RESULTS

Physical Parameters of Different Composts:

pH:

Table 1 shows that the pH values are similar in all the composts, (6.5 - 7.0) however, vermicompost showed highest pH (7).

Changes in Available Nutrients of Different Composts:

Carbon Per cent:

Highest carbon per cent was recorded in vermicompost, whereas, phosphocompost and greencompost showed least carbon per cent (0.06 and 0.08 respectively). (Table 1) (Figure-1).

Nitrogen Per cent:

Highest nitrogen per cent was recorded in vermicompost (0.87) and the least was observed in greencompost (0.12).

C/N Ratio:

Optimum C/N ratio was recorded in vermicompost, whereas, greencompost showed less C/N ratio.

Phosphorus:

Highest phosphorus content was observed in vermicompost among three different compost (Table-1).
Potassium:

Vermicompost showed highest potassium content (0.17 per cent) among all three different composts (Table-1).

Greencompost:

Amaranthus cruentus L.

Influence of Greencompost Enriched with Bioinoculants on Growth Parameters of Amaranthus cruentus L:

Greencompost enriched with different bioinoculants (Trichoderma viride alone) had a positive effect on shoot root ratio in T₂ plants. Among the different treatments T₄ (Pseudomonas fluorescens + Greencompost) produced the highest root length (Table-2) on both the duration (Plate-8).

Helianthus annuus L.

Influence of Greencompost Enriched with Bioinoculants on Growth Parameters of Helianthus annuus L:

The data presented in Table-3 indicated that the plants height(166.5 cm), flower diameter (14.3 cm) and flower disc (346 g) were recorded maximum in T₄ (Pseudomonas fluorescens + Greencompost). Other treatments did not show much variations. However, the flower diameter (16.3 cm) significantly increased due to applications of Frateuria aurentia (T₁) (Plate-9).
**Rumex acetosella L.**

**Influence of Greencompost Enriched with Bioinoculants on Growth Parameters of Rumex acetosella L:**

The data in respect on growth parameters as influenced by various treatments are presented in Table-4. Significantly maximum growth was recorded in T₁. Maximum root length (22.2 cm) and shoot length (43.1 cm) was recorded in T₁ (*Frateruria aurentia*) treated plants than control and other treatments (Plate-11) (Figure-2).

**Trigonella foenum-graceum L.**

**Influence of Greencompost Enriched with Bioinoculants on Growth Parameters of Trigonella foenum-graceum:**

Among the different treatments T₄ (*Pseudomonas fluorescens* + Greencompost) inoculation showed significant increase in root length and shoot length during different durations i.e. 15 and 30 days. There was increased number of effective root nodules in plants treated with greencompost + *Rhizobium* (Table-5) (Plate-12).
PhosphoCompost:

RockPhosphate-Greencompost:

*Amaranthus cruentus* L.

**Influence of PhosphoCompost (RockPhosphate-Greencompost) Enriched with Bioinoculants on Growth Parameters of *Amaranthus cruentus* L:**

Incorporation of greencompost and rock phosphate in combination with phosphate solubilizer (T$_7$) resulted in significant increase in the initial stages of plant growth (15 days) (Table-6).

*Rumex acetosella* L.

**Influence of Phosphocompost (RockPhosphate-Greencompost) Enriched with Bioinoculants on Growth Parameters of *Rumex acetosella* L:**

Among the different treatments T$_6$ i.e. rock phosphate with greencompost showed significant increase in growth parameters in both 15 and 45 day old plants than other inoculations (Table-7)
Trigonella foenum-graceum L.

Influence of Phosphocompost (RockPhosphate-Greencompost) Enriched with Bioinoculants on Growth Parameters of Trigonella foenum-graceum L:

Application of rock phosphate along with greencompost, recorded the highest values with regard to number of nodules and growth parameters (Table-8).

RockPhosphate-Vermicompost:

Amaranthus cruentus L.

Influence of Phosphocompost (RockPhosphate-Vermicompost) Enriched with Bioinoculants on Growth Parameters of Amaranthus cruentus L:

Among different treatments combined inoculation with (Rock Phosphate, Phosphate solubilizer (Aspergillus awamori) and Vermicompost) showed significant increase in vegetative growth and yield than other treatments and control plants (Table-9) (plate-13).
**Rumex acetosella L.**

**Influence of Phosphocompost (Rock Phosphate-Vermicompost) Enriched with Bioinoculants on Growth Parameters of **Rumex acetosella L:**

The data on growth and yield of Rumex are presented in Table-10. Highest values were recorded with the application of Rock Phosphate + Phosphate solubilizer + *Frateuria aurentia* + *Trichoderma viride* + *Azospirillum brasilense* + *Pseudomonas fluorescens* + Vermicompost (T₃) during the initial stages of plant growth, whereas, T₂ (Rock Phosphate + Phosphate solubilizer + Vermicompost) showed maximum growth and yield at 45 day old plants. However, it remains statistically at par with application of other treatments (Plate-16).

