



# Agri Articles

(e-Magazine for Agricultural Articles)

Volume: 03, Issue: 01 (JAN-FEB, 2023)

Available online at <http://www.agriarticles.com>

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## Visit Aided by Adhiparasakthi Horticultural College Students (2019 Batch) at Gudiyatham Block under RHWE (Rural Horticultural Work Experience) Program

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### Abstract

Rural Horticultural Work Experience (RHWE) is a course offered to undergraduate students to get associated with the farmer's community and to understand the agricultural / Horticultural conditions in rural areas. In this program students have visited different places viz., Pesticide testing laboratory, Biocontrol agent laboratory, Soil testing laboratory, Liquid Biofertilizer unit, Coir Industry, as a part of course AEX 411 – Rural Horticultural Work Experience (RHWE) Program.

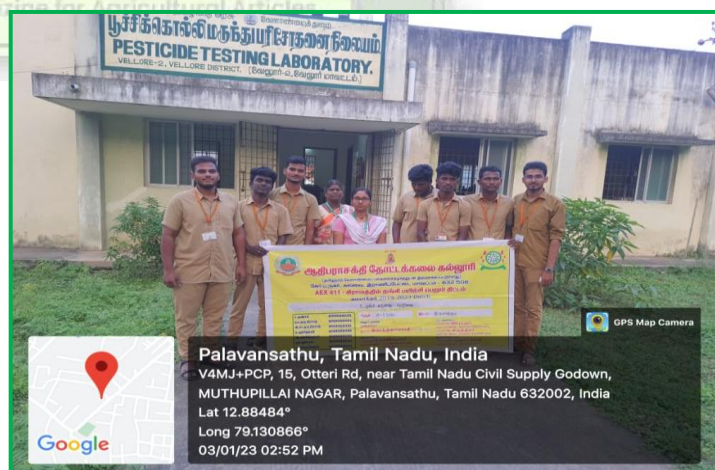
**Keywords:** RHWE, Visit, Farmer's field, Gudiyatham.

### Visit to Pesticide Testing Laboratory

Ms. Divyashree, Agricultural Officer working in pesticide testing laboratory located in Vellore district. She explained the administrative setup of the pesticide testing laboratory and the equipment used in that laboratory and explained the procedures for testing the pesticides. It was established under the Act of Insecticide Act – of 1968 and the Insecticide rule – 1971. NIPHM is one of the designated institutions for offering the mandatory training program in pesticide formulation analysis as per the Insecticide Act, of 1968. To check the quality of pesticides used. The participants are trained in using legally valid analytical methods approved by the Bureau of Indian Standards.

### PROCEDURE FOR GAS LIQUID CHROMATOGRAPHY

- Open the pressure gauge in the Nitrogen cycle
- Switch on the stabilizer
- Switch on the GC instrument
- Press enter
- GC cooling method
- GC waiting method
- GC ready method
- Set oven maximum temperature to 300degree
- Set the temperatures of the oven, Injector, Detector



- Open the pressure gauge ion zero air and hydrogen cylinder gas to the desired mark
- Set the signal parameter
- Click IRIS 32 icon
- Data acquisition
- Signal analysis
- Inject the sample and obtain the chromatogram
- Set the oven temp to 40degree, temp to 40 degrees, and detect temp to 40 degrees
- Immediate switch H2 gas and O air respectively
- After reaching the above temperature close the N2 gas
- Switch off the instrument

#### **PROCEDURE FOR HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY**

- Switch on the HPLC machine and the PC attached to it
- Double-click the CLASS VP icon on the PC
- Select the instrument icon and click it
- Username: system (capital S)
- Password: 2001
- Click the instrument setup and feed the necessary parameters
- Download the method from PC to the machine
- Now drain the position upward
- Once its done turn the knob to drain down position
- Press the pump button and the machine to attain its equilibrium
- Inject the sample and take the chromatogram
- Turn off the pump
- Switch off the PC and HPLC machine

The yearly target of the pesticide testing laboratory is up to 1527 samples

- In case of abnormal formulation, the company must face court.
- If the physical parameter is abnormal, then a penalty should be paid.
- After the testing, the result must be given within 30 days.

#### **ACIDITY TEST**

- 10g of sample + 100 ml of distilled water + 40ml of methanol + indicator (Bromocresol purple)
- The endpoint will be blue.





## Visit to Biocontrol Agent Laboratory

We visited the Bio-control production unit located near the Pesticide testing laboratory located in Bagayam, Vellore district.

