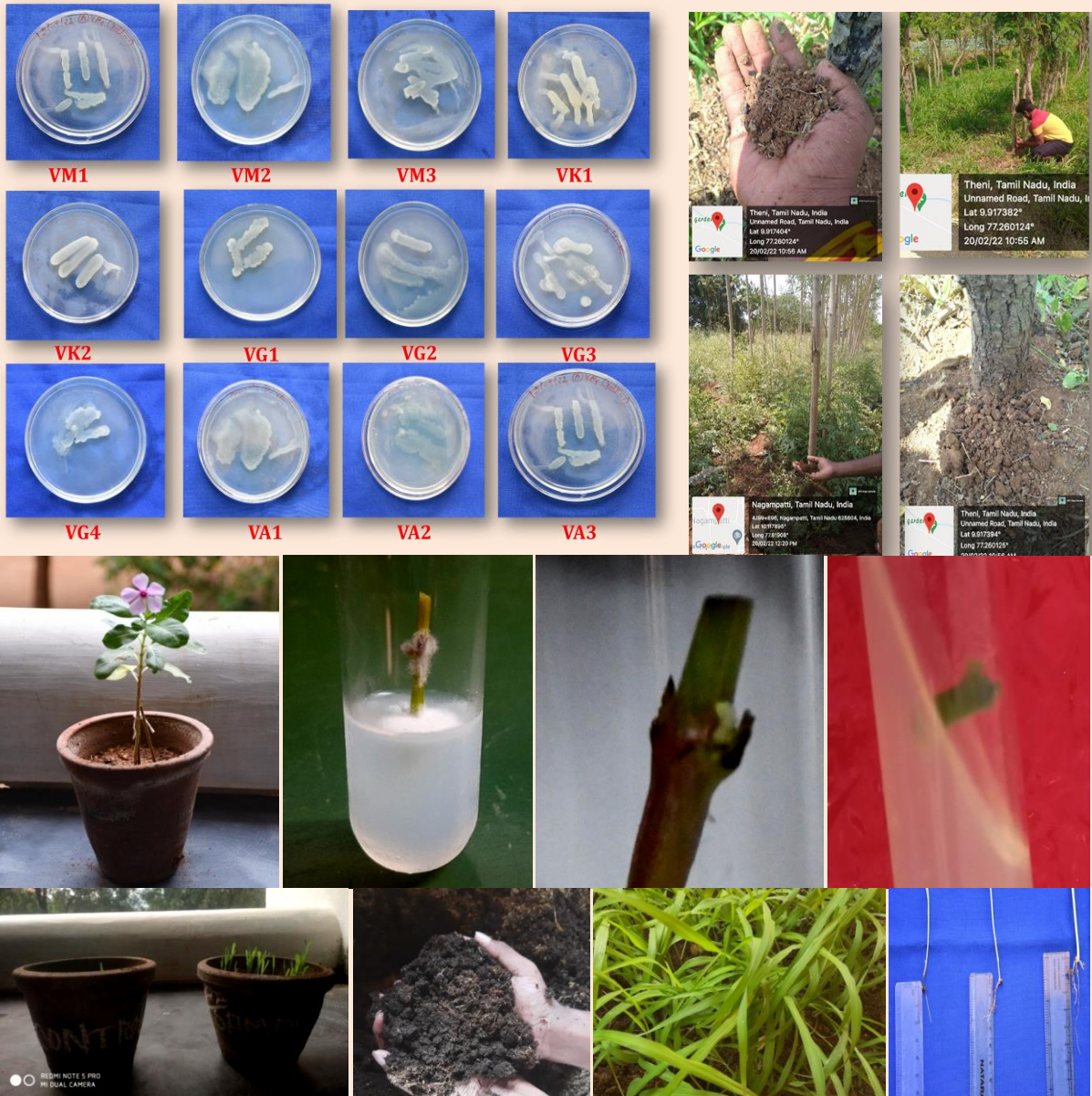


VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST-625234

DEPARTMENT OF BOTANY

DBT STAR College Scheme: Students Group Projects Report - 2021-2022



### Group Project Report 2021-2022

Sl.No	Name of the Mentors	Title of the Projects	Outcome	No. of Beneficiary	Page No.
1.	Dr.V. Ramesh	Isolation of Plant Growth Promoting Rhizobacteria (Pgpr) From Various Agricultural Rhizospheric Soils	12 bacterial isolates were isolated from Rhizospheric soils and we identified one effective PGPR (VG2) for plants growth. Further identification and growth promoting studies will be done in future studies.	3	1
2.	Dr.V. Ramesh	Efficiency of Agricultural waste on Mushroom Cultivation and Biomass Production	Paddy straw was identified as a significant substrate for Oyster mushroom in our environment among various agricultural Crops substrate.	2	2
3.	Dr. T. Sellathurai	Micro propagation of Medicinal plants	<i>Acalypha indica</i> L. established under in vitro condition from stem and nodal region on MS medium supplemented with different level of coconut milk water within the two weeks. Better results showed that MS Medium supplemented with CW (Coconut water) - 6ml. Only single shoot was also initiated from each explant in this medium that also prohibits the elongation of shoots.	6	3
4.	Dr. C.Soundar Raju	Micropropagation of Medicinal Plant <i>Catharanthus roseus</i> (L.) G. Don	The establishment of high efficiency in vitro regeneration system of <i>C. roseus</i> via internode explants. This protocol helps to large-scale production of valuable metabolites catharanthine, vindoline, vincristine, and vinblastine	3	4

5.	Dr. C.Soundar Raju	Bioremediation of Agriculture Biomass for Nutrient Recovery and Vermiremediation	The conversion of agro-wastes and animal manure into highly nutrient fertilizers by vermiremediation enriched the soil quality. In this experiment was observed vermicompost treatment showed great potential to increase 82% of germination rate and growth of sorghum plant.	3	5
