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Response of different micronutrients on yield parameters of Turmeric (*Curcuma Longa*) Cv. Bsr_2

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Abstract

Turmeric (*Curcuma longa* L.) is a golden spice belongs to the family zingiberaceae. It is the national spice of India. Turmeric inhibits the development of cataracts, breast cancer, colon cancer and lymphoma. However, except from its medicinal use, its fresh juice the aqueous extracts and the essential oil of the plant are credited with pesticidal properties against mosquito. An experiment was conducted in a farmer's field at Bharathipuram village, Pennagaram Taluk, Dharmapuri District, Tamil Nadu during May to January 2021 to study the response of different micro nutrients on yield parameters of turmeric. Turmeric cv. BSR_2 was used for the experiment. The experiment was laid out in Randomized Block Design with nine treatments and three replications. The treatments comprised of soil application of boron (Borax), Manganese ($MnSO_4$), Iron ($FeSO_4$) and Zinc ($ZnSO_4$) each @ 25 kg ha^{-1}, foliar application of boron (Borax), Manganese ($MnSO_4$), Iron ($FeSO_4$) and Zinc ($ZnSO_4$) each @ 0.5% after 60 and 90 days after planting. In control no micro nutrients were applied. Inorganic fertilizers were applied at the rate of 80:80:120 kg ha^{-1} of N: P_2O_5: K_2O to all the treatments. Observations on yield parameters like number of mother rhizomes per plant, number of primary fingers per plant, number of secondary fingers per plant, yield per plant and yield per hectare were recorded. The results revealed that soil application of boron as borax @ 25 kg ha^{-1} recorded the highest yield parameters of turmeric cv BSR_2.

Key words : Turmeric, Micro nutrients, BSR_2 and yield parameters.

Turmeric (*Curcuma longa* L.), also known as 'Golden Spice', is one of the most important and ancient spices of India, ranking first in area, production, consumption and export in the world. West Bengal is one of the major turmeric producing states of India. Apart

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from its spice and medicinal value it is also used in the dye, food and cosmetic industries. It is also used in the auspicious religious occasions. Turmeric inhibits the development of cataracts, breast cancer, colon cancer and lymphoma[1]. The active constituents present in turmeric is curcumin, which comprise 0.3-5.5 per cent[5]. Curcuminoids in turmeric have anti-inflammatory, anti-mutagen, anticancer, antibacterial, antifungal, antiparasitic and detoxifying properties [7].

Mineral nutrition is also considered as one of the important factors that influence the growth and yield of turmeric plant get some amount of nutrition from soil but they are inadequate to meet the increased demand of plants for higher production. Optimum dose of fertilizer is required by the crop to increase the productivity potential and there is enough information regarding the requirement of the nitrogen, phosphorus and potassium by this crop. In addition to N, P, K, boron, manganese, zinc and iron are required by most of the crop plants particularly in rhizomatous crop like turmeric for improving the yield characters. Very few information is available with respect to the effect of boron, manganese, zinc and iron on the growth and yield of turmeric. Keeping in this view, the present investigation was undertaken with the response of different micro nutrients on yield parameters of turmeric cv. BSR_2.

