JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Integrated plant nutrient system on selected medicinal plant- Mint *(Mentha longifolia)*

J.P. Jinisha Blessie and S. J. Aruna

College of Agricultural Technology, Theni

Abstract

The effect of Integrated Plant Nutrient System experiment in mint was conducted in the academic block of College Of Agricultural Technology, Theni. Growth parameters such as height of the plant, number of leaves, number of branches, leaf area, root length and girth of stem were analyzed on 30th, 60th and 90th day. Treatment T8 shows better performing result. The integrated application of inorganic, biofertilizers and organic fertilizers produced significantly taller plants in Mint with the height of 30.8 cm and it was on par with organic + inorganic 28.1 cm and organic + biofertilizer 24.3 cm. Shortest plants were observed in control plot of 16.2 cm. Statistical analysis - Completely Randomized Block Design (CRD) was followed with 3 replication and 8 treatment.

Keywords- Mint, growth parameters, Completely Randomized Block Design

Introduction

Medicinal plants have been a resource for healing in local communities around the world for thousands of years. Still it remains of contemporary importance as a primary healthcare mode for approximately 85% of the world's population (Pešić, 2015), and as a resource for drug discovery, with 80% of all synthetic drugs deriving from them (Bauer and Brönstrup, 2014). Concurrently, the last few hundred years has seen a prolific rise in the introduction, development, and advancement of herbal substances analysis. Indian system of medicine (ISM) uses 25 thousand species belonging to more than 1000 genera. About 25% species are used by the industries. Chemical screening of plants for their medicinal effects in various chemical and clinical trials is featured (Farnsworth, 1966) as did their use in derivatized forms for the treatment of nerve inflammation (Jancso et al., 1967) and in human metabolism studies (Pletscher, 1968). Mint leaves also known as Pudina are a popular aromatic herb for its freshness with several health benefits. Since ancient times, people have been used different types of mints all over the world. A variety of mint plants offer a lot of anti-oxidant properties and health benefits. Mint leaves are packed with antioxidants and phytonutrients, and

contains vitamin A, vitamin C, and B-complex, phosphorous, calcium, and has anti-bacterial properties. It is one of the rich sources of iron, potassium, and manganese which improves haemoglobin levels and promotes brain function. Mint leaves are low in calories and contain a minimal amount of protein and fat so you can add mint leaves in your weight loss diet program easily.

Materials and methods

The field experiment was conducted at the Nursery, College Of Agricultural Technology, Theni. Geographically, it is located in 11^0 05' N latitude and 77^0 5' E longitude. Mint seedlings were obtained from Horticultural College and Research Institute, Periyakulam. The data generated from various experiments were subjected to statistical analysis in a Completely Randomized Block Design (CRD). The critical difference was worked for 0.005 per cent probability and the results were interpreted. The statistical analysis was carried out with AGRES software package and MS Excel worksheet.

Fertilizers used and its properties

S. No	Fertilizers	Properties
1	Organic	
	1.1 FYM	0.5%N, 0.2%P, 0.5% K
	1.2 Vermicompost	1.5% N, 0.3% P, 0.5% k
2	Inorganic	
	2.1 Urea	Contains 46% N
	2.2 DAP	Contains 16% P
	2.3 MOP	Contains 60% K
3	Biofertilizer	
	3.1 *Azotobacter*	Free living nitrogen fixing bacteria
	3.2 *Phosphobacteria*	Solubilize the phosphorus
	3.3 VAM	It transforms the nutrients from the soil

Treatment Details

Treatments	Fertilizers	Composition
T1	Control	None
T2	Organic Manure	Farm yard manure, Vermicompost
T3	Inorganic Manure	Urea, SSP, MOP
T4	Biofertilizer	Azospirillum, Azotobacter, VAM
T5	Organic + Inorganic	FYM , Vermicompost +Urea, SSP, MOP
T6	Inorganic + Biofertilizer	Urea, SSP, MOP + Azospirillum, Azotobacter, VAM
T7	Organic + Biofertilizer	FYM, Vermicompost + Azospirillum, Azotobacter, VAM
T8	Organic + Inorganic + Biofertilizer	FYM, Vermicompost + Urea, SSP, MOP + Azospirillum, Azotobacter, VAM

Results and Discussion

Application of different fertilizers significantly influenced the growth characters such as Plant height, number of branches, Number of Leaves, Girth of the stem, Root length and leaf area.

