Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; SP1: 2129-2131

Dheeraj Yadav
Department of Fruit Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.) India

AL Yadav
Department of Fruit Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.) India

Abhinav Kumar
Department of Floriculture and landscaping, College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.) India

Atul Yadav
Department of Fruit Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.) India

Satish Yadav
Department of Vegetable Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.), India

Sharavan Kumar
Department of Vegetable Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.), India

Correspondence
Dheeraj Yadav
Department of Fruit Science College of Horticulture & Forestry, Narendra Deva University of Agriculture & Technology, Faizabad, (U.P.) India

Foliar feeding of nutrients on fruit quality and yield of mango (*Mangifera indica* L.) *cv*. Amrapali

Dheeraj Yadav, AL Yadav, Abhinav Kumar, Atul Yadav, Satish Yadav and Sharavan Kumar

Abstract
A field experiment was carried out to study the foliar feeding of nutrients on fruit quality and yield of mango (*Mangifera indica* L.) cv. Amrapali" was conducted at Main Experiment Station, Department of Horticulture, Narendra Deva University of Agriculture & Technology, Narendra Nagar (Kumarganj), Faizabad (U.P.) during the year 2016-2017.The experiment was conducted in Randomized Block Design with seven treatments i.e. Borax 0.2%, Borax 0.4%, $ZnSO_4$ 0.2%, $ZnSO_4$ 0.4%, Urea 1.0%, Urea 1.5% and control (untreated) in three replications and considering two plants as a unit. The maximum number of fruit yield (43.00 kg/tree), fruit yield (688 q/ha) in the application of $ZnSO_4$ 0.4% followed by $ZnSO_4$ 0.2%. All the phyico-chemical characters were influenced by foliar spray of Borax 0.2%, Borax @ 0.4%, $ZnSO_4$ 0.2%, $ZnSO_4$ 0.4%, Urea 1.0%, Urea 1.5% in alone. The fruit pulp weight (166.66), pulp per cent (72.23) were recorded maximum with the foliar application of $ZnSO_4$ 0.4% followed by $ZnSO_4$ 0.2%. The maximum TSS(19.33), ascorbic acid(31.6), total sugars (17.16) and minimum acidity(0.37) content were observed with the foliar application of $ZnSO_4$ 0.4% followed by $ZnSO_4$ 0.2%.

Keywords: Borax**,** $ZnSO_4$**,** Urea, phyico-chemical, Amrapali

Introduction
Mango (*Mangifera indica* L.) is one of the most prominent members of the family Anacardiaceae and is also known as King of Fruits that is grown commercially in many parts of the world, particularly tropical and subtropical countries. Mango is originated from India and Burma and has been spread to Eastern Asia, Eastern Africa and Malaysia. This is due to several characteristics possessed by this climacteric fruit such as stupendous quality (attractive appearance, great taste and adorable flavor) and excellent nutritional composition (diverse amount of fiber, minerals, vitamins and various antioxidant compounds). Its genotypes are classified into two categories, namely monoembryonic which is mostly from subtropical regions (Indian types) and polyembryonic which is from tropical regions (Southeast Asian types).

Mango is grown almost in all the states of India. Uttar Pradesh tops the list of mango producing states. Other major producing states are Andhra Pradesh, Maharashtra, Karnataka, Bihar and Gujarat. Rest of the states has quite less production. India share 45% and 1stposition of total mango production in the world. The total annual production of mango in India is estimated to be (18527mt.) in area cultivated (2163ha.) and productivity (8.3mt.ha-1) According to National Horticulture Board2014-15,Uttar Pradesh is the leading mango producing state with production of 3,623.22 thousand tons followed by Andhra Pradesh state which has production of 3,363.40 thousand tons. Then comes Karnataka 1,778.75 thousand tons, followed by Bihar and Gujarat i.e. 1,334.87 and 911.30 thousand tons respectively.

There are near about 30 varieties of mangoes which are grown commercially. Some of the most important varieties have been listed are Alphonso, Amrapali, Banganpalli, Chausa, Dashehri, Langra, Totapuri, Kesar, and many more's. Chemical composition of mango differs with the variety and stage of maturity. It is a rich source of carbohydrate of well as vitamin A and C. A comprehensive report has been made on the chemical composition after analysis of more than 5 varieties of mango (Anonymous, 1966). According to this report chemical constituents in mango are moisture 73.0-86.7 per cent, carbohydrate 11.6-24.3 per cent, protein 0.3-1.0 per cent, fat 0.1-0.8 per cent, mineral 0.3-0.7 per cent, vitamin A 650-259 I.U. and vitamin C 3-83 mg/100 g fruit.Boron has important role for ovule development, pollen tube growth and fruit set and zinc play important role in growth and development of fruits, it is one of the essential elements for the formation of chlorophyll and hence useful towards photosynthetic activity. Urea increase vegetative growth, protein, nuclic acid, amino acid, hormones and vitamin of some food and feed crop. Calcium is involved in cell division and

plays a major role in maintenance of membrane integrity. Sulphur involved in plant cell energetic, it is associated with chlorophyll formation and sulphur containing amino acids.

