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Effect of foliar application of micronutrients on organoleptic evaluation of mandarin orange (*Citrus reticulata* Blanco.) under lower Pulney hills

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Abstract

Field experiment was carried out to study the effect of foliar application of micronutrient on cost of economics of mandarin orange. The foliar application of ZnSO₄ (0.2%), FeSO₄ (0.2%), H₃BO₄ (0.2%), MnSO₄ (0.3%) and CuSO₄ (0.4%), sprayed alone or in combination with control (water spray) were used at three different stages such as vegetative, flowering and fruit set. The result showed the maximum score for rind colour (3.56), shape (4.00), flavor (3.82), taste (3.89) and Over all acceptability (3.82) was observed in T₁₁ ZnSO₄ (0.2%) + FeSO₄ (0.2%) + H₃BO₄ (0.2%) of rind colour (3.76), shape (4.20), flavor (4.12), taste (4.40) and Over all acceptability (4.12) and lowest was observed in T₁ (Control) rind colour (1.99), shape (2.00), flavor (2.00), taste (2.02) and Over all acceptability (2.00).

Keywords: mandarin orange, rind colour, shape, flavor, taste and over all acceptability

Introduction

Citrus is one of the most important fruit crops of the globe, extensively cultivated in tropical and sub-tropical climate. Citrus is primarily valued for the fruit, which is either used alone as fresh fruit, processed into juice or added to dishes and beverages. The fruits are well known for their dietary, nutritional, medicinal and cosmetic properties and are also good source of citric acid, flavonoids, phenolics, pectin, limonoids, ascorbic acid *etc.* in addition to potassium, folate, calcium, thiamin, niacin, vitamin B6, phosphorus, magnesium, copper, riboflavin, pantothenic acid and a variety of phytochemicals.

In India, a wide numbers of species of citrus are cultivated of which mandarin covers the largest area. Mandarin orange, botanically *Citrus reticulata* Blanco. Or “fancy fruit” and it is considered as a dessert fruit. It is originated in all probability, in Vietnam or China and has been cultivated in China and Japan over long periods (Singh and Kumar, 2014) [5]. In our country mandarin orange is commercially cultivated in Karnataka (parts of Coorg, Hassan and Chikkamagalore), Maharashtra (Nagpur belt), West Bengal (Darjeeling), Punjab, and Assam etc. In Tamil Nadu, mandarins are grown in Lower Pulney hills, Nilgris and Shervaroy hills (Kumar, 2014) [4]. In some North Indian states, the cultivation of mandarin orange is limited due to the acidity and puffiness of the fruit. It has been proved promising because of its wider adoptability, high bearing potential and good quality fruits.

In Tamil Nadu, mandarin orange is being commercially grown in lower pulney hills. In this area farmer's obtained low yield due to micronutrient deficiency next to pest and disease. In this hill ecosystem, deficiency of micronutrient causes adverse effects on fruit orchard, making it unfit for consumption. Use of micronutrient reduces the deficiency thus improving plant growth and yield. The foliar application of micronutrients increases the photosynthetic compounds inside the plant tissue which ultimately reduces the leaf drop and give strength for their persistency compare to soil application. Thus it helps to improve the yield and quality for consumer preference.

Material and Methods

The field experiment was conducted in farmer field at farmer's field (TVSN Veeranna estate), Kaanalkadu, Thadiyankudisai, Lower Pulney hills, Dindigul district, Tamil Nadu during the year 2014-16.

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For conducting this study six year old uniform trees of mandarin orange were selected. There were 15 treatment replicated thrice tested in randomized block design. The effects of ZnSO₄ (0.2%), FeSO₄ (0.2%), H₃BO₄ (0.2%), MnSO₄ (0.3%) and CuSO₄ (0.4%) alone or in combination was studied. The micronutrient were applied as a foliar sprays thrice at monthly interval from July to October 2015 and spray was given in the evening hours between 3.00-5.00 pm by using a hand sprayer. The required quantities of micronutrients were dissolved in water separately and then pH of these nutrient solutions was adjusted by lime and sprayed in vegetative, flowering and fruit set stages. The simple water spray was done on the tree under control treatment. In each spray treatment Tee pol was added as sticking agent in prepared solution.

Treatment details

T₁: Control (Water spray),
 T₂: ZnSO₄ (0.2%),
 T₃: FeSO₄ (0.2%),
 T₄: H₃BO₄ (0.2%),
 T₅: MnSO₄ (0.3%),

T₆: CuSO₄ (0.4%),
 T₇: ZnSO₄ (0.2%) + FeSO₄ (0.2%),
 T₈: ZnSO₄ (0.2%) + H₃BO₄ (0.2%),
 T₉: ZnSO₄ (0.2%) + MnSO₄ (0.3%),
 T₁₀: ZnSO₄ (0.2%) + CuSO₄ (0.4%),
 T₁₁: ZnSO₄ (0.2%) + FeSO₄ (0.2%) + H₃BO₄ (0.2%),
 T₁₂: FeSO₄ (0.2%) + H₃BO₄ (0.2%) + CuSO₄ (0.4%),
 T₁₃: ZnSO₄ (0.2%) + MnSO₄ (0.3%) + CuSO₄ (0.4%),
 T₁₄: FeSO₄ (0.2%) + H₃BO₄ (0.2%) + MnSO₄ (0.3%),
 T₁₅: ZnSO₄ (0.2%) + FeSO₄ (0.2%) + H₃BO₄ (0.2%) + MnSO₄ (0.3%) + CuSO₄ (0.4%)

Organoleptic characters

Organoleptic evaluation of fresh mandarin orange fruits was carried out by a team of 10 judges consisting of scientists of HC&RI, Periyakulam, Theni (Dist.), Tamil Nadu. The organoleptic characters like colour, shape, taste, flavour and over all acceptability of mandarin orange fruits were evaluated on a five point hedonic scale using following score card. The mean scores given by 10 judges were used for statistical analysis.