5.	Dr. V.Kumarasamy	Effect of some important Biofertilizer on crop production	Ten nitrogen fixing bacteria of <i>Gluconacetobacter diazotrophicus</i> were isolated. Among the isolates VCSoS7 induced significant plant growth in sweet sorghum. In this study, VCSoS7 as potential isolate to use as a biofertilizer in sustainable agriculture	5	6

Group I Title of the Project

**ISOLATION OF PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR) FROM VARIOUS AGRICULTURAL RHIZOSPHERIC SOILS**

**Name of the Mentor** : Dr. V. Ramesh

**Student Name** : Mr. V. Ayyapparaja, Reg No. 190802  
Mr. R. Guruprakash, Reg No. 190807  
Mr. S.Chandru, Reg No. 190803

**Abstract**

In Recent decades, the practice of agricultur is inadequate to meet the demand of the increasing population, coupled with the constant degradation of natural resources. Therefore, it is necessary to explore the alternative practice to increase the productivity as well as the quality of crops with eco-friendly. The use of plant growth promoting rhizobacteria could provide sustainable solutions to agri-environmental problems. In this present study, a total number of 12 bacterial isolates were isolated by using serial dilution technique from four different rhizospheric soils of *Gossypium arboceum*, *Sesbania granidiflora* and *Manihot esculenta*. We found that, among the 12 isolates, the isolate of VG2 isolated from *Lablab purpureus* (Leguminous plant) showed significant effect on the germination in terms of increasing stem thickness and the number of leaves of Pearl Millet seeds under in vitro conditions. The outcome implies that VG2 has the properties of plant growth promoter and can be used as promising inoculants to enhance the growth of various agricultural crops once it to be further studied.

**Keywords:** Eco-friendly, Plant growth promoting bacteria, In-vitro, Serial dilution Technique

Group II Title of the Project

## **EFFECT OF AGRICULTURAL CROPS IN MUSHROOM CULTIVATION**

**Name of the Mentor :** Dr. V. Ramesh

**Student Name :** Mr. R. Gokulkumar, Reg No. 190804  
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### **Abstract**