**Trigonella foenum-graceum L.**

**Influence of Phosphocompost (Rock Phosphate-Vermicompost) Enriched with Bioinoculants on Growth Parameters of Trigonella foenum-graceum L:**

Rock Phosphate incorporation along with combined inoculation with bioinoculants viz., namely Phosphate solubilizer + *Frateuria aurentia* + *Trichoderma viride* showed the highest dry matter production in 30 day old plants than other treatments and control (Table-11).
**VermiCompost:**

*Amaranthus cruentus* L.

**Influence of Vermicompost Enriched with Bioinoculants on Growth Parameters of *Amaranthus cruentus* L:**

The data presented in Table-12, the growth parameters of *Amaranthus* recorded increase in number of leaves and fresh weight and there was significant variations due to different treatments in both the duration T₁ and T₃ (*Frateria aurentia* and *Azospirillum brasilence*) (Plate-14).

*Helianthus annuus* L.

**Influence of Vermicompost Enriched with Bioinoculants on Growth Parameters of *Helianthus annuus* L:**

Among the treatments as represented in Table-13, incorporation of vermicompost with *Azospirillum brasilence* recorded higher yield in T₃ followed by T₄. Highest dry weight of seeds were noticed in T₄ (Plate- 10 &15).

*Rumex acetosella* L.

**Influence of Vermicompost Enriched with Bioinoculants on Growth Parameters of *Rumex acetosella* L:**

Root length, shoot length, number of leaves, fresh weight and dry weight of *Rumex* was recorded maximum in T₁, inoculated
with vermicompost + *Frateuria aurentia* (T₁) than other treatments and control plants (Table-14) (Plate-17).

**Trigonella foenum-graceum** \(L\).  

**Influence of Vermicompost Enriched with Bioinoculants on Growth Parameters of Trigonella foenum-graceum \(L\):**

The data in respect of growth parameters of *Trigonella*, observations on growth parameters as influenced by various treatments are presented in Table-15. Significantly maximum root length and shoot length was recorded in T₃ followed by T₂. The maximum number of nodules (25) of *Trigonella* was recorded in T₃ (Vermicompost + *Rhizobium*) (Plate-18).

**Greencompost and VermiCompost:**

**Amaranthus cruentus** \(L\).  

**Influence of Microbial Enriched Greencompost and Vermicompost on Chemical Characteristics of Amaranthus cruentus \(L\):**

Highest total uptake of nutrients (Calcium, Magnesium and Phosphorus) of *Amaranthus* crop was observed in T₃ followed by T₂ over control in both vermicompost and greencompost (Table-16).
**Helianthus annuus L.**

**Influence of Microbial Enriched Greencompost and Vermicompost on Chemical Characteristics of Helianthus annuus L:**

The results of nutrient uptake are indicated in Table-17 showed highest uptake in greencompost with combined inoculation of Greencompost + *Frateuria aurentia* + *Trichoderma viride* + *Azospirillum brasilence* + *Pseudomonas fluorescens* (T₃) in 90 day old plants followed by T₁ (*Frateuria aurentia* + Vermicompost) vermicompost inoculated with *Frateuria aurentia*.

**Rumex acetosella L.**

**Influence of Microbial Enriched Greencompost and Vermicompost on Chemical Characteristics of Rumex acetosella L:**

Vermicompost application to *Rumex* showed significant increase in Calcium and Magnesium content in T₂ (*Trichoderma viride* + Vermicompost) than other treatments and control (Table-18). Higher amount of Calcium, Magnesium and Phosphorus was noticed in 45 day old *Rumex* plant incorporated with greencompost.
Trigonella foenum-graceum L.

Influence of Microbial Enriched Greencompost and Vermicompost on Chemical Characteristics of Trigonella foenum-graceum L:

Incorporation of vermicompost with bioinoculants (T₃ i.e. Vermicompost + Rhizobium) appreciably increased the Calcium, Magnesium and Phosphorus content than other treatments and control. Whereas, incorporation of greencompost (Table-19) showed significant increase in Calcium and Phosphorus content in T₃ inoculated with Rhizobium in 30 day old plants.

