

Effect of microalgae and vermicompost on growth parameters on strawberry crop

Abstract

A Randomized Block Design (RBD) field experiment was conducted in Central Research Farm (CRF) at Department of Plant Pathology, SHUATS, Prayagraj, U.P. during the Rabi season of 2019-2020 in pots. Effect of microalgae and vermicompost on growth parameters on strawberry crop different dose of microalgae and vermicompost on number of leaves and height per plant of strawberry at 30, 60 and 90 DAT under field condition.

The maximum number of leaves (per plant) was recorded T₉ @ Microalgae 8g + vermicompost (16, 18 and 23.50 per plant, respectively) at 30, 60 and 90 DAT, respectively. The same treatment recorded maximum plant height (cm) (14.80, 23.03 and 28.58 cm, respectively) at 30, 60 and 90 DAT, respectively. shows significant increment in the number of leaves per plant, at different intervals and all the other treatments were non-significant among each other. And all the treatments showed significant result in comparison to control treatment.

Key words: *Alternaria Spp.*, Microalgae, Vermicompost, Plant Height and Leaves

Introduction

Strawberry is very susceptible to a number of fungal diseases, which make the defense management practices fundamental to prevent severe economic losses. Fungal pathogens can attack the crop in all cultivation systems and can cause strawberry fruit decay in post-harvest. Among soil-borne fungi that can infect the plant in soil cultivation, *Sclerotinia sclerotiorum*, *Rhizoctonia solani*, *Phytophthora spp.*, *Pythium spp.*, *Fusarium oxysporum*, *Verticillium dahliae*, and *Macrophomina phaseolina* are the most important. They affect the root system, hindering the nutrient and water absorption from soil. These pathogens cause severe symptoms such as yellowing, wilting, damping-off, root rot, and collar rot and, in conventional cultivation systems, they are controlled by synthetic compound applications. Among foliar pathogens, *Podosphaera aphanis* is responsible for

powdery mildew, a severe disease that causes important economic losses requiring several fungicidal treatments (**Romero et al. 2007**).

Materials and methods

Nine treatments were applied to the plots namely vermicompost (T₁), Microalgae @ 1g/pot + vermicompost (T₂), Microalgae @ 2g/pot + Vermicompost (T₃), Microalgae @ 3g/pot + Vermicompost (T₄), Microalgae @ 4g/pot + Vermicompost (T₅), Microalgae @ 5g/pot + Vermicompost (T₆), Microalgae @ 6g/pot + Vermicompost (T₇), Microalgae @ 7g/pot + Vermicompost (T₈), Microalgae @ 8g/pot + Vermicompost (T₉). T₀ was kept as untreated control.

Methods

Pot filling:

The soil for pot experiments was collected from the university field and brought to the Bio-net. The pots of 15 cm diameter were filled with 250cc of soil and vermicompost used for various experiments.

Application of vermicompost:

4kg vermicompost was applied in my total 40 pots at the @ of 100g per pot, vermicompost was mix with the soil present in the pot manually and then the pot was ready for transplant.



Fig 1 Transplanted plants

Application of microalgae:

Microalgae was applied after 15 days of transplanting on the rhizosphere plants according to the Treatment given in concentration of 1g per pot to 8g per pot, second application of micro algae was done at 30 days after transplanting.



Fig 2 Application of micro algae

Results

Different dose of microalgae and vermicompost on number of leaves per plant of strawberry at 30, 60 and 90 DAT under field condition.

The results presented among all the treatments T₉ shows significant increment in the number of leaves per plant, at different intervals and all the other treatments were non-significant among each other. And all the treatments showed significant result in comparison to control treatment.

Table 1: Effect of micro algae and vermicompost on number of leaves per plant of strawberry at different days of intervals.

Treatments	30 DAT	60 DAT	90 DAT
T ₀	12.25	17.00	18.00
T ₁	15.25	21.00	20.75
T ₂	14.25	18.00	18.50
T ₃	14.50	18.50	20.50
T ₄	15.25	17.75	18.75
T ₅	13.75	18.25	21.00
T ₆	15.75	19.00	21.50
T ₇	14.75	17.75	19.25
T ₈	14.50	15.50	20.75
T ₉	16.00	18.00	23.50
F-test	S	S	S
C.D. at 0.5%	1.088	3.285	3.776
S.Ed. (+)	0.530	1.601	1.840

The data presented in table **different dose of microalgae and vermicompost on height of per plant of strawberry** at 30, 60 and 90 DAT under Bio-net condition.