Materials and Methods

The present study was 20 year old mango orchard planted under taken at Main Experimental Station, Horticulture, N.D.U.A.&T., Kumarganj, Faizabad (U.P.) India during summer season of 2016- 17. Geographically, it is situated in typical saline alkali belt of Indo-gangetic plains of eastern U.P. at 26.47-0 N latitude, 88.120 E longitudes and at an altitude of 113 meter from mean sea level. The region enjoys sub humid and subtropical climate receiving a mean annual rainfall of about 1215 mm out of which about 85% is concentrated from mid June to end of September. The winter months are cold and dry and occasional frost occurs during this period. Westerly hot wind starts from the month of March and continues up to onset of monsoon. The experiment was laid out in Randomized Block Design with three replications and seven treatments either alone 21 years old uniform mango plants planted at a distance of 2.5 x 2.5m were used as experimental material in the present investigation. Spray of nutrients was done at pea stage after fruit set. Observations recorded is The yield per tree was recorded at the time of fruit harvesting and expressed in kg/ tree, Five fruits were collected randomly from four side of the tree and estimations were done in laboratory. The chemical composition of mango fruit with respect to total soluble solids (TSS), total sugar, acidity and ascorbic acid contents were determined by taking the sample from extracted juice of fruits.. The obtained data had statistically analyzed adopting procedure as given by Fisher and Yates (1949).

Results and Discussion

The statistical analysis of data (Table-1) revealed that the maximum (166.66 g) pulp weight was noted with the foliar application of $ZnSO_4$ 0.4% followed by application of $ZnSO_4$ 0.2%. The minimum (77.83 g) pulp weight was obtained with the spray of water. Revealed that maximum (72.23 per cent) pulp was obtained with foliar application of $ZnSO_4$0.4% followed by $ZnSO_4$ 0.2%. However, minimum (63.62 per cent) pulp was recorded in control (water spray).Increase in pulp percentage may be due to more absorption of water, nutrients and increase the volume of inter-cellular spaces in the pulp. Such type results are in also reported by Vejendla *et al.* (2008), Moazzam *et al.* (2011).The highest (19.330 Brix) T.S.S was observed with of foliar spray of $ZnSO_4$ 0.4% followed with the use of Borax 0.2%. The lowest (16.330 Brix) T.S.S content was obtained in control (water spray).Total Soluble Solids content of fruit may be due to fact that nutrients have played important role in photosynthesis which ultimately lead to the accumulation of carbohydrates and attributed to increase TSS of mango fruit. The adequate amount of zinc improved the auxin content and it also acted as catalyst in oxidation process. Increase in the Total Soluble Solids may be because of more carbon assimilation promoted by application of boric acid. The results are in closed conformity with the finding of Yadav *et al.* (2004),Bakshi *et al*. (2013). The maximum (17.16%) total sugars content was noted with the foliar application of $ZnSO_4$ 0.4%. This was closely followed by Borax (0.4%) and minimum (11.16%) under control (water spray).. Increased in sugar per cent may be due to involve in the translocation of more sugar to the fruits. It has been reported that there is a greater conversion of starch into sugar (source to sink) in the presence of these nutrients. The results are conformed to the finding of Ghosh and Besrai (2000), Bhowmick *et al.* (2012). The highest ascorbic acid content (31.16 mg/100g pulp) was obtained with the foliar spray of $ZnSO_4$ 0.4% followed by Borax 0.4% while, lowest ascorbic acid content (26.06 mg/100g pulp) was obtained under control (water spray).The increased ascorbic acid content of fruit juice was due to increase synthesis of catalytic activity by enzyme and coenzyme, which are represented ascorbic acid synthesized. The adequate amounts of zinc improve the auxin content and it also acted as catalyst in oxidation process. These findings is closely confirmed with the finding of Singh and Maurya (2003). The minimum (0.37%) fruit acidity was recorded with the spray of $ZnSO_4$ 0.4 per cent followed by spray of Borax 0.4%per cent. The maximum (0.63%) acidity was recorded in foliar application of Borax 0.2%. Acidity content of fruit decrease with the foliar application of nutrients, might be due to increase in translocation of carbohydrates and increase metabolic conversion from acidity to sugar by the reaction involving reversal of glycolytic path way by used in respiration or both similarly. Acidity per cent was reduced with nutrients treated fruits, which might be due to early ripening induced by the nutrient spray during which degradation of acid might have occurred. The similar results were reported by Hasan and Jana (2000),Pal *et al.* (2008). The highest fruit yield (43 kg/tree) was obtained with the foliar application of $ZnSO_4$ (0.4%) followed by (38.00 kg/tree) with spray of Borax 0.4%. However, the lowest fruit yield (27.66 kg/tree) was recorded in control. The highest fruit yield (688 q/ha) was obtained with the foliar application of $ZnSO_4$ (0.4%) followed by (608 q/ha) with spray of Borax 0.4%. However, the lowest fruit yield (442.66 kg/tree) was recorded in control. The increased fruit yield due to foliar feeding of nutrients, might be attributed to more uptake of nutrients because efficient absorption and consequently more luxuriant vegetative growth to the initial stage, which later on resultant more metabolites for developing fruits. The importance of these nutrients in improving the physiological activities. The present finding is also in conformity with observations recorded by Singh (2002), Bhowmick *et al.* (2012) in mango.