Table 1: Effect of foliar application of micronutrients on Score card for organoleptic evaluation

Hedonic scale	Score				
	Rind Colour	Shape	flavour	Taste	Overall Acceptability
Extremely good	4.1-5.0	4.1-5.0	4.1-5.0	4.1-5.0	4.1-5.0
Very good	3.1-4.0	3.1-4.0	3.1-4.0	3.1-4.0	3.1-4.0
Good	2.1-3.0	2.1-3.0	2.1-3.0	2.1-3.0	2.1-3.0
Bad	1.1-2.0	1.1-2.0	1.1-2.0	1.1-2.0	1.1-2.0
Very bad	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0	0.0-1.0

Result and Discussion

Sensory evaluation

The mandarin orange fresh fruit were subjected to Organoleptic evaluation by a panel of 10 judges following hedonic rating test. The characters of score ranging from 0.0 to 5.0. The fresh fruit was evaluated for colour, shape, flavour, texture and Overall Acceptability. The score was given by them was averaged. The scoring for all sensory character was done as show in table 2.

Among the different treatments studied, (Table 2) the treatment T₁₁ registered the highest score for rind colour (3.76), shape (4.20), flavor (4.12), taste (4.40) and Over all acceptability (4.12) was observed in T₁₁ ZnSO₄ (0.2%) + FeSO₄ (0.2%) + H₃BO₄ (0.2%) followed by T₁₅ ZnSO₄ (0.2%)

+ FeSO₄ (0.2%) + H₃BO₄ (0.2%) + MnSO₄ (0.3%) + CuSO₄ (0.4%) of colour (3.56), shape (4.00), flavor (3.82), taste (3.89) and Over all acceptability (3.82) and lowest was observed in T₁ (Control) rind colour (1.99), shape (2.00), flavor (2.00), taste (2.02) and Over all acceptability (2.00). The high percentage of total and non reducing will helps in promotion of sensory attributes. It is due to the application of combine iron, zinc and boron these nutrients will helps in the maintenance of fruit firmness, retardation of respiratory rates as well as transpiration and delayed senescence increase photosynthates mobility and it was favored by optimum nutrients availability will increase membrane resistance to bio-chemical changes was also in conformity with Arvind *et al.* (2012) ^[1], Gaya (2008) ^[2] and Guvvali *et al.* (2017) ^[3].

Table 2: Effect of foliar application of micronutrients on organoleptic evaluation of mandarin orange

Treatments	Rind colour	Shape	Flavor	Taste	Over all acceptability
T ₁	1.99	2.00	2.00	2.02	2.00
T ₂	2.78	2.93	2.78	2.64	2.78
T ₃	2.79	3.00	3.02	3.26	3.02
T ₄	2.89	3.05	3.01	3.09	3.01
T ₅	3.00	3.17	3.13	3.22	3.13
T ₆	3.05	3.25	3.22	3.35	3.22
T ₇	3.14	3.35	3.28	3.34	3.28
T ₈	3.20	3.41	3.31	3.31	3.31
T ₉	3.25	3.45	3.34	3.33	3.34
T ₁₀	3.38	3.57	3.51	3.59	3.51
T ₁₁	3.76	4.20	4.12	4.40	4.12
T ₁₂	3.47	3.65	3.58	3.63	3.58
T ₁₃	3.67	3.72	3.67	3.62	3.67
T ₁₄	3.45	3.76	3.59	3.56	3.59
T ₁₅	3.56	4.00	3.82	3.89	3.82

Conclusion

The mandarin orange fresh fruit were subjected to Organoleptic evaluated for colour, shape, flavour, texture and Overall Acceptability maximum score was observed in T₁₁.

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References

1. Arvind B, Mishra NK, Mishra DS, Singh CP. Foliar application of potassium, calcium, zinc and boron enhanced yield, quality and shelf life of mango. Hort. Flora Res. Spectrum. 2012; 1(4):300-305.
2. Gaya. M.Sc. Thesis, G.B. Pant Univ. of Agric. & Tech., Pantnagar, 2008.
3. Guvvali T, Shirol AM, Nagesh N, Venugopal U, Sampath PM. Effect of micronutrients on post-harvest quality and shelf life of Sapota cv. Kalipatti. Int. J of Agri. Sci. 2017; 9(14):4084-4086.
4. Kumar N. Introduction to Horticulture. Oxford & IBH Publisher Co. Ltd., Delhi, 2014.
5. Singh A, Kumar A. Fruit production technology. Aavishkar Publishers., Jaipur, 2014.