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# Foliar Application of Arka Banana Special as Micronutrients Increase Yield of Banana

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## ABSTRACT

A study on effect of foliar application of micronutrients mixtures in banana (*Musa* spp.) for growth and yield characters was conducted at Krishi Vigyan Kendra, Ramanathapuram at Tamil Nadu. There were four technology options *viz.,* TO1: No application of micronutrients, TO2 foliar application of micronutrients (0.5 % $ZnSO_4$, 0.2 % $FeSO_4$, 0.2 % $CuSO_4$ and 0.1 % borax @ 3rd, 5th and 7th months after planting (TNAU), TO3: foliar application (spraying) of 0.3 % Arka banana special @ 4 sprays at monthly interval starting from 5th month after planting (IIHR) and TO4: spraying (foliar application) of 2 % Banana Sakthi @ three sprays at monthly interval starting from 4th month after planting (NRCB). The local banana Muppattai used in this study. The experiment was conducted in Randomized Block Design (RBD) with five replications. The results revealed that among the technological options, TO3 recorded the highest values in all the growth and yield characters *viz.,* plant height, pseudostem girth, number of leaves per plant, bunch weight, hand weight, number of fingers per bunch, number of hands per bunch, number of fingers per hand, finger length, finger girth, weight of finger and yield per ha. It was followed by TO4 whereas the TO1 recorded the lowest values in all the characters. Regarding cost economics, TO3 recorded the highest BC ratio of 3.31 with the net profit of Rs. 1,70,750/ha and it was followed by TO4 whereas TO1 registered the lowest B:C ratio (2.92) and net profit (Rs.1,35,200/ha). TO3 (foliar application of 0.3 % Arka banana special) registered 15.0 percent yield increase over the control. It was concluded that from the present study, foliar application of 0.3 % Arka banana special recorded the highest yield coupled with higher B:C ratio and net profit.

**Key Words:** Arka banana special, Banana Sakthi, Foliar application, Micronutrients, Yield.

## INTRODUCTION

Banana is one of the major fruit crops in India, occupies 8.03 lakh hectares with the production of 29.7 MT and 37 t of productivity per ha (Chhuria *et al,* 2016). India stands first place in both area and production of banana and contributes more than 20 percent of world production. In Tamil Nadu banana is cultivated in an area of 1.18 lakh ha with the production of 56 lakh tonne and with a productivity of 47.9 t/ha. Balanced nutrition is very important for high yield, quality and resistance to diseases in banana. It is a high nutrient requiring crop. Banana requires a continuous supply of nutrients at proper growth stages for enhanced yield and productivity. Many earlier studies revealed that the yield of banana be increased by 21 to 60 per cent with adoption of improved production technologies such as introduction of improved variety, recommended dose of fertilizer application and plant protection. Banana crop requires large amount nutrients and it exhausts both the major and micronutrients for its growth, development and yield (Thangaselvabai *et al,* 2009) (Hazarika and Ansari, 2010), especially nitrogen and potassium. The nutrient requirement should be replenished to maintain soil fertility and to sustain the productivity. Several workers reported that the application of micronutrients is enhanced the various processes, growth and yield parameters of banana. Foliar spray of nutrients is a contingent measure for the crop which suffers from nutrient

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**Table 1. Influence of micronutrients application on growth and yield of banana.**

| Treatment details | TO-1 | TO-2 | TO-3 | TO-4 | SEd | CD (P=0.05 %) |
|---|---|---|---|---|---|---|
| Plant height (cm) | 278.40 | 290.80 | 312.20 | 309.45 | 13.83 | 25.410 |
| Pseudo stem girth (cm) | 64.78 | 68.65 | 72.50 | 70.14 | 3.58 | 6.945 |
| Number of leaves per plant | 8.64 | 8.70 | 9.20 | 8.80 | 1.16 | 3.201 |
| Number of hands / bunch | 8.60 | 8.70 | 9.10 | 8.90 | NS | NS |
| Number of fruits /hand | 10.10 | 10.30 | 11.25 | 10.75 | NS | NS |
| No. of fruits per bunch | 109.50 | 112.30 | 120.80 | 115.20 | 5.24 | 10.123 |
| Hand weight (kg) | 1.58 | 1.68 | 1.83 | 1.74 | 0.103 | 0.214 |
| Bunch weight (kg) | 11.95 | 12.47 | 14.25 | 13.58 | 1.924 | 3.875 |
| Finger length (cm) | 9.40 | 9.80 | 10.50 | 10.25 | 0.527 | 1.025 |
| Finger girth (cm) | 7.05 | 7.24 | 7.60 | 7.35 | 0.541 | 0.978 |
| Finger weight (g) | 87.50 | 88.40 | 92.50 | 90.25 | 2.562 | 4.954 |
| Yield ( t/ha) | 19.10 | 20.80 | 22.61 | 21.90 | 1.589 | 3.142 |

deficiencies. In Ramanathapuram district, banana is cultivated 20 – 50 ha area particularly Nainarkovil and Kamuthi blocks. These areas micronutrient disorders are very common and farmers are unaware about to reduce the disorders as well as getting low yield and income. With this background, the present On Farm Testing was undertaken to find out the effect of foliar application of micronutrient mixtures in banana (*Musa* spp.) for growth and yield.