Table 1: Foliar feeding of nutrients on fruit quality and yield of mango (*Mangifera indica* L.) *cv.* Amrapali

Treatments	Pulp weight (g)	Pulp per cent	Total Soluble Solids per cent	Total sugars per cent	Ascorbic acid (mg/100 g pulp)	Acidity per cent	Fruit yield (kg/tree)	Fruit yield (q/ha)
T_1 : Control (Water spray)	77.83	63.62	16.33	11.16	26.06	0.63	27.66	442.66
T_2 : Borax 0.2%	95.83	66.11	17.00	13.33	28.33	0.61	35.66	570.66
T_3 : Borax 0.4%	126.50	68.36	17.66	15.16	28.66	0.51	38.00	608.00
T_4 : $ZnSo_4$ 0.2%	139.50	69.74	19.00	16.16	30.00	0.48	40.66	650.66
T_5 : $ZnSo_4$ 0.4%	166.66	72.23	19.33	17.16	31.16	0.37	43.00	688.00
T_6 : Urea 1.0%	85.83	63.85	16.66	12.16	27.16	0.62	30.00	480.00
T_7: Urea 1.5%	109.50	66.35	17.33	14.50	28.56	0.60	33.33	533.33
S. Em ±	2.62	0.67	0.59	0.56	0.39	0.05	0.94	15.08
CD at 5%	8.06	2.07	1.83	1.71	1.22	0.16	2.90	46.47

References

1. Vejendla V, Maity PK, Banik BC. Effect of chemicals and growth regulators on fruit retention, yield and quality of mango cv. Amrapali. Journal of Crop and Weed. 2008; 4(2):45-46.
2. Moazzam A, Tahir FM, Shahzad J, Mahmood N. Effect of foliar application of micronutrients on the quality of mango (*Mangiferaindica* L.) cv. Dasheharifruit. *Mycopath*. 2011; 9(1):25-28.
3. Yadav RA, Chaturvedi OP, Tripathi VK. Influence of Zn and Fe on growth, flowering, yield and quality of strawberry (Fragaria *X ananasa DUCH*) cv. Chandler. Inter Seminar on Rec. Trend Hi-Tech Horticulture and PHT, Kanpur. 2004; (4-6):201.
4. Bakshi P, Jasrotia A, Wali VK, Sharma A, Bakshi M. Influence of pre-harvest application of calcium and micro-nutrients on growth, yield, quality and shelf-life of strawberry cv. Chandler. Indian Journal of Agricultural Sciences. 2013; 83(8):831-835.
5. Ghosh SN, Besrai KC. Effect of Zn, B and Fe spray on quality and yield of sweet orange *cv.* Mosambi grown under rain fed literate soil. Indian Agri. 2000; 44(3-4):147-151.
6. Bhowmick N, Banik BC, Hasan MA, Ghosh B. Response of pre-harvest foliar application of zinc and boron on mango cv. Amrapaliunder New Alluvial Zoneof West Bengal. Indian Journal of Horticulture. 2012; 69(3):428-431.
7. Singh J, Maurya AN. Effects of micronutrients on quality of mango fruit (*Mangifera indica* L.) cv. Mallika. Progressive Agriculture. 2003; 3(1-2):92-94.
8. Hasan Md A, Jana A. Effect of potassium, calcium, zinc and copper in improving the chemical composition of fruits in litchi *cv*. Bombai. Environment and Ecology. 2000; 18(2):497-499.
9. Pal A, Pathak RK, Pal K, Singh T. Effect of foliar application of nutrients on yield and quality of guava fruits (*Psidium guajava* L.) cv. Sardar guava. Prog. hort. 2008; 3(1):89-90.
10. Singh DM. Studies on foliar feedings of nutrient on yield and quality of aonla (*Emblica officinalis* Gaetn.) fruit, Thesis Master of Science in Agriculture (Hort.) N.D.U.A. &. T. Faizabad. Archives. 2000; 9(1).
11. Fisher RD, Yates F. Statistical table for biological and medical research oliver and boyd. Edbery (Londan): 3rd edition, 1949.