The results presented in indicates that among all the treatments T₉ shows significant increment in the number of leaves per plant, at different intervals and all the treatment were non- significant among each other but significant with control treatment.

This result is in agreement with **Edra et al., (2011)** who found that the brown-alga *Lessonia trabeculata* inhibited bacterial growth and reduced both the number and size of the necrotic lesions in tomato leaves following infection with *Botrytis cinerea*. Marine algae represent a great source of a vast variety of complex natural products and could be a promising source of a novel bioactive compound that can help plant survival by offering protection against stress imposed by pathogens. Aqueous and ethanolic extracts from the red-alga *Gracillaria chilensis* prevent the growth of *Phytophthora cinnamomi*.

Wafaa et al., (2014) also reported that seeds and foliar application of Blue-green Cyanobacteria *Oscillatoria agardhii* showed significant effective net blotch, powdery mildew, rust and spot blotch management. Blue-green Algae applied treatments increased antioxidant enzymes as catalase (CAT), peroxidase (POD) and superoxide dismutase (SOD), as well as grain yield, kernel weight in most cases and improved

barley yield quality parameters and grain protein. **Burjus et al., (2014)** also observed that biomass obtained from cultivation of *N.commune*, *Anabaena circinalis* in bioreactor to inoculated mature compost was the best way of cultivation of nitrogen fixing cyanobacteria with low cost. The application of cyanobacteria in growth and yield of chickpea plant reduces the need of chemical fertilizers about 30 %-50 % and subsequently reduces environmental pollution compared with other mineral chemical fertilizers.

Table 2 Effect of microalgae and vermicompost on plant height (cm) of strawberry at different days of intervals.

Treatment S	30 DAT	60 DAT	90 DAT
T ₀	10.43	18.48	23.18
T ₁	11.23	18.83	23.73
T ₂	11.75	19.00	23.55
T ₃	12.00	18.83	23.85
T ₄	12.35	20.03	25.05
T ₅	12.90	19.73	25.30
T ₆	12.15	19.95	25.98
T ₇	13.48	22.15	27.20
T ₈	14.13	22.23	26.43
T ₉	14.80	23.03	28.58
F-test	S	S	S
C.D. at 0.5%	1.279	1.428	1.437
S.Ed. (+)	0.623	0.696	0.700

Conclusion

A trial was conducted to check the effect of micro algae and vermicompost on **leaf spot (*Alternaria sp.*) disease of strawberry**. The experiment was analysed by using RBD (randomized block design) with 4 replication, 9 treatments along with the control. Observations recorded were disease intensity at 30, 60 and 90 (days after transplanting), plant growth parameters such as plant height at 30,60 and 90 DAT. Among all the treatments T₉ (Microalgae 8g + vermicompost) shows significant increment in the number of leaves, Plant height at different intervals and all the other treatments were non-significant among each other. And all the treatments showed significant result in

comparison to control treatment. And treatment T₉ shows least percent disease infestation.

References

Burjus, Sanaa j., Jawad, Abdul latif M. and Al-Ani, Nabeel K. (2014). Effect of Two Species of Cyanobacteria as Biofertilizers on Characteristics and Yield of Chickpea Plant. *Iraqi Journal of Science*, Vol 55, No.2B, pp:685-696

Edra J, Dorta F, Medina C, Ramírez A, Ramírez I and Peña-Cortés H (2011). Anti-Phytopathogenic Activities of Macro-Algae Extracts *Mar Drugs* 9: 739-756.

M. Haggag, Wafaa, M.M., Hussein Mekhail, E. El-Habbash. 2014, Res. J. Pharmaceutical, Biolo.and Chem. Sci.,3 (11)1530.

Romero,A. J., and Carvajal,S. C.,(2007) Adolescent Bicultural Stress And Its Impact On Mental Well-Being Among Latinos, Asian Americans, And European Americans. *Journal of Community Psychology*, Vol. 35, No. 4, 519–534.