## MATERIALS AND METHODS

The study was conducted at Krishi Vigyan Kendra, Ramanathapuram district, Tamil Nadu during 2017-2018 to find out the influence of foliar application of micronutrient on banana. There were four technology options were imposed *viz.,* TO1: No application of micronutrients (control), TO2 : foliar application of micronutrients (0.5 % $ZnSO_4$, 0.2 % $FeSO_4$, 0.2 % $CuSO_4$ and 0.1 % borax @ 3rd, 5th and 7th months after planting (TNAU), TO3: foliar application (spraying) of 0.3 % Arka Banana Special @ 3rd, 5th and 7th months after planting, TO4: spraying (foliar application) of 2 % Banana Sakthi @ three sprays at monthly interval starting from 4th months after planting. The trial was laid out in a Randamized Block Design (RBD) with four technology options and replicated five times. Arka banana special was purchased from Indian Institute of Horticultural Research, Bengaluru and Banana Sakthi purchased from National Research Centre for Banana, Tiruchirapalli, Tamil Nadu. Before implantation of the OFT, group meetings, trainings and field visits were conducted and trained the farmers for the foliar application of micronutrient mixtures in banana. The local banana cultivar "Muppattai' (ABB) was used for this study. The spacing of 2.0 x 2.0 m was adopted as per the recommendation of Crop Production Guide, 2013. Planting was taken up during the month of June and in an area of one hectare. Different biometric and yield parameters such as pseudostem height (m), pseudostem girth (cm), number of leaves per plant, bunch weight (kg), number of hands per bunch, hand weight (kg), number of fruits per hand, number of fruits per bunch, yield per ha (g/ha), finger length (cm), finger girth (cm), finger weight (g), net profit (Rs.) and benefit cost ratio were recorded. The data were analysed with appropriate statistical method was suggested by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

Foliar application of micronutrients significantly influenced the growth and yield of banana (Table 1). The results revealed that among

**Table 2. Cost economics on foliar application of micronutrients in banana.**

| Treatment details | Yield ( t/ha) | Gross cost (Rs.) | Gross expenditure (Rs) | Net profit (Rs.) | BC ratio |
|---|---|---|---|---|---|
| TO 1 | 19.10 | 2,05,300 | 70,100 | 1,35,200 | 2.92 |
| TO 2 | 20.80 | 2,14,400 | 70,800 | 1,43,600 | 3.02 |
| TO 3 | 22.61 | 2,44,500 | 73,750 | 1,70,750 | 3.31 |
| TO 4 | 21.90 | 2,29,950 | 71,500 | 1,58,450 | 3.21 |

the four technology options, TO3 (foliar application of Arka banana special) recorded the highest values in growth, yield and cost benefit ratio than other technology options. The highest pseudostem height (312.20 m) was recorded in TO3 (foliar application of 0.3 % Arka banana special) and it was followed TO4 (foliar application of 0.2 % banana Sakthi) of 309.45 cm; whereas the lowest (278.40 cm) pseudostem height was noticed in TO1 (control). The highest pseudostem girth was recorded in TO3 (72.50 cm) followed by TO4 (70.14 cm) and the lowest girth was noticed in TO1 (control) of 64.78 cm. In this context, Kumar and Jeyakumar (2001) also reported that increased pseudostem height and girth with application of micronutrients. The pseudostem girth was proportionately increased to give strength to the plant to withstand the bunch weight. The application of micronutrients through both soil and foliar application which resulted in the maximum pseudostem girth, pseudostem height and numbers leaves reported by Krishnamoorthy and Hanif (2017). The number of leaves per plant (9.20) was found to be highest in TO3 (17), followed by TO4 of (8.80); whereas the lowest (8.64) number of leaves was noticed in TO1 (farmer practices). Similar finding was also reported by Yadlod and Kadam (2008).

