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Influence of foliar nutrition on growth of French basil (*Ocimum basilicum* L.)

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ABSTRACT

The present investigation entitled "Influence of foliar nutrition on growth of French basil (*Ocimum basilicum* L.)" was carried out during 2022-2023 at Agricultural and Horticultural Research Station, Thirthahalli. The experiment was laid out in randomized complete block design (RCBD) with fourteen treatments and three replications. Results revealed that among different treatments, plants treated with treatment T_{14} (Urea @ 0.25 % + $MgSO_4$ @ 0.25 % + $ZnSO_4$ @ 0.25 % + Potassium Schoenite @ 0.25 %) recorded significantly higher plant height (79.89 cm), maximum number of primary(38.99) and secondary branches (107.05) per plant, plant spread (2932.25 cm^2), number of leaves per plant (518.41), leaf area (4076.73 cm^2/plant) and leaf area index (3.02). Hence, it is concluded that foliar application of treatment T_{14} at 60 DAT proved to be promising for enhancing the growth parameters in French basil.

Key words: *French basil, Magnesium, Zinc, Potassium schoenite and growth.*

Introduction

French basil (*Ocimum basilicum*) is an important essential oil crop with around 350 tonnes of essential oil being produced throughout the world annually, belonging to the family Lamiaceae. The volatile oil from herb of French basil mainly contains d-linalool and methyl chavicol as the major components, with the former up to 55% and the latter about 70%, depending on the sources. The herb is known for its potential use in the food, pharmaceutical, and cosmetic industries (Wei and Shibamoto, 2010).

Foliar application of nutrients shows better efficacy than soil application as the uptake and assimi-

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lation of nutrients by soil application takes more time. Thus, the advantages of foliar fertilizer application should be explored, such as high fertilizer use efficiency, better crop response and ease of application (Buck *et al.*, 2008). The present experiment was conducted to evaluate the influence of foliar nutrition on growth of French basil.

Materials and Methods

Studies were carried out at the Agricultural and Horticultural Research Station, Seebinakere Farm, Thirthahalli, under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Iruvakki, Shivamogga, Karnataka, during 2022-2023. The soil was prepared to fine tilth and small plots of 2.7 m × 1.8 m were prepared under open condition. Thirty days old, healthy and uniform sized seedlings were selected and transplanted at a spacing of 45 × 30 cm. The experiment was laid out in randomized complete block design (RCBD) with fourteen treatments and three replications. Treatments included T_1 - control, T_2 - Urea @ 0.25 %, T_3 - Urea @ 0.50 %, T_4 - Potassium schoenite @ 0.25 %, T_5 - Potassium schoenite @ 0.50 %, T_6 - $MgSO_4$ @ 0.25 %, T_7 - $MgSO_4$ @ 0.5 %, T_8 - $ZnSO_4$ @ 0.25 %, T_9 - $ZnSO_4$ @ 0.50 %, T_{10} - Urea @ 0.25 % + $MgSO_4$ @ 0.25 %, T_{11} - Urea @ 0.25 % + $ZnSO_4$ @ 0.25 %, T_{12} - Urea @ 0.25 % + Potassium schoenite @ 0.25 %, T_{13} - Potassium schoenite @ 0.25 % + $ZnSO_4$ @ 0.25 % and T_{14} - Urea @ 0.25 % + $MgSO_4$ @ 0.25 % + $ZnSO_4$ @ 0.25 % + Potassium schoenite @ 0.25 %. RDF-125:75:60 kg NPK per hectare + FYM 10 t/ha was common for all the treatments which was given during transplanting. Nitrogen was given in split doses. The foliar treatments were applied at 60 days after transplanting (DAT). Following observations were recorded and statistically analysed.

Results and Discussion

Plant height (cm)

The data pertaining to plant height at 90 DAT as influenced by the foliar nutrition are presented in the Table 1. The results revealed that the plant height of French basil at 90 DAT showed significant differences among the treatments where the maximum plant height (79.89 cm) was recorded in T_{14} and the minimum plant height (50.70 cm) was recorded in T_1. The increased plant height might be attributed to the to higher availability of nitrogen to the plant, as it is an important component of protoplasmmay have increased the production of phytohormones such as auxins, gibberellins and cytokinins resulted in increased plant height (Rathod *et al.,* 2022). The results are in conformity with Kumar *et al.* (2010) on *Mentha arvensis* L., Matter (2009) and Hadi and Ghale (2016) on chamomile plant, Aradhana *et. al.*(2014) in *Cymbopogan flexuosus* L., Alhasan *et al.* (2021) and Mehmood *et al.* (2021) in French basil.

