

SPECIMEN FORMAT FOR THESES OF MONTH

Faculty : Bio Science

Department : Botany

Branch/ Area: : Organic Farming

Sub Subject Heading: : Organic Farming

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Title of the thesis : Effect of biocomposted sugarcane trash and bagasse on selected crop plants and soil nutrient status

(i) In Roman Script EFFECT OF BIOCOMPOSTED SUGARCANE TRASH AND BAGASSE ON SELECTED CROP PLANTS AND SOIL NUTRIENT STATUS

(ii) In roman Script effect of biocomposted sugarcane trash and bagasse on selected crop plants and soil nutrient status

Nomenclature of Degree: : Ph.D

Month & Year of Enrolment: : July 2017

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Name of Supervisor : Dr. A. Vijayalakshmi

Designation of Supervisor : Professor and Head, Dean, Academics

Centre/department/school in which research was conducted : Bioscience

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Abstract within 300 words:

The compost was incorporated into different treatments and evaluated its effect on vegetative growth, biochemical, yield, soil status, soil microbial population, antioxidant and antibacterial activity of Onion (*Allium cepa* L.), Black Nightshade (*Solanum nigrum* L.), Tomato (*Solanum lycopersicum* L.) and Brinjal (*Solanum melongena* L.). In phase I, composting was carried out in pit using *Pleurotus florida*, *Trichoderma asperelloides*, Microbial consortium and *Eudrilus eugeniae*. Microbial population composting revealed that treatment C₅ noted highest bacterial, fungal and actinobacteria count on 30th, 60th and 90th day respectively. A significant decrease in lignin, cellulose, EC, organic carbon and C:N ratio was noted in C₅ treatment when compared to the raw sample. The increasing trend was noted in C₅ and C₂ treatment for pH, N, P, K, Ca and Mg respectively. The FT-IR spectroscopic analysis showed that raw sugarcane trash and sugarcane bagasse waste sample has a deep peak when compared to the composted sample having a smaller or disappearing peak which may be due to the composting process. Phase II, revealed that the biometric characteristics such as shoot length, root length, number of leaves, number of branches, fresh weight and dry weight (30, 60 and 90 days) and yield parameters number of bulb/fruit, diameter of fruit, fruit yield per plant and fruit yield per plot (90 days) were significantly higher in T3 in onion and tomato, T4 in black nightshade and T5 in brinjal. Phase III results revealed that biochemical parameters such as protein, carbohydrates and chlorophyll in leaves were noted in T3 in onion and tomato, T4 in black nightshade and T5 in brinjal. Protein and carbohydrates increased in T3 in onion and tomato, T4 in black nightshade and T5 in brinjal. Phase IV results showed the initial and post-harvest soil pH, electrical conductivity, available nitrogen, available phosphorus, available potassium of crops more in T3 in onion and tomato, T4 in black nightshade and T5 in brinjal. Remarkable antioxidant activity of bulb extracts in T3, leaves extracts of black nightshade in T4, fruit extracts of tomato and brinjal in T5 in best treatment and control. The antibacterial activity with higher zone of inhibition was observed in best treatment and control.

i) Major objectives:

- To prepare compost from sugarcane trash and sugarcane bagasse waste using *Pleurotus florida*, *Trichoderma asperelloides*, *Eudrilus eugeniae* and Microbial consortium.
- To count and evaluate the microbial population present in compost during 30, 60 and 90th days.
- To evaluate physico-chemical parameters of raw and composted sugarcane trash and sugarcane bagasse waste.
- To investigate the functional groups of raw and composted sugarcane trash and sugarcane bagasse waste using Fourier transform infrared spectroscopy (FT-IR).
- To evaluate the role of different compost treatments on the growth and yield of *Allium cepa* L., *Solanum nigrum* L., *Solanum lycopersicum* L. and *Solanum melongena* L.
- To study the protein and carbohydrates content in leaves and seeds of selected plants.
- To determine chlorophyll 'a', chlorophyll 'b' and total chlorophyll content in leaves of selected plants.
- To analyze pre and post-harvesting soil.
- To analyze the pre and post soil microbial population
- To study the antioxidant and antibacterial activity of the selected plants.

ii) Hypothesis:

- ❖ There is no disadvantage resulting from sugarcane trash and sugarcane bagasse

iii) Methodology:

Phase I

- Collection of samples
- Composting procedure
- Microbial count
- Physico-chemical properties of raw and compost sample
- FT-IR analysis of raw and compost sample

Phase II

- Field experiment
- Biometric characters
- Yield parameters

Phase III

- Biochemical analysis

Phase IV

- Pre and post harvesting soil analysis
- Pre and post soil microbial population
- Antioxidant activity
- Antibacterial activity.

iv) Findings:

The present study brings out the possibility of recycling of wastes like sugarcane trash and sugarcane bagasse waste into biocompost by using *Pleurotus florida*, *Trichoderma asperelloides* *Eudrillus eugeniae* and Microbial consortium found to be an efficient organic matter which enhanced the biometric, yield and biochemical parameters of onion, black nightshade, tomato and brinjal sweet grown in compost. The success of the study will allow to minimize the use of chemical fertilizer and pesticide to crops and encourage the farmer to use organic manure for healthy life and environment.

Examiners

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