The important yield traits *viz.,* traits like number of fruits per hand (11.25) and number of fruits per bunch (120.80) were found to be highest in TO3 followed by TO4; whereas the lowest values was observed in TO1 (farmer practices). The highest hand weight was registered in TO3 (1.83 kg) followed by TO4 (1.74 kg) whereas the lowest hand weight was noticed in farmer practices (TO1) of 1.58 kg. Krishnamoorthy and Hanif (2017) also stated that foliar application of micronutrient increased fruits per bunch under Pudukottai condition of Tamil Nadu. Regarding bunch weight, the highest weight was exhibited in TO3 (14.25 kg) which was superior to the rest of the treatments. The lowest bunch weight was observed in TO1 of 11.95 kg (farmer's practices). This might be due to the fact that foliar application of micronutrients had significantly positive influence on the yield parameters through many physiological manipulations. This was in conformity with the findings of Pathak *et al* (2011), where they registered higher finger weight and bunch weight owing to the application of micronutrients in banana. Kumar and Jeyakumar (2001) also observed the foliar application of different micronutrients registered the highest bunch weight in Robusta (AAA). In the present study, the highest yield was registered in TO3 (22.61 t/ha), followed by TO4 (21.90 t/ha); whereas the lowest yield was recorded found in TO1 (19.10 t/ha). This might be due to balanced nutrient management with timely application of foliar micronutrients which enhanced the bunch weight and there by yield. The micronutrient accelerates in the metabolism and also mobilization of source produced photosynthesis from the leaves to sink (Jyothi *et al,* 2020). Jagadeeswari *et al* (2018) reported that foliar application of banana special during fruit development stage resulted in increased banana productivity under Virudhunagar district conditions of Tamil Nadu. Bindu (2019) reported that there was an increased yield of 20.6 t/ha in Nendran banana due to application of micronutrient than farmers' practice (14.8 t/ha).

**Economics**

Data on the influence of foliar application of micronutrients on the economics of banana cultivation are depicted in Table 2. The gross cost of cultivation almost similar for three technological options but local practice recorded the lowest in gross cost. Among the technological options, TO3 exhibited the highest yield with a net profit of Rs. 1,70,750/ha and benefit to cost ratio of 3.31. This was followed by TO4 (Rs. 1,58,450/ha; 3.21) while the farmers' practices recorded the lowest net profit of Rs. 1,35,200 per ha with the benefit cost ratio of 2.92. Similar finding was also reported by Jyothi (2020) who reported that the foliar application of Arka banana special under G9 banana, recorded the net profit of Rs. 2,35,000/- with the B:C ratio of 2.54. It was revealed from the study that the performance of foliar application of Arka banana special and fetches higher yield (22.61 t/ha) and income when compared to the farmers' practices (19.10 t/ha).

## CONCLUSION

The present study concluded that foliar application of Arka banana special to banana cv. Muppattai at Ramanathapuram district was more beneficial due to enhanced yield. TO3 registered the highest yield (22.61 t/ha) and fetches higher net profit of Rs. 1,70,750//ha with benefit to cost ratio of 3.31 when compared with farmer practices. TO3 performed better and recorded an increased yield of 12.0 per cent with good market preference over the farmers' practices. Hence from the present study, it was concluded that application of Arka banana special as micronutrients application to the banana significantly increased yield of banana. This technology will be promoted as Front Line Demonstrations (Large scale demonstration) during ensuing season at Ramanathapuram district.

## REFERENCES

Bindu B (2019).Micronutrient mixture application in banana cv. Nendran (*Musa* AAB) for yield enhancement. *J Pharmacognosy and Phytochem* **8(1):** 840-842.

Chhuria S Mandal P Biswal M Thriveni V (2016). Impact of integrated nutrient management on soil fertility status of tissue culture banana cv. Grand Naine (*Musa* AAA, Cavendish). *J Crop and Weed* **12(2):** 72-74.

Hazarika B Ansari S (2010). Effect of integrated nutrient management on growth and yield of banana cv. Jahaji. *Indian J Hort* **67(2):** 270-273.

Jegadeeswari D Dheebakaran G A and Paulpandi V K (2018). Foliar application of micronutrients for enhancing productivity of banana under irrigated conditions through farmers' participatory approach. *Int J Chem Stud* **6(5):** 1094-1097.

Jyothi R Yaligar R Kalibavi C M Ravi M V Radha J Mahantesh M T Ullikashi K and Mamathamadly N G (2020). Effect of Arka banana special micronutrient mixture and bunch cover on yield and quality enhancement in banana. *Int J Curr Microbiol App Sci* Special Issue-11: 2668-2673.

Krishnamoorthy V and Noorjahan A KA Hanif (2016). Influence of micronutrients on growth and yield of banana. *J Krishi Vigyan* **5(2):** 87-89.

Kumar N and Jeyakumar P (2001*). Influence of micronutrients on growth and yield of banana Musa spp cv. Robusta (AAA.)* In: Plant nutrition – food security and sustainability of agro ecosystem. Kluwer Academic Publishers Netherlands pp: 354-355.

Panse V G and Sukhatme P V (1967). *Statistical Methods for Agricultural Workers*. Indian Council of Agricultural Research, New Delhi, p.381.

Pathak M Bauri F K Misra D K Bandoyopadhyay B and Chakraborty K (2011). Application of micronutrients on growth, yield and quality of banana. *J Crop and weed* **7(1):** 52-54.

Thangaselvabai T Suresh S Joshua J P and Sudha K (2009). Banana nutrition- A review. *Agric Rev* **30** (1): 24- 31.

Yadlod S S and Kadam B A (2008). Effect of plant growth regulators and micronutrients on growth, yield and storage life of banana (*Musa* spp.) cv. Shrimanti. *The Asian J Hort* **3**(2): 409-411.

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