SPECIMEN FORMAT FOR THESES OF MONTH

Faculty	**:**	Science
Department	**:**	Botany
Branch/ Area:	**:**	Botany
Sub Subject Heading:	**:**	Integrated Application of Agroindustrial Compost – An Environmental Friendly Technology for Enhancing Crop Productivity of Legumes
Candidate's Name	**:**	Anju Singh
Candidate's Address with email	**:**	Mrs. Anju Singh C/O- Shri Ram Chandra Singh RE- Three Wheeler Bajaj Agency Fatima Hospital Khajanchi Bazaar P/O -Arogya Mandir Gorakhpur **Email :** gkp.anjusingh@gmail.com
Title of the thesis	**:**	Integrated Application of Agroindustrial Compost – An Environmental Friendly Technology for Enhancing Crop Productivity of Legumes
(i) In Roman Script		-
(ii) In roman Script		-
Nomenclature of Degree:	**:**	Ph.D
Month & Year of Enrolment:	**:**	June, 2011
Month & Year of Registration:	**:**	June, 2011
Month &Year of Submission:	**:**	March, 2015
Month &Year of Award	**:**	January, 2016

Name of Supervisor	**:**	Dr. A. Vijayalakshmi
Designation of Supervisor	**:**	Professor and Head, Department of Botany
Centre/department/school in which research was conducted	**:**	Botany
University's Name & Address	**:**	Avinashilingam Institute for Home Science and Higher Education for Women (University), Coimbatore- 43, Tamil Nadu.

Abstract within 300 words:

A study was conducted to estimate rates of impact of the conjugative use of organic manures like coirpith, pressmud and farmyard manure on black gram, cluster bean and green gram to find out means and solution for the profitable utilization and to reduce its environmental hazards. A pot culture experiment was conducted in sandy clay loam soil with black gram, cluster bean and green gram seeds. Composted coirpith and pressmud produced by the degradation of ligno-cellulolytic fungi (*Pleurotus sajor-caju*) and farmyard was found to be an efficient organic manure as it enhanced the biometric, biochemical, leghaemoglobin content and yield parameters of black gram (*Vigna mungo* L. Var. ADT 5), cluster bean (*Cyamopsis tetragonoloba* L. (taub) Var. Pusa Navbahar) and green gram (*Vigna radiata* L. Var. (Co (Gg) 7)), macro and micro nutrients, enzymatic activity of the soil, incorporated with different concentration of composted coirpith, composted pressmud, farmyard manure and NPK.

Lignin and cellulose content was reduced in composted coirpith. pH was decreased in composted coirpith whereas increased in composted pressmud. EC, organic carbon and C: N ratio was reduced in the composted coirpith and composted pressmud. Nitrogen, phosphorus, potassium, calcium and magnesium were increased in the composted coirpith and pressmud. The vegetative parameters root length (cm), shoot length (cm), number of leaves, number of nodules, number of flowers/plant, number of pods/plant, plant fresh weight (gm), plant dry weight (gm)) of black gram, cluster bean and green gram were increased in all the treatments on 25, 45 and 55 DAS when compared to the control. Protein content, carbohydrate content, Chlorophyll a, b and total chlorophyll content was maximum in T_{12} (composted coirpith (6.5t ha^{-1})+ composted pressmud (6.5t ha^{-1})+ farmyard

manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment as compared to the control T_1 on 25, 45 and 55 DAS.

Leghaemoglobin content was significantly increased in T_{12} (composted coirpith (6.5t ha^{-1}) + composted pressmud (6.5t ha^{-1})+ farmyard manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment when compared to the control T_1 on 25, 45 and 55 DAS. Yield parameters (number of pods/plant, length of pod (cm), Weight of pod (gm), number of seeds/pod, weight of seeds/pod (gm), pod fresh weight (gm), pod dry weight (gm)) were increased in all the treatments as compared to the control on 75th day. The protein and carbohydrate content in pods of black gram, cluster bean and green gram were maximum in T_{12} (composted coirpith (6.5t ha^{-1}) + composted pressmud (6.5t ha^{-1}) + farmyard manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment when compared to control T_1.

