STUDY ON THE EFFICIENCY OF MICROORGANISMS FOR COST-EFFECTIVE PRODUCTION OF VAM (VESICULAR-ARBUSCULAR MYCORRHIZA)

EP No: 22/2006-07; **Research centre:**, Valkaradu and Kalamavoor Modern Nursery Centre, **Range:**Dindigul Modern Nursery Range, Modern Nursery Division, Dharmapuri; **Scheme:**TAP scheme

Introduction

Vesicular-Arbuscular Mycorrhiza (VAM) is a symbiotic association between fungi and plant roots that enhances nutrient uptake, particularly phosphorus, and improves plant growth. The present experimentsconducted to identify a cost-effective medium for VAM production using different combinations of vermiculite, sand, and red soil. The study aimed to find out the most suitable treatment for VAM production with high infection and cost effective. In this regard MND has proposed to conduct the experiment on VAM with the following objectives.

Objectives

1. To identify a cost-effective medium for VAM production using vermiculite, sand, and red soil.
2. To evaluate the infection percentage of VAM spores in different medium combinations.
3. To reduce the production cost of VAM without compromising its quality.

Materials and Methods

Materials

Two experiments were conducted at Modern Nursery Centres in Kalamavoor (Ep No 22/2006-07) and Valkaradu (Ep No 22/2006-07), using maize and sorghum as host plants, respectively during the year 2006. Different combinations of **Vermiculite (Grade IV), Red Soil, Sand have been applied as treatments**. Poly feed and MAP (Monoammonium Phosphate) used as growth promoters for VAM production.

Methods

1. **Experimental Design:**
    - Seven VAM beds (1m × 1m × 0.30m) were prepared for each treatment.
    - 7 different treatments have been chosen for the study
        - **T1:** Pure Vermiculite (100%).

- **T2:** 75% Vermiculite + 25% Sand.
- **T3:** 75% Vermiculite + 25% Red Soil.
- **T4:** 50% Vermiculite + 25% Sand + 25% Red Soil.
- **T5:** 50% Vermiculite + 50% Sand.
- **T6:** 50% Vermiculite + 50% Red Soil.
- **T7:** 20% Vermiculite + 80% Sand.

2. **Methodology:**
    - Maize (Kalamavoor) and Sorghum (Valkaradu) were sown in the VAM beds and treatments have been applied.
    - After 60 days, the shoot portions of the plants were harvested, and the root portions were analyzed for VAM spore infection using the **Trypan blue in lactophenol method** (Phillips and Bayman, 1970).
    - The percentage of VAM infection was recorded for each treatment. The results have been analyzed furnished below.

Results and Discussion

1. VAM Infection Percentage

The infection percentage of VAM spores was recorded for each treatment in both experiments. The results are summarized below:

Treatment	VAM Infection in Maize (%) (Kalamavoor)	VAM Infection Sorghum (%) (Valkaradu)	Average Infection (%)
T1: Pure Vermiculite (100%)	90%	95%	92.5%
T2: 75% Vermiculite + 25% Sand	82%	90%	86%
T3: 75% Vermiculite + 25% Red Soil	85%	90%	87.5%
T4: 50% Vermiculite + 25% Sand + 25% Red Soil	95%	95%	95%
T5: 50% Vermiculite + 50% Sand	80%	85%	82.5%
T6: 50% Vermiculite + 50% Red Soil	85%	80%	82.5%
T7: 20% Vermiculite + 80% Sand	82%	80%	81%

The analyzed data revealed that, T4 (50% Vermiculite + 25% Sand + 25% Red Soil) showed the highest average infection percentage (95%) in both experiments compared to other experiments and **T7:** 20% Vermiculite + 80% Sand had registered lowest average infection percentage (81%). Pure Vermiculite (T1) also showed average high infection rates (92.5%) but it was more expensive.