(Table- 1) Effect of various treatments on Plant height and No. of branches on Mint

		Plant height (cm)			No. of branches		
Sl.No	Treatments	30th day	60th day	90th day	30th day	60th day	90th day
1	T1	9.2	13.2	16.2	1	1	2
2	T2	11.2	16.5	20.5	1	2	4
3	T3	12.3	18.2	22.1	1	3	5
4	T4	10.8	15.1	18.5	1	2	3
5	T5	14.8	23.1	28.1	2	6	8
6	T6	14.1	20.2	24.3	2	5	7
7	T7	13.5	19.7	23.7	1	4	6
8	T8	15.3	26.3	30.8	3	7	12

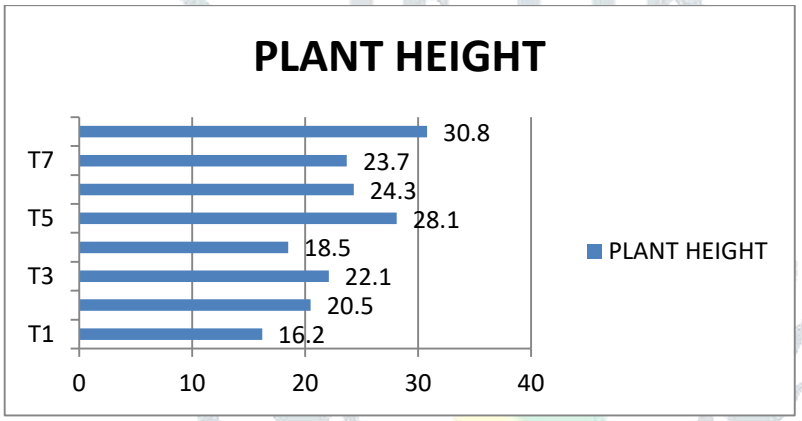

Table-1 shows that the integrated application of inorganic, biofertilizers and organic fertilizers produced significantly taller plants in Mint with the height of 30.8 cm and it was on par with organic + inorganic 28.1 cm and organic + biofertilizer 24.3 cm. Shortest plants were observed in control plot of 16.2 cm. It also influenced the number of branches per plant

(Table- 2) Effect of various treatments on No. of leaves and Leaf area on Mint

		No. of leaves			Leaf area (cm)		
Sl. No	Treatments	30th day	60th day	90th day	30th day	60th day	90th day
1	T1	5	11	15	3.7	4.7	5.5
2	T2	6	18	28	5.1	6.3	7.1
3	T3	7	20	30	5.4	6.9	7.7
4	T4	5	20	22	4.2	5.0	6.0
5	T5	12	27	37	8.2	9.7	11.2
6	T6	10	24	33	7.6	8.3	10.1
7	T7	9	22	30	6.7	8.0	9.2
8	T8	15	30	42	9	10.5	12.6
SE(d)				1.16			1.75
CD (0.05)				2.48**			3.75**

Table -2 depicted that number of leaves was also found to be highest in case of integrated nutrient system as 30 in Mint. Leaf area was found to be highest as 12.6cm.

(Table- 3) Effect of various treatments on Root length and Girth of stem on Mint

		Root length (cm)			Girth of stem (cm)		
Sl. No	Treatments	30th day	60th day	90th day	30th day	60th day	90th day
1	T1	6.8	9.5	13.2	0.007	0.0257	0.050
2	T2	8.7	11.7	14.5	0.007	0.0267	0.057
3	T3	9.2	12.8	16.2	0.03	0.028	0.060
4	T4	7.5	10.0	13.9	0.001	0.251	0.053
5	T5	11.6	16.1	20.2	0.17	0.40	0.68
6	T6	10.3	14.2	18.3	0.11	0.36	0.63
7	T7	9.8	13.1	17.5	0.08	0.33	0.61
8	T8	12.6	18.2	24.6	0.23	0.48	0.70

Table- 3 presents that the root length as 12.6 cm highest in Mint. The girth of the stem was highest as 0.70 cm. The results are significant by having the best performing treatments in (T8 – Combined use of Organic, Inorganic and Biofertilizer) has the best treatments and (T1 – control) the poorest performing treatments.

Reason behind the growth of plants is the first application of biofertilizers which increased the microbial population and enhances the uptake of nutrients in organic fertilizers, the third application of inorganic fertilizer which boost up the plants to grow well and proliferate into many branches.

Conclusion

The increase of Nitrogen in the root zone and the synergistic effect of these microorganisms on the physiological and metabolic activities of the plant and also the application of organic manures and inorganic fertilizers lead to have good growth in root length, girth of the stem, plant height and number of branches.

Acknowledgement

We are grateful to Dr. S. J. Aruna, Associate Professor (Microbiology) HOD for the great help throughout the entire study

References

(1) Bauer, A., Brönstrup, M. (2014). Industrial natural product chemistry for drug discovery and development. *Natural Prod. Rep.* 31 (1), 35–60. doi: 10.1039/C3NP70058E

(2) Farnsworth, N. R. (1966). Biological and phytochemical screening of plants. *J. Pharmaceut. Sci.* 55 (3), 225–276. doi: 10.1002/jps.2600550302

(3) Jancso, N., Jancsó-Gábor, A., Szolcsanyi, J. (1967). Direct evidence for neurogenic inflammation and its prevention by denervation and by pretreatment with capsaicin. *Br. J. Pharmacol. Chemother.* 31 (1), 138–151. doi: 10.1111/j.1476-5381.1967.tb01984.

(4) Pešić, M. (2015). Development of natural product drugs in a sustainable manner. Brief for United Nations Global Sustainable Development Report 2015.

(5) Pletscher, A. (1968). Metabolism, transfer and storage of 5-hydroxytryptamine in blood platelets. *Br. J. Pharmacol. Chemother.* 32 (1), 1–16. doi: 10.1111/j.1476-5381.1968.tb00423.x