Commercial mushrooms are produced on lignocellulose such as straw, saw dust, and wood chips. As such, mushroom forming macro fungi convert low quality waste into high quality food. Cultivation of edible mushrooms is a useful method for bio conservation in the agriculture industry. For the better production, we used various agricultural waste materials as a substrate. After mushroom harvesting, these substrates are available as an excellent source of soil conditioner. In this present study, we investigated that the effect of various agricultural residues of Paddy straw, Sorghum straw, Sugarcane baggase and *Sesbania* Pod Waste by using polyethylene bag wall technique on *Pleurotus ostreatus* (Oyster mushroom) yield. Among these above four residues, we found that the paddy straw residues showed maximum yield of 2.5 kg/Bed in first harvest. Sorghum straw showed moderate yield of 2kg/be. In this study, we concluded that Paddy straw is the most suitable source in terms of number of fruiting bodies and fresh weight of mushroom and are therefore we recommended as potential substrate for cultivation of oyster mushroom.

**Keywords:** Oyster mushroom, Paddy straw, *Pleurotus ostreatus*, Substrates, Yield

Group III Title of the Project

**Micropropagation of *Acalypha Indica* Linn. – As a Medicinal Plant**

**Name of the Mentor :** Dr. T. Sellathurai

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Mr. U. Hariharan, Reg. No: 190810  
Mr. P. Kanagavel, Reg. No: 190811  
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**Abstract**

*Acalypha indica* L. of the family Euphorbiaceae is an annual herb found wild throughout Southern Asia, India, Philippines and tropical Africa. It is a annual herb, upto 75cm high. Leaves 3-8cm long, ovate, thin usually 3nerved; Margins of the leaves toothed; leaf-stalks longer than leaves. Flowers in axillary erect spikles; female flowers supported by conspicuous wedge-shaped bracts, male flowers, minute, borne towards the top of the spike. Fruits small-hairy, concealed in the bracts. The plant has been used as drug in traditional medicine since ancient times. It contains an active compound named ‘acalyphine’. Numbers of plant tissue culture works done in the field of medicinal and aromatic plants throughout the world. They were studied an to standardized a protocol for rapid callus induction and indirect plantlets regeneration from leaf segments and nodal explants of *Acalypha indica* was described. *Acalypha indica* explants of stem and nodal region showed the better responses on MS medium supplemented with different level of coconut milk water with in the two weeks. The nodal explants responded with 90 % bud break within the nine days in MS medium supplemented with MS + CW- 1mg (Coconut water), MS + CW- 2mg (Coconut water), MS + CW- 3mg (Coconut water), MS + CW - 4mg (Coconut water), MS + CW- 5mg (Coconut water), MS + CW- 6mg (Coconut water), MS + CW- 7mg (Coconut water), MS + CW -8mg (Coconut water), MS + CW- 9mg (Coconut water) and MS + CW- 10mg (Coconut water). Better results showed that MS Medium supplemented with CW (Coconut water) - 6ml. Only single shoot was also initiated from each explant in this medium that also prohibits the elongation of shoots. After four weeks the shoots to be sub cultured for further developments. Lower level MS medium supplemented with MS + CW- 1mg (Coconut water), MS + CW- 2mg (Coconut water), MS + CW- 3mg (Coconut water), MS + CW - 4mg (Coconut water), MS + CW- 5mg (Coconut water), did not show good response the shoot or root or callus initiation compared to the other. Our results suggested that plant growth regulators and in vitro culture conditions increased the shoot and callus production for pharmaceutical application in future.

**Keywords:** *Acalypha indica*, Coconut milk water, Callus production MS medium

Group IV Title of the Project

**Micropropagation of Medicinal Plant *Catharanthus roseus* (L.) G. Don**

**Name of the Mentor :** Dr. C. Soundar Raju

**Students Name** : Mr. S.P. Nitheesh Gupta, Reg. No. 190818  
Mr. P. Praveen, Reg. No. 190819  
Mr. M. Rivin, Reg.No. 190820