RockPhosphate-GreenCompost:

Influence of Microbial Enriched Phosphocompost (RockPhosphate-Greencompost) on Chemical Characteristics of Amaranthus cruentus L., Rumex acetosella L. and Trigonella foenum-graceum L.:

Significant enhancement in total uptake of Calcium, Magnesium and Phosphorus was observed in T₇ of Amaranthus (Table-20). Combined inoculation of phosphocompost and greencompost along with bioinoculants (T₆) showed significantly higher Calcium and Magnesium content of Rumex plants in comparison to rest of the treatments.
**Rock Phosphate-VermiCompost:**

**Influence of Microbial Enriched Phosphocompost (Rock Phosphate-Vermicompost) on Chemical Characteristics of Amaranthus cruentus L., Rumex acetosella L. and Trigonella foenum-graecum L.:**

Calcium, Magnesium and Phosphorus content were significantly increased in T₂ (Amaranthus and Rumex) treated plants followed by Trigonella in T₃ inoculation than single inoculation and control plants (Table-21).

**Vermicompost, Greencompost and Phosphocompost:**

**Influence of Microbial Enriched Composts (Vermicompost, Greencompost and Phosphocompost) on Potassium (K) and Nitrogen (N) Content of Test Plants Amaranthus, Helianthus, Rumex and Trigonella:**

Single as well as combined inoculation of Vermicompost, Greencompost and Phosphocompost resulted in significant increase in Potassium and Nitrogen content in Helianthus and Amaranthus, whereas lower values were obtained with other treatments. (Figure-4).

The highest net results was obtained in Amaranthus plants treated with phosphocompost than other treatments. The data in respect to Nitrogen content (Table-22) was significantly recorded in Helianthus and Rumex as influenced by vermicompost.
Vermicompost and Greencompost:

Influence of Microbial Enriched Composts (Vermicompost and Greencompost) on Mycorrhizal Distribution of Test Plants Amaranthus, Helianthus, Rumex and Trigonella:

The data in the Table-23 shows the influence of microbial enriched vermicompost and greencompost on mycorrhizal distribution (only vesicles) reveals that only in T₂ and T₄ treatments the highest number of vesicles were recorded more. Whereas, in case of greencompost T₂ showed significant increase in vesicles in all the three test crops Helianthus, Rumex and Trigonella, except Amaranthus.

Maximum number of vesicles were observed in vermicompost treated Helianthus plants. However, the other plants did not show any appreciable increase in the number of vesicles (Table-23).

RockPhosphate-GreenCompost:

Influence of Microbial Enriched Compost Phosphocompost (RockPhosphate-Greencompost) Mycorrhizal Distribution of Test Plants Amaranthus cruentus L., Rumex acetosella L. and Trigonella foenum-graceum L.:

Bioinoculants combined with Rock Phosphate and Greencompost (T₇) in Amaranthus showed significant increase in
mycorrhizal vesicles. Whereas, other treatments showed lowest vesicles.

In case of Rumex, the combined inoculation of Rock Phosphate and Greencompost along with microbial inoculants T₅ showed higher mycorrhizal vesicles (Table-24).

**RockPhosphate-Vermicompost:**

**Influence of Microbial Enriched Compost Phosphocompost (RockPhosphate-Vermicompost) Mycorrhizal Distribution of Test Plants Amaranthus cruentus L., Rumex acetosella L. and Trigonella foenum-graceum L. :**

The microbial enriched Rock Phosphate and Vermicompost and the mycorrhizal vesicles present in different crops have been represented in Table-25. Considerably there was increase in the distribution of number of vesicles in Amaranthus, Rumex and Trigonella in T₁ and T₃ (Table-25).

**Greencompost:**

**Influence of Microbial Enriched Greencompost on Phytochemical Parameters of Test Plants Amaranthus, Helianthus, Rumex and Trigonella:**

The data on the antioxidant content of different crops treated with greencompost are presented in Tables-26,27,28,and 29.
There was significant increase in total antioxidant content by the application of *Frateuria aurentia* and greencompost combined with (T₁), there was significantly higher antioxidant contents compared to the rest of the treatments. (Figure -5)

**RockPhosphate-Greencompost:**

Influence of Microbial Enriched Phosphocompost (RockPhosphate-Greencompost) on Phytochemical Parameters of Test Plants *Amaranthus, Rumex* and *Trigonella*:

Application of Rock Phosphate and greencompost along with bioinoculants (T₆ and T₈) improved the antioxidant contents of Amaranthus, Rumex and Trigonella (Tables-30,31 and 32).