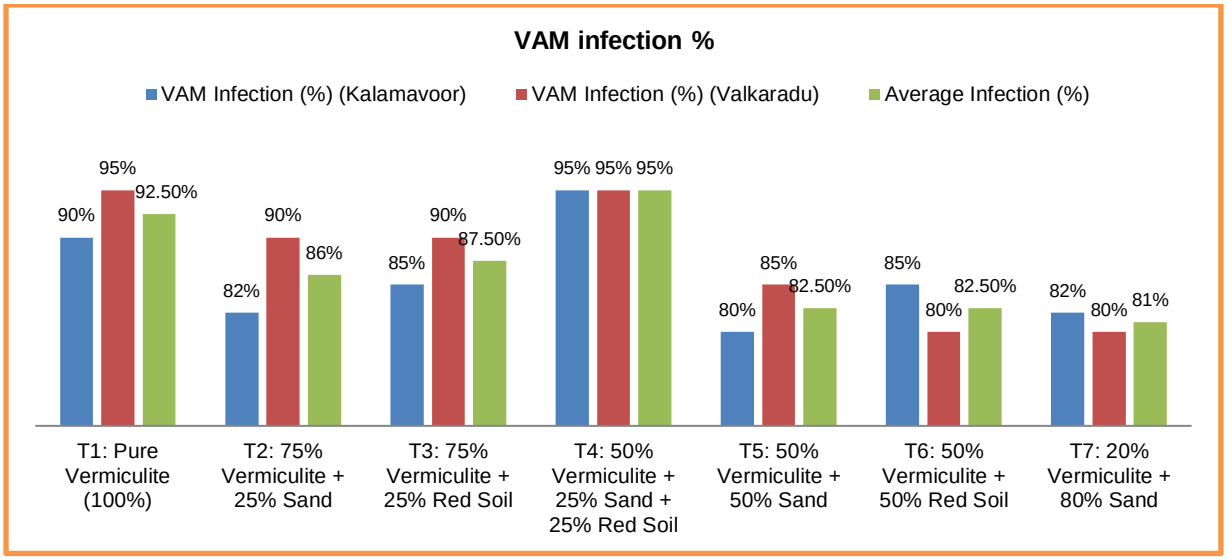


Chart represents the VAM infection % of both maize and sorghum

2. Cost Analysis

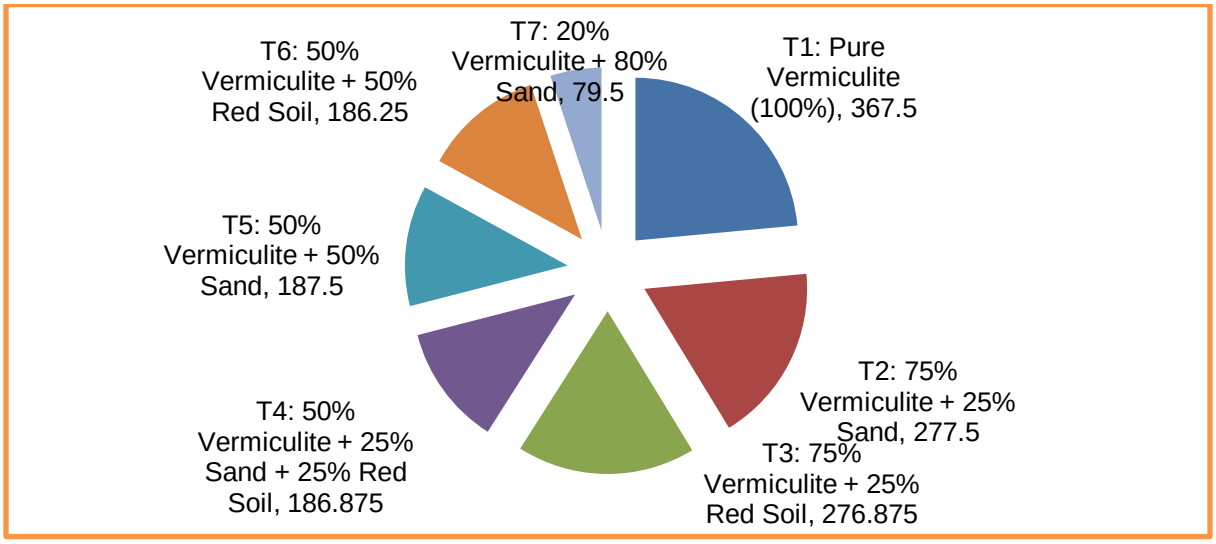
The cost of raw materials for each treatment was calculated based on 2006 prices. The results are summarized below:

Vermiculate price: Rs. 7.35 / kg and (100% Vermiculate: 50 kg)

Treatment	Cost of raw materials for 50 Kg (Rs.)
T1: Pure Vermiculite (100%)	367.5
T2: 75% Vermiculite + 25% Sand	277.5
T3: 75% Vermiculite + 25% Red Soil	276.875
T4: 50% Vermiculite + 25% Sand + 25% Red Soil	186.875
T5: 50% Vermiculite + 50% Sand	187.5
T6: 50% Vermiculite + 50% Red Soil	186.25
T7: 20% Vermiculite + 80% Sand	79.5

With respect to cost, T1 is most expensive method followed by T2 and T7 (20% Vermiculite + 80% Sand) was the cheapest (Rs. 79.5) but T7 had lower infection rates (81%).**T4 (50% Vermiculite + 25% Sand + 25% Red Soil)** provided the best balance between cost (Rs. 186.875) and infection percentage (95%) compared to other treatments.

Chart represents the raw material cost different treatments



Recommendations

- The medium consisting of **50% Vermiculite, 25% Sand, and 25% Red Soil (T4)** is recommended for VAM production. It has the highest infection percentage (95%) at a reasonable cost (Rs. 186.875)/ 50 kg.
- **T7 (20% Vermiculite + 80% Sand)** is the least cost effective treatment for VAM production, but it is results in lower infection rates (81%).