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Original Research Article

Effect of Nutrients on Fruit Quality of Aonla (*Emblica officinallis* Gaertn.) cv. Chakaiya

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Keywords

Nutrients on Fruit Quality of Aonla (*Emblica officinallis* Gaertn.)

A B S T R A C T

The present investigation entitled "Effect of nutrients on fruit quality of Aonla (*Emblica officinallis* Gaertn.) cv. Chakaiya" was carried out at the Main Experiment Station, Horticulture, Narendra Deva University of Agriculture & Technology, Faizabad (U.P.) during the year 2012-2013. The experiment was conducted in Randomized Block Design with eight treatments and replicated in four times, considering one plant as a unit. The observations were recorded for quality of aonla fruits. The maximum Total soluble solids (TSS), Acidity, Ascorbic acid, Reducing sugars, Non-reducing sugars and Total sugars were recorded with foliar application of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each). More ever it can be concluded that combined application of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each) judged the best for produced better fruit quality and yield of aonla.

Introduction

The Indian gooseberry (*Emblica officinalis* Gaertn.) is an important indigenous and minor fruit, belongs to the family Euphorbiaceae and sub family Phyllathoidae. Naturally growing aonla has been reported from Cylon, Cuba, Puerto Rico, Hawaii, Florida, Iran, Iraq, Java, West Indies, Trinidad, Pakistan, Malaya and China (Benthal, 1946). Aonla is the second richest source of Vitamin-C (600 mg/100 g pulp) among the fruits, after Barbados cherry. It can be grown under wider edapho-climatic situations; well drained fertile loamy and moderately alkaline soils are the best for its cultivation. Aonla is drought hardy fruit crop which is characterized by deep root system and exhibits deciduous nature due to abscission and shedding of determinate shoot during February and March. Fruit pulp of Indian gooseberry is an important ingredient of Chyawanprash and Triphala powder.

The foliar application of micro nutrients have immense important role in improving fruit set and productivity of fruits.

Foliar application is based on the principle that the nutrients are quickly absorbed by leaves and transported to different parts of the plant to fulfill the function requirement of nutrition. The intensity of drainage caused by fruits dropping can be minimized by the foliar application of micro nutrients and also help to improve yield and fruit quality of the aonla.

Materials and Methods

The present investigation "Effect of nutrients on vegetative growth and yield of Aonla (*Emblica officinallis* Gaertn.) cv. Chakaiya" was carried out at Main Experimental Station, Department of Horticulture, Narendra Deva University of Agriculture and Technology, Faizabad (U.P.) during the year 2012-13. 15 year old uniform in vigour plants of aonla cv. Chakaiya were selected for the study. The experiment was laid out in randomized block design (R.B.D.), replication four with eight treatments. The foliar application of these nutrients were applied two times before flowering (April) and after fruit set (August). The observations Total soluble solids (TSS), Acidity, Ascorbic acid, Reducing sugars, Non-reducing sugars and Total sugars were recorded in the horticulture lab after harvesting. The statistical analyses of experimental data recorded during the experimentation period were estimated as per treatments using the statistical Method as suggested by Chadel, S.R.S (1984).

Results and Discussion

The maximum (12.25 ^{0}Brix) accumulation of total soluble solids content in aonla fruit was found with combined spray of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each), followed by $ZnSO_4$@ (0.5%) + $CuSO_4$@ (0.5%) However, the promoting effect was also observed by almost all nutrients over control. The reasons for increase in TSS content of fruit may be due to fact that nutrients play important role on photosynthates which ultimately lead to the accumulation of carbohydrate and attributed to increase in TSS of fruits. The results are close conformity with the finding of Awasthi and Lal (2009) by spraying of calcium nitrate, boric acid and zinc sulphate to increase TSS of guava fruits *cv*. Sardar. Ghose *et al.,* (2009) also reported that spray of Zinc (0.5%) increase the total soluble solids in aonla cv. NA-10.

All the treatments of nutrients were found to reduce the acid content of fruits as compared to control. The lowest (1.70 %) acid content was observed with combined spray of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each), followed by $ZnSO_4$@ (0.5%) + $CuSO_4$@ (0.5%). Such type of results might due to transformation of organic acid into sugars at the time of ripening. Likewise similar results were obtained with combined application of zinc sulphate to decrease the acidity in pear, *cv*. Patharnakh. (Shandhu *et al.,* 1994) and Singh *et al.,* (2001) also reported that combined spray of zinc. Similar observations were findings of Singh *et al.,* (2012) with the spray of zinc sulphate to reduce the acidity of aonla fruit, *cv*. Banarasi.

Ascorbic acid content was significantly influenced by spraying of nutrients as compared to control. Significantly maximum (791.00 mg/100g pulp) ascorbic acid content was recorded with application of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each), followed by $ZnSO_4$@ (0.5%) + $CuSO_4$@ (0.5%) the minimum (690.00 mg/100g pulp) ascorbic acid content was found in control. The increase in ascorbic acid content of fruit juice was due to increase synthesis of catalytic enzymes and co-enzyme which are represented ascorbic acid and synthesized. These results are in close conformity with the findings of Ghosh *et al.,* (2009) that the spray of zinc sulphate and borax increase ascorbic acid in aonla. Singh *et al.,* (2001) with ZnSO4, CuSO4 and Borax in aonla it is evident from the result that vitamin-'C' content in fruit might be improved with application of micro-nutrients.