**RockPhosphate- Vermicompost:**

Influence of Microbial Enriched Phosphocompost (RockPhosphate- Vermicompost) on Phytochemical Parameters of Test Plants *Amaranthus, Rumex* and *Trigonella*:

Higher values were noticed in treatments with Rock Phosphate and vermicompost incorporation along with bioinoculants T₃ and T₄ (Table-33).

Rock Phosphate and vermicompost inoculated with T₂ and T₄ had a positive effect and significant increase in antioxidant content of *Rumex* (Table -34), *Trigonella* (Table-35). Among the
different treatments $T_2$ produced the highest amount of antioxidants in both *Rumex* and *Trigonella* ($T_2$).

**Vermicompost:**

**Influence of Microbial Enriched Vermicompost on Phytochemical Parameters of Test Plants *Amaranthus, Helianthus, Rumex* and *Trigonella:*

Chlorophyll, Xanthophyll and Vitamin content was significantly higher with the inoculation of vermicompost with *Frateruria aurentia* ($T_1$) .(Figure-6)

Vermicompost with *Frateruria aurentia* inoculation represented in Tables- 36, 37 and 38 in all the crop plants viz., *Amaranthus, Helianthus, Rumex* and *Trigonella* was found to be the best treatment. However, inoculation with vermicompost with *Rhizobium* alone did not have any significant effect on the antioxidant content, Table-39.

**Vermicompost and Greencompost:**

**Influence of Microbial Enriched Composts (Vermicompost and Greencompost) on Acid Phosphatase Activity of Test Plants *Amaranthus, Helianthus, Rumex* and *Trigonella:*

The data on acid phosphatase activity as influenced by vermicompost and greencompost on different crop plants are presented in Table-40. Considerable increase in acid phosphatase
activity was recorded in T_1 and T_3 than other treatments and control.

**RockPhosphate-GreenCompost:**

**Influence of Microbial Enriched Phosphocompost (RockPhosphate-Greencompost) on Acid Phosphatase Activity of Test Plants Amaranthus, Rumex and Trigonella:**

Inoculation of Rock Phosphate and greencompost showed significant increase in acid phosphatase activity (Table-41).

**RockPhosphate-Vermicompost:**

**Influence of Microbial Enriched Phosphocompost (RockPhosphate-Vermicompost) on Acid Phosphatase Activity of Test Plants Amaranthus, Rumex and Trigonella:**

Rock Phosphate and vermicompost inoculated with Phosphate solubilizer showed significant increase in acid phosphatase activity (Table-42).

**Vermicompost, Greencompost and Phosphocompost:**

**Influence of Microbial Enriched Composts (Vermicompost, Greencompost and Phosphocompost) on Total Lipids Content, Fatty Acid Composition and Saponin Content of Helianthus annuus L. and Rumex acetosella L.:
Among the treatments, combined inoculation with vermicompost and greencompost (T₁ and T₂) along with bioinoculants (Fratureria aurentia) recorded significant increase in total lipids, fattyacid and saponin content (Table-43).

As well as, the fatty acid contents appreciably increase in Helianthus in both vermicompost and greencompost. Whereas, in greencompost combination no saponin content was recorded (Table-43). (Figure-7)

**Vermicompost and Phosphocompost:**

**Influence of Microbial Enriched Composts (Vermicompost and Phosphocompost) on Crude Protein Content of Test Plants Amaranthus, Helianthus, Rumex and Trigonella:**

Table-44, represents the crude protein content of microbial enriched vermicompost and phosphocompost.

Among the test crops the crude protein content was highest in *Helianthus* and *Rumex* (T₁).

However, inoculation with phosphocompost did not have much significant effect in *Trigonella* and *Rumex* except in T₂ treated *Amaranthus* (Table-44).
Influence of Microbial Enriched Composts (Vermicompost, Greencompost and Phosphocompost) on Organic Acid Content of Test Plants *Amaranthus, Helianthus, Rumex* and *Trigonella:*

Organic acid content was also significantly higher inoculated *Frateuria aurentia* with vermicompost (Table-45). Combined inoculation with vermicompost and greencompost was found to be the best than other treatments. The phosphocompost application did not have any significant effect on the organic acid content of *Amaranthus, Rumex* and *Trigonella.*