**Abstract**

*Catharanthus roseus* (L.) G. Don is a notable member of Apocynaceae family, locally named as *Nithyakalyani*. An extensive range of catharanthine, vindoline, vincristine, and vinblastine in *C. roseus* is gradually mounting in the global pharmaceutical industries. Plant cell, tissue, and organ culture-based techniques are being applied for mass clonal propagation of *C. roseus* as an alternative to conventional commercial cultivation. A large number of true-to-type plants of a species could be developed via micropropagation in a short period of time, under a controlled and aseptic environment. The objective of this study was aimed at developing efficient micropropagation system from internode explants, which can be multiply the *C. roseus* and utilized to valuable secondary compounds. Among the different cytokinin and auxin combinations, Murashige and Skoog's (MS) medium fortified with 6-benzylaminopurine (BAP) and 1-Naphtaleneacetic acid has been respond higher percentage of shoot induction compared with others combinations. However, Presence of 2 mg l<sup>-1</sup> BAP and 0.5 mg l<sup>-1</sup>NAA in MS medium was most suitable for regeneration and multiplication. This protocol could be useful for large-scale production of terpenoid indole alkaloids compounds from this medicinal plant.

**Key words:** *Nithyakalyani*, microporopagation, catharanthine, MS medium, BAP

Group V Title of the Project

**Bioremediation of Agriculture Biomass for Nutrient Recovery and Vermiremediation**

**Name of the Mentor** : Dr. C. Soundar Raju

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Mr. R. Mukilan, Reg.No. 190820

**Abstract**

Vermiremediation is the process of producing compost by utilizing earthworms to turn the organic waste into highly enriched compost. They consist mainly of worm cast in addition to decayed organic matter known as vermicompost. Earthworms to convert the agro-wastes, animal manure and domestic refuse into highly nutrient fertilizers for plant and soil. The objective of this work was aimed at technology development and modifications for the production of quality vermicompost from locally available organic waste materials using composting earthworm in combination with cowdung (1:1). Further investigation, vermicompost was used to study the growth pattern of Sorghum in comparison with soil and cow dung. The results of this study showed that vermicompost treatment showed great potential to increase 82% of germination rate and growth of sorghum plant and improvement of soil quality. Sorghum plants grown in vermicompost-amended soil showed enhanced growth rate when compared to plants treated with plant growth regulators. The study positively highlights the importance of organic farming; therefore, Vermiremediation may be put to good use as a natural fertilizer for cereals and vegetable crops for increased production and for sustainable agricultural systems.

**Keywords:** Vermiremediation, earthworm, organic wast, sorghum, organic farming



GROUP VI Project Title

## **EFFECT OF SOME IMPORTANT BIOFERTILIZER ON CROP PRODUCTION**

**Name of the Mentor** : Dr.V.Kumarasamy

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Mr. K.Socrates, Reg No: 190822  
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Mr. N.Vishnu, Reg No: 190826

Attention has increasing to paid alternate source for applying biofertilizers to increasing food production to satisfied world's population. The exploitation biofertilizers of as a alternate source for inorganic fertilizers in the production of food. Biofertilizers keep the soil environment rich in all kinds of micro and macro nutrients *via* nitrogen fixation. Over the past century legume- *Rhizobium* symbiosis has extensively studied. In recent times, research focus on plant associated symbiotic relationship organisms to fix atmospheric nitrogen fixation. The present study was focused on isolate and evaluate nitrogen fixing biofertilizer *viz* *Gluconacetobacter diazotrophicus* from grass. Altogether, ten isolates of *G.diazotrophicus* from rhizosphere, root and stem of sugar cane from T.Kolingipatti of Madurai district. All the isolates were Gram negative, negative to nitrate reductase, amylase, gelatinase and H<sub>2</sub>S production and positive to catalase and indole production. Among the ten isolates, VCSoS7 solubilized substantial quantity of tricalcium phosphate. Further, the effect of *G.diazotrophicus* on the growth performance of Sweet sorghum. Sweet sorghum plants were grown in a controlled conditions and the effect of inoculation with ten isolates of *G.diazotrophicus* on plant biomass, total nitrogen, soluble sugars and chlorophyll content. The stem isolate VCSoS7 induced a significant increase in dry weight, total N, soluble sugars and chl content in sweet sorghum over the isolates has been discussed.

**Keywords:** Biofertilizer, legumes, *Rhizobium*, *Gluconacetobacter diazotrophicus*, Sweet sorghum