

## *Experimental procedure*

---

---

### 3.0 EXPERIMENTAL PROCEDURE

The present study entitled “A comparative study of the effect of biofertilizer, vermicompost and chemical fertilizer on the growth and yield of green chilli (Gundu variety)” was analysed by recording the response of the above crop to vermicompost, biofertilizer, chemical fertilizer both individually and in combinations as pot culture method.

The experimental procedures were discussed under the following headings

- 3.1. Collection of biofertilizer and vermicompost
- 3.2. Collection of triple -17 complex
- 3.3. Collection of seeds
- 3.4. Soil preparation
- 3.5. Layout of treatment
- 3.6. Sowing of seeds and maintenance of crops
- 3.7. Harvest methodology
- 3.8. Biometric observations
- 3.9. Biochemical analysis
- 3.10. Soil analysis
- 3.11. Vermicompost analysis
- 3.12. Statistical analysis

#### 3.1. Collection of biofertilizer and vermicompost

Biofertilizer (*Azophos*) and vermicompost were collected from Tamil Nadu Agricultural University, Coimbatore. Plate I shows the biofertilizer (*Azophos*) and Plate -II depicts the vermicompost used.

#### 3.2. Collection of triple -17 complex

Triple - 17 complex was purchased from Murugan Agro services, Coimbatore. Plate – III shows the triple -17 complex used.

#### 3.3. Collection of seeds

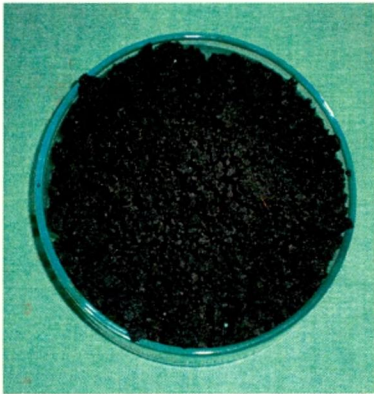
Seeds of chilli (Gundu type) were collected from Nambiyur of Tirupur district, Tamil Nadu. Chilli seeds are shown in plate – IV.

### 3.4. Soil preparation

Each pot was filled with 8 kg of the red soil mixed with sand at the ratio of 3:1. The soil was enriched by the application of farmyard manure at the rate of 10 tonnes per hectare. These pots were then treated with different combinations of biofertilizer, vermicompost and chemical fertilizer (triple -17 complex). The biofertilizer (*Azophos*) and chemical fertilizer (triple-17 complex) were mixed at the rate of 10gm, 20gm per 8 kg of soil. Vermicompost was mixed at the rate of 1kg per 10kg of soil.

**Plate – I**

*Azophos*



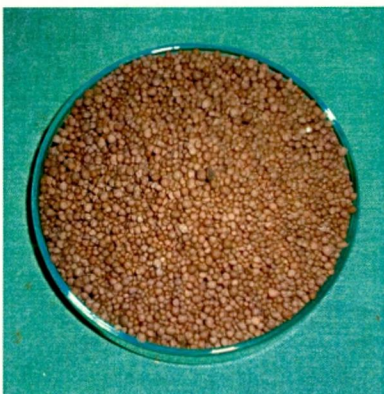
**Plate - II**

Vermicompost



**Plate – III**

Triple -17 complex



**Plate -IV**

Seeds of Chilli



### **3.5. Layout of treatment**

The experiment was laid out with four replications for each of the eight treatments in completely randomised block design. The treatments were as follows:

T<sub>1</sub>- Uninoculated control

T<sub>2</sub> - Triple - 17 complex

T<sub>3</sub>- *Azophos*

T<sub>4</sub>- Vermicompost

T<sub>5</sub>- Triple - 17 complex + Vermicompost

T<sub>6</sub>- Triple - 17 complex + *Azophos*

T<sub>7</sub>- *Azophos* + Vermicompost

T<sub>8</sub>-Triple-17 complex + *Azophos* + Vermicompost

### **3.6. Sowing of seeds and maintenance of crops**

A nursery was raised by sowing chilli seeds in plastic trays and the young plantlets were transferred to the pots of respective treatment groups after 30 days of their growth. The pots were watered well and 100% moisture content was maintained after transplantation. The plants were protected from the attack of insects and pests. Plate – V shows the growth of the chilli plant on the 30<sup>th</sup> day before transplantation.

### **3.7. Harvest methodology**

The plants were uprooted on the 50<sup>th</sup> and 90<sup>th</sup> day after transplantation without any damage. The adhering soil particles were removed by washing gently with water and the water droplets were removed by blotting with the filter paper. Then these plants were used for the biometric observation and biochemical analysis. Plate VI and VII depicts the growth of the chilli plant on the 50<sup>th</sup> day and on the 90<sup>th</sup> day after transplanting to the respective treatment groups.