An experiment was carried out in the farmers field, Bharathipuram village, Pennagaram Taluk, Dharmapuri District during May to January 2021. Turmeric cv. BSR_2 was used for the experiment. BSR_2 is a mutant from Erode local type released in 1994, medium statured, short duration crop, high yielding and resistant to scale insects. The experiment was laid out in Randomized Block Design with nine treatments and three replications. The treatments comprised of soil application of boron (Borax), Manganese ($MnSO_4$), Zinc ($ZnSO_4$) and Iron ($FeSO_4$) each @ 25 kg ha^{-1}, foliar application of boron (Borax), Manganese ($MnSO_4$), Zinc ($ZnSO_4$) and Iron ($FeSO_4$) each @ 0.5% after 60 and 90 days after planting. In control no micro nutrients were applied. Main field is ploughed four times. FYM @ 15t ha^{-1} was applied as basal to all the treatments. Inorganic fertilizers were applied at the rate of 80:80:120 kg ha^{-1} of N: P_2O_5: K_2O to all the treatments. Full dose of P_2O_5 and one third dose of nitrogen was applied as basal, remaining two third nitrogen and K_2O were applied in two equal splits at 45 and 90 days after planting. The rhizomes are planted at a spacing of 45x 10 cm. 30g weight rhizomes are dibbled at a depth of 4 cm. Observations were recorded on yield parameters such as number of mother rhizomes per plant, number of primary fingers per plant, number of secondary fingers per plant, yield per plant and yield per hectare. The data was statistically analysed as per the method suggested by Gomez and Gomez[2] and wherever the treatment differences were found significant critical differences were worked at 5% level of significance.

Growth attributes :

Perusal of the data (Table-1) revealed increases in all the yield attributes of turmeric due to application of micronutrients over control.

Table-1. Influence of different micronutrients on yield parameters of turmeric cv. BSR_2

Treatment Details	Number of mother rhizomes per plant	Number of primary fingers per plant	Number of secondary fingers per plant	Yield per plant (g)	Yield per hectare (tonnes)
T_1 - Borax @ 25kg ha^{-1} (SA)	4.73	14.28	7.21	335.55	29.43
T_2 - $MnSO_4$ @ 25kgha^{-1} (SA)	3.66	10.48	5.08	262.06	22.98
T_3 - $FeSO_4$ @ 25kg ha^{-1} (SA)	4.21	12.19	6.15	298.77	26.14
T_4 - $ZnSO_4$ @ 25kg ha^{-1} (SA)	4.39	12.83	6.51	310.86	27.25
T_5 - Borax @ 0.5 % (FA)	4.03	11.64	5.80	285.91	25.07
T_6 - $MnSO_4$ @ 0.5 % (FA)	3.57	10.27	4.87	255.99	22.73
T_7 - $FeSO_4$ @ 0.5 % (FA)	3.85	11.12	5.43	274.01	24.00
T_8 - $ZnSO_4$ @ 0.5 % (FA)	4.56	13.45	6.86	323.29	28.31
T_9 - Control (Without micronutrients)	3.38	9.31	4.52	244.23	21.45
S. Ed	0.07	0.22	0.11	5.35	0.41
CD(p=0.05)	0.16	0.46	0.23	11.35	0.87

SA- Soil application, FA- Foliar application @ two sprays at 60 and 90 days after planting.

Yield parameters like number of mother rhizomes (4.73) number of primary fingers per plant (14.28), number of secondary fingers per plant (7.21), yield per plant (335.55 g) and yield per hectare (29.43 t ha^{-1}) was observed with the soil application of boron (as borax) @ 25 kg ha^{-1}. This was followed by the treatment which received the foliar application of zinc ($ZnSO_4$) @ 25 kg ha^{-1} which recorded number of mother rhizomes (4.56) number of primary fingers per plant (13.45), number of secondary fingers per plant (6.86), yield per plant (323.29 g) and yield per hectare (28.31 t ha^{-1}). The least yield parameters were recorded in the control where no micro nutrients were applied. The substantial increase in the yield attributes of turmeric could be ascribed to the direct involvement of micronutrients in improving the photosynthetic activity, protein synthesis and reproduction[4]. Boron is essential for cell division and development transports carbohydrate in the plant which in turn improve the growth and yield parameters of turmeric[3]. Thiripurasundari *et al.*,[6] reported that application of boron as borax improves the DNA synthesis which in turn improved the yield parameters of turmeric.

Based on the present investigation entitled, Influence of different micronutrients on yield parameters of turmeric cv. BSR_2, it can be concluded that the soil application of boron (as borax) @ 25 kg ha^{-1} resulted in improving the yield parameters of turmeric.

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