The dehydrogenase and urease activity of the soil of black gram, cluster bean and green gram were increased in T_{12} (composted coirpith (6.5t ha^{-1}) + composted pressmud (6.5t ha^{-1})+ farmyard manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment when compared to control T_1 on 0 day, 25,45, 55 and 75 DAS. In pre and post harvest soil, the pH, EC, macro (available nitrogen (Kg/ha), available phosphorus (Kg/ha) and available potassium (Kg/ha)) and micro (sulphur (ppm), copper (ppm), zinc (ppm), iron (ppm) and manganese (ppm)) nutrients were increased in all the treatments as compared to control T_1.

i) Major objectives :

- To monitor the effect of the composted agrowastes (coirpith and pressmud) and organic manure (FYM) on the biometric and yield parameters of the plants.
- To evaluate the influence of composted coirpith, composted pressmud and farmyard manure on chlorophyll, protein and carbohydrate content of the legumes.
- To study the leghaemoglobin content in the nodules grown in different treatments of agrowastes.
- To study the changes in enzymes (dehydrogenase and urease) in different treatments in soil.
- To investigate the efficiency of composts and chemical fertilizers in improving the soil fertility.

ii) Methodology :

Sample- Lignin degrading mushroom *Pleurotus sajor caju* degrades coirpith and pressmud, and convert into organic manure which promote crop productivity and physical, chemical and biological properties of the soil.

Instruments/Tools used- Spectrophotometer, Refrigerator centrifuge, Deep freezer, pH meter, soil thermometer and Incubator etc.

Statistical Techniques/Designs- One way and two way ANNOVA

Experimental observation- A pot culture experiment was conducted in sandy clay loam soil with black gram, cluster bean and green gram seeds. Composted coirpith and composted pressmud produced by the degrading of ligno-cellulolytic fungi (*Pleurotus sajor-caju*) and farmyard manure was found to be an efficient organic manure for crop productivity and soil fertility.

Inference- From this study, it can be concluded that composted coirpith and pressmud produced by the degradation of ligno-cellulolytic fungi (*Pleurotus sajor-caju*) and farmyard manure was found to be an efficient organic manure as it enhanced the biometric, biochemical, leghaemoglobin content, yield parameters (blackgram, cluster bean and green gram) and enzymatic activity of the soil, incorporated with different concentration of composted coirpith, composted pressmud, farmyard manure and NPK. The enhancement in growth and yield parameters of the test crops might be due to the synergistic interaction of the constituent present in the composted coirpith and pressmud along with farmyard manure.

iii) Findings:

1. Lignin and cellulose content was reduced in composted coirpith. pH was decreased in composted coirpith whereas increased in composted pressmud. EC, organic carbon and C: N ratio was reduced in the composted coirpith and composted pressmud. Nitrogen, phosphorus, potassium, calcium and magnesium were increased in the composted

coirpith and pressmud. . 2. The vegetative parameters root length (cm), shoot length (cm), number of leaves, number of nodules, number of flowers/plant, number of pods/plant, plant fresh weight (gm), plant dry weight (gm)) of black gram, cluster bean and green gram were increased in all the treatments on 25, 45 and 55 DAS when compared to the control.

3. Protein content, carbohydrate content, chlorophyll a, b and total chlorophyll content and leghaemoglobin content was maximum in T_{12} (composted coirpith (6.5t ha^{-1})+ composted pressmud (6.5t ha^{-1})+ farmyard manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment as compared to the control T_1 on 25, 45 and 55 DAS.

4. Yield parameters (number of pods/plant, length of pod (cm), Weight of pod (gm), number of seeds/pod, weight of seeds/pod (gm), pod fresh weight (gm), pod dry weight (gm)) were increased in all the treatments as compared to the control on 75^{th} day.

5. The protein and carbohydrate content in pods of black gram, cluster bean and green gram and dehydrogenase and urease activity of the soil of black gram, cluster bean and green gram were maximum in T_{12} (composted coirpith (6.5t ha^{-1}) + composted pressmud (6.5t ha^{-1}) + farmyard manure (6.5t ha^{-1})) treatment followed by T_9 (composted coirpith (12.5t ha^{-1})+ 25% NPK) treatment when compared to control T_1.

6. In pre and post harvest soil, the pH, EC, macro (available nitrogen (Kg/ha), available phosphorus (Kg/ha) and available potassium (Kg/ha)) and micro (sulphur (ppm), copper (ppm), zinc (ppm), iron (ppm) and manganese (ppm)) nutrients were increased in all the treatments as compared to control T_1.

Examiners

Internal Examiner : Dr. M. B. Vishwanathan
Professor and Head,
Department of Plant Science,
Coordinator, Centre for Development of Siddha Ayurvedha Medicine,
School of Life Sciences,
Bharathidasan University,
Trichirapalli- 620024

External Examiner : Dr. Mahfuzur Rahman
Professor,
Department of Botany,
Faculty of Biological Science,
Jahangirnagar University,
Savar, Dhaka, Bangladesh.