

Original Research Article

<https://doi.org/10.20546/ijcmas.2024.1303.010>

Effect of Micronutrients on Enhancing the Quality of Banana (*Musa spp.*) cv. Red Banana

L. R. Arthi * and Arumugam Shakila

Department of Horticulture, Annamalai University – 608002, India

*Corresponding author

ABSTRACT

The investigation on “Effect of micronutrients on enhancing the quality of banana (*Musa spp.*) cv. Red Banana (AAA)” was carried out to identify a suitable micronutrient concentration for enhancing the quality of triploid banana cultivar Red Banana. The field experiment was laid out in Randomized Block design in three replications with ten treatments. The treatments comprised of various micronutrient concentrations of NRCB Banana Sakthi applied at different intervals. The quality parameters viz., total soluble solids, reducing sugar content, non-reducing sugar content, total sugar content and ascorbic acid content was found to be the highest in the treatment which received 2.0 per cent micronutrients at 45 days interval, while the control registered the least values for all the quality parameters. Application of 2.0 per cent micronutrients at 45 DI (T_8) increased the TSS (20.62 °Brix), reducing sugar content (7.25 per cent), non-reducing sugar content (7.39 per cent), total sugar content (14.64 per cent), ascorbic acid content (1.53 mg 100g⁻¹) and reduced the acidity content (0.24 per cent). The least values for TSS (17.62 °Brix), reducing sugar content (5.19 per cent), non-reducing sugar content (4.84 per cent), total sugar content (10.03 per cent) and ascorbic acid (0.37 mg 100g⁻¹) was recorded in T_{10} (Control). Thus the study concluded that application of 2.0 per cent micronutrients at 45 days interval can be recommended as the best practice for enhancing the quality of Red Banana (AAA).

Keywords

Red Banana,
Micronutrient,
NRCB Banana
Sakthi, quality

Article Info

Received:
25 January 2024
Accepted:
28 February 2024
Available Online:
10 March 2024

Introduction

In India, Banana is a major fruit crop which belongs to the musaceae family. Banana is well known for its antiquity and is interwoven with Indian heritage and culture. The plants are considered as the symbol of prosperity and fertility. Owing to its greater socio-economic significance and multifaceted uses, banana is popularly known as ‘Kalpataru’ (A plant with virtues). All parts of the plant including leaves, pseudostem,

flower bud and corm can be used in one or another way (Chadha, 2009). The productivity is 20.80 metric tonnes hectare⁻¹ which is much lower than the productivity in India (34.20 metric tonnes hectare⁻¹).

India contributes 29 percent of total world production and occupies 20 percent area (7.76 lakh hectares) among the total area under fruit crops in India with a production of 25.51 million tonnes. The area under banana cultivation in Tamil Nadu is 0.94 lakh hectares with a

production of 3.302 lakh tonnes (NHB, 2020). Among various banana cultivars, Red Banana has more health benefits viz., strengthens immune system, alleviates digestive problems and helps to stop smoking. They have no fat, cholesterol or sodium and contain more digestible carbohydrates than any other fruit.

Micronutrients are essential for the crop growth and are equally important as primary and secondary nutrients. They have an important role in the balance of plant nutrition for the stabilization of a crop yield and quality of a produce.

Micronutrient deficiencies in soil and crops have become prevalent in recent years due to several factors like intensive cropping, loss of top soil, soil erosion, leaching, decreased use of FYM, increased use of high analysis fertilizers and lack of proper liming of acid soils (Singh *et al.*, 2007). To keeping in this view, the present investigation was undertaken with the objectives to study the effect of micronutrients on the quality of Red Banana.

Materials and Methods

The experiment was conducted in a farmer's field at Chitharal village, Kanyakumari district of Tamil Nadu to study the effect of micronutrients on enhancing the quality of banana (*Musa spp.*) cv. Red Banana (AAA). The field experiment was laid out in Randomized Block Design with three replications.

The treatments comprised of various micronutrient concentrations (1%, 1.5%, 2%) of NRCB Banana Sakthi applied at different days intervals (30, 45, 60 days intervals) along with the recommended dose of fertilizers (110:35:330 NPK g/ plant).

The micronutrient mixture contains 4.8 per cent iron, 5.3 per cent zinc, 2.8 per cent boron, 2.4 per cent copper and 4.6 per cent manganese. Planting was done at a spacing of 3 x 3 m.

Standard cultural practices was followed along with treatments per the schedule. Observations on quality parameters were recorded in three tagged plants under each treatment.

The data observed for quality parameters are TSS, reducing sugar content, non- reducing sugar content, total sugar content, ascorbic acid content and acidity content.

Results and Discussion

The fruit quality is mainly judged by the sugar content and acidity in the pulp. The role of micro-nutrients for production of quality traits have been already reported by several scientists.

Zinc aids in regulating the plant growth hormones and enzyme systems and it is also necessary for carbohydrate and starch formation, while iron promotes formation of chlorophyll pigment, which acts as an oxygen carrier involving cell division and growth.