Number of primary and secondary branches per plant

The data presented in Table 1 indicates that the number of primary and secondary branches per plant showed a significant differences among the treatments at 90 DAT where the maximum number of primary (38.99) and secondary branches (107.05) per plant were recorded in T_{14} and the minimum number of primary (22.14) and secondary branches (59.45) per plant were recorded in T_1. The above increase in number of primary and secondary branches can be attributed due to the role of micro and macro nutrients in enhancing metabolic processes, which in turn increases various plant metabolites responsible for cell division, resulting in the breaking of apical dominance and enhancing the development of lateral buds to growing branches. The results are in conformity with Said and Mahmoud (2021) and Rathod *et al.* (2022) on French basil, coriander and sweet fennel, Salman *et al*. (2019) on Chia and Tawfik (2022) on fennel.

Plant spread (cm^2)

The results presented in Table 1 indicates that the plant spread showed a significant differences among the treatments at 90 DAT where the maximum plant spread (2932.25 cm^2) was recorded in T_{14} and the minimum plant spread (1576.09 cm^2) was recorded in T_1. The enhanced plant spread might be the result of the vigorous nature of plant growth at this level due to availability of more nutrients, as indicated by the greater number of branches and leaves. The results are in line with works of Muniramappa *et al.* (1997) in kalmegh, Lokesh and Gangadharappa (2007) in makoi.

Number of leaves per plant and leaf area index (LAI)

The results represented in Table 1 indicates that the number of leaves per plant and LAI showed a sig-

Table 1. Influence of foliar nutrition on different growth parameters of French basil

Tr. No.	Treatment details	Plant height (cm) 90 DAT	Primary branches per plant 90 DAT	Secondary branches per plant 90 DAT	Plant spread (cm^2) 90 DAT	Number of leaves per plant 90 DAT	Leaf area index (LAI) 90 DAT
T_1	Control (water spray)	50.70	22.14	59.45	1576.09	323.08	1.72
T_2	Urea @ 0.25 %	67.50	31.67	85.26	2545.54	454.11	2.66
T_3	Urea @ 0.5 %	69.87	32.33	88.36	2608.10	464.45	2.72
T_4	Potassium schoenite @ 0.25 %	61.49	29.06	76.34	2210.00	400.42	2.33
T_5	Potassium schoenite @ 0.5 %	63.24	30.07	78.67	2312.05	442.72	2.72
T_6	$MgSO_4$ @ 0.25 %	56.68	25.77	66.05	1754.21	364.09	2.11
T_7	$MgSO_4$ @ 0.5 %	59.59	27.68	71.67	1973.07	381.31	2.21
T_8	$ZnSO_4$ @ 0.25 %	57.26	26.36	68.67	1841.92	374.46	2.19
T_9	$ZnSO_4$ @ 0.5 %	60.37	28.67	74.34	2017.42	392.26	2.27
T_{10}	Urea @ 0.25 % + $MgSO_4$ @ 0.25 %	71.04	33.66	91.34	2705.50	472.93	2.79
T_{11}	Urea @ 0.25 % + $ZnSO_4$ @ 0.25 %	73.41	35.03	95.34	2766.19	485.27	2.94
T_{12}	Urea (0.25 %) + Potassium schoenite (0.25 %)	76.76	37.66	102.67	2831.02	506.19	2.99
T_{13}	Potassium schoenite (0.25 %) + $ZnSO_4$ (0.25 %)	64.41	30.70	80.68	2448.19	435.82	2.55
T_{14}	Urea (0.25 %) + $MgSO_4$ (0.25 %) + $ZnSO_4$ (0.25%)+ Potassium schoenite (0.25 %)	79.89	38.99	107.05	2932.25	518.41	3.02
	S. Em ±	2.05	1.22	2.26	55.00	15.89	0.07
	C.D@ 5 %	5.95	3.56	6.58	159.88	46.20	0.22

nificant differences at 90 DAT where the maximum number of leaves per plant (518.41) and LAI (3.02) were recorded in T_{14} and minimum number of leaves per plant (254.90)and LAI (1.72) were recorded in T_1. Rathod *et al.* (2022) reported that the increase in leaf characteristics of French basil might be attributed to the nutrients delivered by foliar spraying reaching the cells more quickly through stomata in the leaves which helps to maintain the continuity and speed of delivery of nutrients for plant metabolic activities. The results confirm with Mehmood *et al.* (2021) in French basiland Chandwani *et al.* (2022) in mint.

Conclusion

On the basis of the results obtained in the present investigation it is concluded that, the foliar application of Urea @ 0.25 % + $MgSO_4$ @ 0.25 % + $ZnSO_4$ @ 0.25 % + Potassium schoenite @ 0.25% proved significant for improving the growth of French basil under field condition.

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Conflict of Interest: None

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