Ms. Thendral (A.O) explained to us the activities of the production unit. There are total of 24 Bio-control production units in



Tamilnadu. In this unit, they have produced *Pseudomonas flourescens* (₹180/kg), *Metarrhizium anisophilae* – entomopathogenic fungi (₹135/kg), *Trichoderma viride*, parasitoids like *Trichogramma chilonis* and *Chrysoperla carnea*. They bought their mother culture from the National Bureau of Agricultural Insects Resources Museum located in Bangalore. Potato Dextrose Agar medium was used for *Metarrhizium anisophilae* and *T. viride* and Kings B medium for *P. flourescens*. For 1 tonnes production, 35 laborers are required and they are paid for ₹577/day. They have a fermentor of 100l capacity for mass production which requires 8l broth.

### Procedure

Mother culture → subculture → mass production → packing with talc (1:2) → sealing → dispatch.



- The optimal temperature for production - 24°C
- They have a target for the production of 14.4 tonnes of *Pseudomonas flourescens* and 11.3 tonnes of *T. viride* and 11.3 tonnes of *Metarrhizium anisophilae*.
- Packages should have properly labeled with the date of manufacture and date of expiry.
- *Corcyra sp.* eggs have been used as feed for the production of *Chrysoperla carnea* along with Cumbu, groundnut, and yeast to the tray.
- *Chrysoperla* - 30-35 days adults emerge from a single tray.
- *Trichogramma* production target of 2,30,000 eggs.

- 1 *Trichogramma* card - 1 cc - ₹30
- *Chrysoperla carnea* can be used as a predator against whiteflies in coconut, mealybugs, thrips, aphids, and Lepidopteran insects.
- *Trichogramma* is used against paddy leaf folders, cotton bollworms, and vegetable borers.

### Visit to Soil Testing Laboratory

We visited the soil testing lab on 05.01.2002. Mr. Singaravelan (A.O) has explained the activities of the soil test laboratory. Started in 1960s where farmer can test their soil directly and soil tests were also done by schemes. Field Water is also tested. Test Results are given within 3 days.

#### Process

- To take a soil sample a 'V' shape cut is made at 2 feet depth for vegetables.
- In the case of tree crops 1 feet trench is made and soil is taken from sides correspondingly soil is taken at 2 and 3 feet separately (3 samples).
- 10 places are selected for 1 acre of land.
- Taken samples are reduced to 1kg by the quadrative method of soil sampling.
- 2mm sieves are taken in which soil is sieved and labeled.
- 13 Para minerals are tested



#### Majorly they analyze:

- Soil - EC, PH, lime, organic carbon,
- N, P, K (macro nutrients)
- Sulphur and boron (secondary nutrients)
- Iron, zinc, copper, manganese (micro nutrients)
- Water – EC, PH, carbonate, bicarbonate, Ca, Mg, Na, K, Cl.

#### To test EC:

- 20 grams of soil is taken in a 50 ml beaker and 40 ml distilled water is added and stirred well and kept for 30 min undisturbed
- EC is tested with an EC meter and readings are noted.

#### For pH:

- pH meter is used to analyze the pH of soil.

For testing lime in soil:

- HCL 10% with soil is added to the watch glass. It will effervesce.

**For OC:** Soil is sieved with 0.5 mm sieve and 5 g of soil taken 10ml potassium dichloride is added with H<sub>2</sub>SO<sub>4</sub> 10 ml and stirred for 10 min. Further 100 ml water is added followed by adding an indicator where colour change is observed from orange to apple green.



**For nitrogen:** 20g of soil is taken in a glass bit in which paraffin liquid with Potassium permanganate 100ml followed by NaOH 100ml and boric acid 25 ml. It is made to 80 ml and titrated against 0.2N H<sub>2</sub>SO<sub>4</sub>.



**For Potash:**

- NNAA (Neutral Normal Ammonium Acetic Acid) solution is used.
- 20 g of soil mixed with 40 ml NNAA solution and filtered with whattman no 1 filter paper and solution is extracted and observed in flame photometer

**For Potash and Sulphur:**

- Spectrophotometer is used.
- With 660 nm and 440nm correspondingly.
- Iron, copper, and zinc is tested with atomic absorption Spectrophotometer which works with principles of absorption.
- Water sample is taken in the well after running the pump for 30mins
- Where it should be collected only in bislery water bottle of 1liter
- Because other bottles have chances to change the nature of the sample

**Visit to Liquid Biofertilizer Unit**

- We visited the liquid biofertilizer production unit and Mr. Rajendran(A.O) explained about the production unit.
- Major fertilizers are N, P, k in India.
- N – 4 strains, P – 1 strain, K- 1 strain.
- Mother culture is brought from TNAU 1strain slant culture is Rs 10,000 and it is stored at 4 degrees Celsius.
- Biofertilizers such as Rhizobium, Azospirillum, and Phosphobacteria provide nitrogen and phosphorous nutrients to crop plants through nitrogen fixation and phosphorous solubilization processes.
- These Biofertilizers could be effectively utilized for rice, pulses, millets, cotton, sugarcane, vegetable, and other horticulture crops.
- Biofertilizers is one of the prime input in organic farming not only enhances crop growth and yield but also improves soil health and sustain soil fertility.
- At present, Biofertilizers are supplied to the farmers as carrier-based inoculants.
- As an alternative, liquid formulation technology has been developed in the Department of Agricultural Microbiology, TNAU, Coimbatore which has more advantages than the carrier inoculants.

