



A Study on Ground Nut Growth Parameters Due to Vermicompost Treatment

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ABSTRACT

Compositing has been recognized as a low cost and environmentally sound process for treatment of many organic waste. Vermicompost is the type of compositing that was studied on the growth parameters of Ground Nut plant [*Arachis hypogaea*.L]. Vermicomposts are the products delivered from the accelerated bio degradation of the organic waste by earth worm and microorganisms. Vermicompost chemical composition contains especially nitrates, exchangeable phosphorous, soluble potassium, calcium and magnesium than that of growth media. The study was mainly aimed on the plant growth on the seedlings that was grown in difference composition of the vermicompost such as [10%-100%].

Keywords: *Arachis hypogaea*; Vermicompost; Growth; Nutrition

INTRODUCTION

Large quantity of organic wastes produced entire world creating a serious disposable issues and environment pollution. On the other hand the use of synthetic fertilizers is causes the huge impact on the environment and the cost of these fertilizers is increasing over the years. Now it is a well-established fact that the organic fertilizers provide a enough requirements for a proper growth of the crop and enhance the consumption of nutrients increase the assimilation capacity and will stimulate the hormonal activity as well [1-4]. Earthworms and Microorganisms are important organisms helping to the environment to maintain the nutrient flow from one system to another and also minimize the environmental degradation. The huge decomposition are increasing the temperatures during composting procedure a relatively homogenous, Odourless, pathogen free and handling the product is essay. Vermicomposting is a simple biotechnological process of composting, in which certain species of Earth worms are used to enhance the process of waste conversion and produce a better end product [5-9]. It is nutritionally rich natural organic fertilizer which releases nutrients relatively slowly in the soil and improve the quality of the plants along with physical and biological properties of soil. This increases the usefulness of introducing low cost organic farming techniques as a viable alternative to high cost conventional chemical farming [10-15]. One of the main questions raised with regard to organic farming practices includes the ability of organic methods to meet the nutrient requirements of the crops while increasing yield at low-cost.

MATERIALS AND METHODS

Experimental Description

A culture experiment was conducted in the laboratory using the vermicompost and vermicompost enriched with biofertilizers red soil was collected from the agricultural lands sieved and weighed in the black plastic bags with 20 cm in diameter and 20 cm in depth. The experimental was conducted in a complete randomized block design with 10 treatments and 1 control as follows:

BAG 1: 10% vermicompost + 90% red soil (SAMPLE 1)
BAG 2: 20% vermicompost + 80% red soil (SAMPLE 2)
BAG3: 30% vermicompost + 70% red soil (SAMPLE 3)
BAG4: 40% vermicompost + 60% red soil (SAMPLE 4)
BAG5: 50% vermicompost + 50% red soil (SAMPLE 5)
BAG6: 60% vermicompost + 40% red soil (SAMPLE 6)
BAG7: 70% vermicompost + 30% red soil (SAMPLE 7)
BAG8: 80% vermicompost + 20%red soil (SAMPLE 8)
BAG9: 90% vermicompost + 10% red soil (SAMPLE 9)
BAG10: 100% vermicompost (SAMPLE 10)
BAG11: 100% red soil (control).



Figure 1: Vermicompost



Figure 2: *Arachis hypogaea*

The ground nut growth parameters such as shoot length (SL), root length (RL), total length (TL), fresh weight of shoot (Fwt S), fresh weight of root (Fwt R), dry weight of shoot (Dwt S), dry weight of root (Dwt R), Total dry weight (Dwt TP), number of nodules (RN), number of pods per plant (PP), leaf area index (LAI), were analysed.

Leaf Area Index

Leaf area index (LAI) is the ratio of leaf area per plant to the land area occupied by the plant and calculated by using the formula as:

$$LAI = \frac{\text{leaf area per plant}}{\text{land area occupied by a plant}}$$

Fresh Weight

The seedlings were separated into root and shoot. They were rolled in a blotting paper to remove water after that each seedling's fresh weight were taken using single pan balance.

Dry Weight

The seedlings were kept in hot air oven at 80 °C for 24 hours. Then their dry weight was weighed and recorded with the help of an electronic single pan balance.

Germination Percentage

The germination percentage calculated by using the formula,

$$GI = \frac{\text{number of seeds germinated}}{\text{total number of seeds sown}} \times 100$$

Vigour Index

The vigour index was calculated by using the formula proposed by Abdul- Baki and Anderson.

VI=germination percentage × length of the seedlings.

RESULTS AND CONCLUSION

The shoot length and root length shows difference with the vermicompost compositions and proportional to the vermicompost concentrations. The vigour index increases with increase of the vermicompost composition as the germination yield shows steady increase with the same ratio [16-19]. The leaf area index (LAI) shows linear variations that it increases with the increase of the vermicompost composition (Figures 1-3 and Tables 1-3).



Figure 3: Root, shoot and total length percentage of sample

Table 1: Root, shoot and total length of sample

Number of sample	Shoot Length (SL)	Root Length (RL)	Total Length (TL)
Sample 1	5	2	7
Sample 2	7.7	4.9	12.6
Sample 3	9.7	5.9	15.6
Sample 4	10	6	16
Sample 5	15.5	6	21.5
Sample 6	16	6.2	22.2
Sample 7	17	6.7	23.7
Sample 8	21	7	27
Sample 9	22.9	7.1	30
Sample 10	24	8.5	32.5

Table 2: Germination percentage and Vigour Index of sample

Number of sample	Germination percentage (G %)	Vigour Index (VI)
Sample 1	33.3	233.1
Sample 2	33.3	419.58
Sample 3	66.67	1040.52
Sample 4	83.3	1332.8
Sample 5	83.3	1790.95
Sample 6	83.3	1849.26
Sample 7	100	2370
Sample 8	100	2700
Sample 9	100	3000
Sample 10	100	3250

Table 3: Leaf area index of sample

Number of sample	Leaf Area Index(LAI)
Sample 1	2
Sample 2	2.33
Sample 3	3
Sample 4	3
Sample 5	4.6
Sample 6	5.67
Sample 7	6.3
Sample 8	7.67
Sample 9	7.33
Sample 10	8.67

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