### **3.8. Biometric observations**

Biometric observations were recorded on the 50<sup>th</sup> and 90<sup>th</sup> day after transplantation of the young plantlets.

### **3.8.1. Fresh weight**

The fresh plants were weighed and the weights were expressed in  $\text{g plant}^{-1}$ .

### **3.8.2 Dry weight**

The plants after recording the fresh biomass were oven dried at  $70^{\circ}\text{C}$  for 36 hours and were weighed and expressed in  $\text{g plant}^{-1}$ .

### **3.8.3. Shoot length**

The shoot length was measured from the point of first cotyledonary node to the tip of the longest leaves and was expressed in  $\text{cm plant}^{-1}$ .

### **3.8.4. Root length**

The root length was measured from the crown region of the plant to the top of the root and were expressed in  $\text{cm plant}^{-1}$ .

### **3.8.5. Number of leaves**

The total number of leaves in each plant were counted on the 50<sup>th</sup> day after sowing and expressed as number of leaves  $\text{plant}^{-1}$ .

### **Plate – V**

#### **Chilli plantlets before transplantation.**



Plate VI  
Growth of chilli on the 50<sup>th</sup> day after transplantation



T<sub>1</sub>

T<sub>2</sub>

T<sub>3</sub>

T<sub>4</sub>



T<sub>5</sub>

T<sub>6</sub>

T<sub>7</sub>

T<sub>8</sub>

**Plate VII**

**Growth of chilli on the 90<sup>th</sup> day after transplantation**



**T<sub>4</sub>**

**T<sub>3</sub>**

**T<sub>2</sub>**

**T<sub>1</sub>**



**T<sub>8</sub>**

**T<sub>7</sub>**

**T<sub>6</sub>**

**T<sub>5</sub>**

### 3.9. Biochemical analysis

The biochemical parameters like chlorophyll, carotenoids, proteins, carbohydrates and phenols were analysed in fresh leaves and nitrogen, phosphorus and potassium were analysed in plant dry sample on the 50<sup>th</sup> and 90<sup>th</sup> days after transplantation. The details of the methods and the parts used were given in Table - I.

### 3.10. Soil analysis

The initial and post harvest stage of soil samples were analysed to know the fertility status of the soil. The processed samples were analysed for phosphorus, nitrogen, potassium, pH, texture, lime and electrical conductivity and the methods of analysis were given in the table - I.

### 3.11. Vermicompost analysis

The applied vermicompost was analysed to know the status of nitrogen, phosphorus, potassium, organic carbon, calcium and magnesium levels in it. The details of the methods used were given in table – I.

### 3.12. Statistical analysis

Statistical analysis like arithmetic mean and analysis of variance (ANOVA) were employed to predict the results of the experiment.

**TABLE- I**  
**ANALYSIS OF BIOCHEMICAL PARAMETERS AND SOIL SAMPLES**

Parameters	Parts used	Method of analysis	Reference	Appendix number
<b>Biochemical analysis</b>				
Chlorophyll	Fresh leaves	Spectrophotometry	Witham <i>et al.</i> , 1971	I
Carotenoid	Fresh leaves	Spectrophotometry	Goodwin, 1954	II
Proteins	Fresh leaves	Spectrophotometry	Lowry <i>et al.</i> , 1951	III

Total carbohydrate	Fresh leaves	Spectrophotometry	Hedge and Hofreiter, 1962	IV
Total phenol	Fresh leaves	Colorimetry	Bray and Thorpe, 1954	V
Nitrogen	Plant dry sample	Colorimetry	Raguramulu <i>et al.</i> , 2003	VI
Phosphorus	Plant dry sample	Titrimetry	Humphries, 1956	VII
Potassium	Plant dry sample	Flame photometry	Jackson, 1975	VIII
<b>Soil and Vermicompost analysis</b>				
Nitrogen	Soil, Vermicompost	Titrimetry	Humphries, 1956	VI
Phosphorus	Soil, Vermicompost	Colorimetry	Raguramulu <i>et al.</i> , 2003	VII
Potassium	Soil, Vermicompost	Flame photometry	Jackson, 1975	VIII
Organic carbon	Vermicompost	Titrimetry	Jackson, 1973	IX
Calcium and Magnesium	Vermicompost	Titrimetry	Cheng and Bray, 1951	X
pH and Electrical conductivity	Soil	--	Shoemaker, 1961	XI