Table.1 Effect of micro-nutrients on fruit yield and fruit quality

Treatments	TSS (^{0}Brix)	Acidity (%)	Ascorbic acid (mg/100g pulp)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugars (%)	Yield (kg /tree)
T_1 Control (Water spray)	9.75	2.61	690.00	2.63	2.08	4.71	46.04
T_2 Zinc sulphate @ (0.5%)	11.00	2.44	735.00	2.77	2.30	5.14	54.27
T_3 Copper sulphate @ (0.5%)	10.50	2.50	730.00	2.97	2.26	5.23	52.53
T_4 Magnesium sulphate @ (0.5%)	10.20	2.50	718.00	2.76	2.21	4.97	50.07
T_5 Zinc sulphate @ (0.5) + Magnesium sulphate @ (0.5%)	11.25	2.29	744.50	3.01	2.33	5.34	56.89
T_6 Zinc sulphate @ (0.5%) + Copper sulphate @ (0.5%)	12.00	1.90	754.25	3.16	2.37	5.53	57.29
T_7 Magnesium sulphate @ (0.5%) + Copper sulphate @ (0.5%)	11.70	2.40	740.00	3.11	2.34	5.45	56.44
T_8 Zinc sulphate @ (0.5%) + Magnesium sulphate @ (0.5%) + Copper sulphate (0.5%)	12.25	1.70	791.00	3.41	2.47	5.88	58.64
S. Em. ±	0.277	0.041	10.68	0.079	0.033	0.082	0.370
C.D. at 5%	0.813	0.12	31.43	0.235	0.097	0.240	1.089

The application of urea, magnesium and zinc sulphate increase ascorbic acid in guava cv. Sardar (Pal *et al.*, 2008) and (Singh *et al.*, 2012) in aonla fruit *cv*. Banarasi.

The maximum reducing, non-reducing and total sugars were recorded with combined application of $ZnSO_4$+ $MgSO_4$ + $CuSO_4$ (0.5 per cent each), followed by $ZnSO_4$@ (0.5%) + $CuSO_4$@ (0.5%) while; the value was minimum under control (water spray). This might be due to the involvement of these nutrients in the translocation of more sugars to the fruits. The results are in closed conformity with the findings of Yadav *et al.*, (2011) that maximum ascorbic acid recorded with the application of zinc sulphate and borax in guava fruits cv. L 49, (Singh *et al.*, 2009) also reported that spray of urea and potash increased the sugars content in aonla fruits. (Singh *et al.*, 2007) have also reported that combined spray of zinc, copper and NAA increased the sugar contents in aonla fruits cv. NA-10.

Thus, it may be concluded that the combined foliar application of ZnSO4 (0.5%) + MgSO4 (0.5%) + CuSO4 (0.5%) was found to be most effective for better yield and quality of fruits.

References

Awasthi, P. and Lal, Shant 2009. Effect of calcium, boron and zinc foliar sprays on the yield and quality of guava (*Psidium guajava* L.). *Pantnagar J. Res;* 7 (2): 223-225.

Benthal, A.P. 1946. Trees of Calcutta and its nieghborhood. *Thaker Spink and C.Ltd.* Calcutta.

Chadel, S.R.S 1984. Principal of Experimental Designs. *A handbook of Agriculture Statistics.* pp: 14-53.

Ghosh, S. N.; Bera, B.; Roy, S.; Kundu, A. and Roy, S. K. D. 2009. Effect of nutrients and plant growth regulators on fruit retention, yield and physico-chemical characteristics in aonla cv. NA-10. *Journal of Horticultural Sciences; 4 (2): 164-166.*

Pal, Anju; Pathak, R.K.; Pal, Krishna and Singh, Tejbir 2008. Effect of foliar application of nutrients on yield and quality of guava fruits (*Psidium guajava* L.) cv. Sardar guava. *Prog. hort.;* 3 (1): 89-90.

Shandhu, A.S.; Singh, S.S.; Grewal, M.G.P. and Sagar, D. 1994. Influence of sources of zinc on growth and nutrient status of sand pear (*Pyrus pyrifolia* Braum Nobai.), Sixth International Symp. On pear growing Med. Ford, Oregon, U.S.A., 12-14, 1993, *Acta Hort*., 367: 323-328.

Singh, D. M.; Singh, H. K.; Vishwanath and Pratap Bhanu 2009. Effect of foliar feeding of nutrients on yield and quality of aonla fruits (*Emblica officinalis* Gaertn.) *Annals of Horticulture;* 2 (1): 95-97.

Singh, H. K.; Srivastava, A. K.; Dwivedi, R. and Kumar, P. 2001. Effect of foliar application on internal fruit necrosis of aonla (*Emblica officinalis* Gaertn.) cv. Francis. *Progressive Horticulture;* 33 (1): 80-83.

Singh, J. K.; Prasad, J. and Singh, H. K. 2007. Effect of micro-nutrients and plant growth regulators on yield and physico-chemical characteristics of aonla fruit in cv. Narendra Aonla-10. *Indian Journal of Horticulture;* 64 (2): 216-218.

Singh, P. C.; Gangwar, R. S. and Singh, V. K. 2012. Effect of micronutrients spray on fruit drop, fruit quality and yield of aonla cv. Banarasi. *Hort Flora Research Spectrum;* 1 (1): 73-76.

Yadav, H. C.; Yadav, A. L., Yadav, D. K. and Yadav, P. K. 2011. Effect of foliar application of micro-nutrients and GA3 on yield and quality of rainy season guava (*Psidium guajava* L.) cv. L-49 *Plant Archives;* 11: (1) 147-149.