Copper catalyzes several plant processes like photosynthesis and development of reproductive stage, plays an indirect role in chlorophyll production, increases sugar content, intensifies colour and improves flavour of fruit on ripening, while Boron is necessary for translocation of sugars and promotes fruit maturity (Premalatha and Suresh, 2019).

The findings of the present study revealed that application of 2.0 per cent micronutrients at 45 days interval resulted in the production of fruits with great pulp: peel ratio and highest total soluble solids, reducing sugar content, non- reducing sugar content, total sugar content and ascorbic acid content and with lower titrable acidity when compared to the fruits of the control treatment which registered the least values for all the quality parameters (Table.1).

Application of micronutrients induced higher total sugar per cent in the fruits. The increase in carbohydrates might be due to quick metabolic transformation of starch and pectin into soluble compounds and enhanced conversion of organic acids into sugar. The above findings are also in support with the reports of Devi *et al.*, (1997); Deolankar and Firke, (2001) in banana. The perceptible increase in ascorbic acid content might be due to the catalytic influence of micronutrients on its biosynthesis or inhibition of its conversion to hydro ascorbic acid by enzyme ascorbic acid oxidase or both (Hemant *et al.*, 2018).

The enhancement of quality of fruits could be possibly due to the catalytic action of micronutrients particularly at higher concentrations. The foliar application of micronutrients quickly increased the uptake of macronutrients in the tissues and organs of the plant, decreased deficiencies and improved the fruit quality.

Table.1 Influence of micronutrient concentrations on quality characters in Red Banana (AAA)

Treatments	Total soluble solids (Brix)	Reducing sugar content (%)	Non-reducing sugar content (%)	Total sugar content (%)	Ascorbic acid content (mg 100 g ⁻¹)	Total crop duration (days)
T ₁	19.05	6.17	6.60	12.77	0.74	433.47
T ₂	18.60	5.72	5.97	11.69	0.53	441.96
T ₃	18.16	5.39	4.97	10.36	0.40	450.70
T ₄	18.47	5.55	5.65	11.20	0.46	445.63
T ₅	20.13	7.08	7.00	14.08	1.32	418.00
T ₆	18.81	5.93	6.43	12.36	0.65	438.45
T ₇	19.82	6.68	6.53	13.21	1.28	423.84
T ₈	20.62	7.25	7.39	14.64	1.53	413.94
T ₉	19.59	6.23	6.79	13.02	0.98	429.36
T ₁₀	17.62	5.19	4.84	10.03	0.37	455.40
SE _D	0.24	0.085	0.08	0.16	0.02	1.46
CD at 5 %	0.49	0.17	0.16	0.32	0.04	2.92

Hence from the results of the present study it can be concluded that application of 2.0 per cent micronutrients at 45 days interval can be recommended as the best practice for enhancing the quality of Red Banana (AAA).

Author Contribution

Arthi: Investigation, formal analysis, writing—original draft. Arumugam Shakila: Validation, methodology, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

References

- Chadha, K. L. 2009. Handbook of Horticulture (2nd ed.). Indian Council of Agricultural Research, New Delhi., pp: 76-82
- Devi, D. D., P.S. Shrinivasan, K. Balakrishna. 1997. Influence of zn, Fe and Mn on photosynthesis and yield of *Citrus sinensis*. Indian J. Plant Physiol.,2(2): 174-176.
- Deolankar KP, Firake NN. (2001). Effect of water soluble fertilizers on growth and yield of banana. J. Maharashtra agric. Univ., 26(3): 333- 334.
- Hemant Kumar Panigrahi, Tikeswar Kumar, Prabhakar Singh and S N, Dikshit. 2018. Studies on the effect of different micronutrients on quality attributing parameters of banana (*Musa paradisiaca* L.) cv. Grand Naine. Intl. J. Chem. Studies., 6(1): 2134- 2138.
- NHB. 2020, Indian Horticultural Database, Banana area, production and productivity. <http://www.nhb.gov.in>.
- Premalatha, A and Suresh, P. R. 2019. Studies on the effect of foliar application of micronutrient mixture on quality attributing parameters of banana (*Musa* AAB) cv. Nendran. J. Pharma. Phytochem., 8(4): 1036-1040
- Singh, J. K., J. Prasad, H. K. Singh. 2007. Effect of micronutrients and plant growth regulators on yield and physico- chemical characteristics of aonla fruits in cv. Narendra Aonla-10. Indian J. Hort., 64(2): 216-218.

How to cite this article:

Arthi, L. R., and Arumugam Shakila. 2024. Effect of Micronutrients on Enhancing the Quality of Banana (*Musa* spp.) cv. Red Banana. *Int.J.Curr.Microbiol.App.Sci.* 13(3): 117-120. **doi:** <https://doi.org/10.20546/ijemas.2024.1303.010>