**Benefits**

- Longer shelf life of 12-24 months & No contamination.
- No loss of properties due to storage upto 45° c.
- Greater potential to fight with the native population.
- High populations can be maintained for more than 10<sup>9</sup> cells/ml up to 12 months to 24 months.
- Cost saving on carrier material, pulverization, neutralization, sterilization, packing, and transport.
- Better survival on seeds and soil.

- No need of running Bio-fertilizer production units throughout the year.
- Very much easy to use for the farmer.
- Dosages are 10 times less than carrier-based powder Bio-fertilizers.
- High commercial revenues & high export potential.

#### Mother culture

- The pure growth of any organism on a small scale is called a mother culture.
  - It is prepared only from TNAU, Coimbatore.
1. Mother culture (₹15000)
  2. Subculture
  3. Starter Culture
  4. Bottle culture (Shaker) - 2.5 lit population growth is increasing.

#### Fermenter

- The fermenter capacity is about 200 lit and we fill up to 180 liters and maintains the temperature for the growth of microbes.
- The fermenter must be sterilized & cooled by using chemicals and fumigation.
- Manufactured by using Tangential Flow Filtration (TFF) Technology, contains unique preservatives that ensure longer shelf life, tolerance to adverse conditions, and better survival on seeds/soil.
- Then it is filled in cans and stored in 4°C maintained-1 month life.
- After filling into 1, 1.5, 2 lit cans based on requirements and then it is labeled.

#### Quality test

- It is conducted in the laboratory to check the microbial population
1. Serial dilution
  2. Petridish
  3. Gram straining kit - 4 strain colours are used.
    - Crystal violet
    - Safranin
    - Ethanol
    - Iodine solution.
- It identifies gram-positive and negative bacteria.
  - Gram +ve bacteria stained to purple colour by crystal violet.
  - Gram -ve bacteria stained to red or pinkish by ethanol or safranin.
  - Only liquid biofertilizer warranty and shelf life for up to 1 year after that microbial population is gradually decreased.

#### Cost

- Azospirillum Rs.300/lit.
- Phosphobacteria Rs.300/lit.
- Liquid biofertilizer production
- Azospirillum - paddy and other crops = 5-7 days for growth.
- Rhizobium - pulses & oil seeds = 3-7 days.



#### Visit to Coir Industry

We have visited the Nazeer Coir industry located in Seevur on 12-01-2023. Mr. Nazeer owner of this industry runs this factory for more than 25 years. It covers about the area of 1 acre. Here he produces coir rope and sell the waste to poultry sheds and coir rope waste are sent for Beds and Sofa Making purpose.

### Procedure

- Around 16000 Coconut trees are leased (₹350-400/tree/year) around the Gudiyatham block villages.
- Nuts are harvested (₹19 as labour charges per tree)
- Harvested nuts are transported to industry from field to industry through tractor (₹250 as wages for labour)
- After receiving nuts are graded based on size- first quality, second quality and third quality.
- Graded nuts are dehusked
- Nuts are sold for Rs.8/nut and husks are transferred to Coir extractor.
- There is stand lane for storing husks.
- From there husks are transferred to grinder through conveyor belt.
- Coir fibres are extracted by grinding the husks
- Fibres are sieved and larger fibres are push out and smaller particles transferred through conveyor belt and is again sieved along with fibres.
- Larger fibres are soaked in water for one day and it is again transferred to Grinder for extracting pure fibre.
- Smaller particles are sold to poultry sheds it act as a cushioning material(1 tractor load - ₹8,000-₹10,000)
- Pure fibres are transferred to turbo machine to remove dust particles.
- It is then transferred to two flaw machines to form coir ropes. Currently, Coir ropes are exported to Andhra Pradesh (₹200/kg)
- After forming coir ropes waste fibres are also sold for Beds and Sofa Making purpose(1 bundle=₹100).



### Other Notes

- He has owned 10 two flaw machines for coir ropes making, two tractors.
- Electricity charges upto ₹30,000 per month.
- He has machinery for spinning of ropes.

### Total labour

- Dehusking process-10 members (₹1/nut)
- Harvesting process -10 members(₹19-25/tree)
- Loading and unloading process-15 members(₹250/day)
- Coir fiber extraction and rope making process-7 members (₹350/day)

