69.49	69.96	70.84	70.86		18.30	18.43	18.95	19.00	

Treatment	**S. Em. ± C. D. at 5% level**		**Treatment**	**S. Em. ± C. D. at 5% level**	
Urea	0.09	0.31	Urea	0.02	0.08
NAA	0.05	0.14	NAA	0.02	0.07
Urea x NAA	0.13	0.51	Urea x NAA	0.05	0.16

TABLE 2

Effect of different concentrations of urea and NAA on reducing and nonreducing sugars of mango fruits.

Treatment	*Reducing sugar percentage* Urea %					*Non-reducing sugar percentage* Urea %				
	0 (U_0)	2 (U_1)	4 (U_2)	6 (U_3)	*Mean*	0 (U_0)	2 (U_1)	4 (U_2)	6 (U_3)	*Mean*
NAA (ppm)										
0 (N_0)	4.60	4.65	4.77	4.80	4.71	13.14	13.23	13.45	13.50	13.33
30 (N_1)	4.69	4.79	4.89	4.92	4.82	13.24	13.37	13.55	13.58	13.43
60 (N_2)	4.78	4.87	5.06	5.11	4.95	13.32	13.53	13.67	13.73	13.56
90 (N_3)	4.89	5.02	5.53	5.57	5.25	13.41	13.61	14.72	14.75	14.12
120 (N_4)	4.93	5.06	5.57	5.62	5.29	13.45	13.66	14.77	14.82	14.17
150 (N_5)	4.94	5.08	5.60	5.65	5.32	13.49	13.70	14.84	14.87	14.22
Mean	4.80	4.91	5.24	5.28		13.34	13.51	14.17	14.21	

Treatment	S. Em. ±	C. D. at 5% level	Treatment	S. Em. ±	C. D. at 5% level
Urea	0.02	0.05	Urea	0.11	0.38
NAA	0.04	0.12	NAA	0.05	0.16
Urea x NAA	0.08	0.21	Urea x NAA	0.15	0.46

TABLE 3

Influence of different concentrations of urea and NAA on acidity percentage of mango fruits.

Treatment	*UREA %* 0 (U_0)	2 (U_1)	4 (U_2)	6 (U_3)	*Mean*
NAA (ppm)					
0 (N_0)	0.303	0.296	0.266	0.256	0.283
30 (N_1)	0.303	0.286	0.266	0.256	0.278
60 (N_2)	0.300	0.283	0.263	0.243	0.276
90 (N_3)	0.286	0.270	0.246	0.236	0.260
120 (N_4)	0.273	0.256	0.243	0.233	0.251
150 (N_5)	0.266	0.253	0.236	0.232	0.245
Mean	0.290	0.274	0.253	0.241	

Treatment	S. Em. ±	C. D. at 5% level
Urea	0.009	0.032
NAA	0.002	0.007
Urea x NAA	0.010	0.034

and non reducing) of the fruits harvested from treated trees and thereby affected the acidity percentage of these fruits adversely. Deloriation in acidity percentage was also reported by Chauhan and Gupta (1985) in ber with foliar spray of urea.

REFFERENCES

Bel, J. S., Singh, S. N. Randhawa J. S. and Jawanda, J. S. (1984). Effect of growth regulators on fruit drop, size and quality of Ber (*Zizyphus mauritiana* Lamk.) *Indian Jour. Hort.* **41** (3-4) : 182-185.

Chauhan, K. S. and Gupta A. K. (1985). Effect of foliar application of urea on the fruit drop and physico-chemical composition of Ber (*Zizyphus mauritiana* Lamk.) fruits under arid conditions. *Haryana Jour. Hort. Sci.* **14** (1-2) : 9-11.

Gauri Shankar (1984). Practical manual in Horticulture. Kitabistan, Allahabad, India.

Leopold, A. C. (1967). Auxins and plant growth. Univ. of Calif. press Berkelay, U.S.A.

Singh, O. P. and Phogat, K. P. S. (1984). Effect of growth regulators on fruit drop, size and quality of litchi cv. Calcutta. *Punjab Hort. Jour.* **24** (1-4) : 83-88.