

SPECIMEN FORMAT FOR THESES OF MONTH

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Department	:	Botany
Branch/ Area:	:	Organic Farming
Sub Subject Heading:	:	
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Title of the thesis	:	Harnessing the benefits of groundnut and toddy palm shell biocompost on selected crops
(i) In Roman Script (ii) In roman Script		HARNESSING THE BENEFITS OF GROUNDNUT AND TODDY PALM SHELL BIOCOMPOST ON SELECTED CROPS harnessing the benefits of groundnut and toddy palm shell biocompost on selected crops
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Designation of Supervisor	:	Professor & Head, Dean Academics
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Abstract within 300 words:

Safe management of plant and animal waste is one of the most important environmental issues in the world. Disposal of groundnut shells and toddy palm shells are a threat to the environment. A significant amount of shell residuals dumping or burning process leads to the accumulation of waste causing environmental pollution. Hence, minimizing the waste by recycling promotes zero-waste production. Recycling of organic waste is most important for preserving natural resources. The current research was performed to investigate the growth and yield performance of bhendi, cluster bean, coriander and fenugreek by the influence of groundnut shell and toddy palm shell composts. The degradation of groundnut shell (GNS) and toddy palm shell (TPS) through the microbial consortium (MC) and *Trichoderma asperelloides* (TA) along with *Eisenia fetida* (EF) has been presented. The treatments includes T₁: GNS + TA + EF, T₂: GNS + MC, T₃: GNS + MC + EF, T₄: TPS + TA + EF, T₅: TPS + MC, T₆: TPS + MC + EF respectively. During composting bacterial, fungal and actinomycetes count were observed at the regular interval of 30, 60 and 90 days which achieved peak stage on 60th day of composting. The physical and chemical parameters of raw and composted samples were analyzed. The results observed range between pH (6.01–6.40), EC (1.39–2.59 dS m⁻¹), TN (0.91–1.39%), TP (1.98–2.51%), TK (2.36–3.85%), Ca (2.27–3.25%) and Mg (2.18–2.99%), were significantly increased while lignin (9.54–6.69%), cellulose (10.71–6.35%), OC (29.8–26.5%) and C:N ratio (29:1–19:1) were considerably reduced in C₆ and other treatments. In addition, FT-IR analysis showed high degradation in C₃ and C₆ and XRD confirms excellent compost maturity. SEM micrographs of final composts revealed the presence of many structural changes. The matured compost was used to evaluate the growth and yield characteristics of selected test crops in field trial in 2019. The application of TPS + MC + EF (T₆) enhanced the growth, yield, biochemical and soil

nutrients status of selected test crops compared to the control. Further, the best treatment (T₆) was compared with coir pith and effective microorganisms in field studies during 2020. The growth, yield, biochemical parameters and nutrients status of soil was observed maximum in coir pith (T₁) or effective microorganisms (T₃). However, the application of bio-composted TPS by using MC and *EF* (T₆) showed near to maximum value. The study revealed that composting could be a sustainable method for recycling organic waste into organic fertilizers, which can help in increasing productivity by enhancing nutrient supply.

i) Major objectives:

- To evaluate the efficacy of bio-composted groundnut shell and toddy palm shell by microbial consortium, *Trichoderma asperelloides* and *Eisenia fetida*.
- To count the microflora present in the bio-compost.
- To study the physico-chemical and spectrochemical analysis of raw and composted groundnut shell and toddy palm shell.
- To assess the effect of bio-compost on the growth and yield parameters of selected crops such as bhendi, cluster bean, coriander and fenugreek under field culture.
- To estimate the biochemical parameters of selected plants in different treatments of agricultural wastes.
- To analyze the pre and post harvested soil of selected plants.
- To evaluate the influence of effective microorganisms and coir pith under field culture.
- To study the growth, yield, biochemical attributes and soil nutrient status of bhendi, cluster bean, coriander and fenugreek under the best treatment.

ii) Hypothesis:

- ✓ There is a significant difference between raw and biocomposted groundnut shell and toddy palm shell.
- ✓ There are no negative consequences present in the study

iii) Methodology :

Phase I

- Collection of materials
- Collection of microorganisms and earthworms
- Preparation of microbial consortium
- Process of composting
- Enumeration of microbial populations
- Evaluation of compost maturity
- Physico-chemical parameters
- Fourier transform infrared spectroscopy
- X-ray diffraction method
- Scanning electron microscopy

Phase II

- Field studies
- Collection of seeds
- Authentication of Test Crops
- Application of treatment and cultivation
- Growth parameters
- Yield parameters

Phase III

- Biochemical analysis
- Soil nutrients status

Phase IV

- Best treatment
- Preparation of effective microorganisms
- Coir pith
- Growth parameters
- Yield parameters
- Biochemical characters
- Soil status

iv) Findings:

The present study not only can be viewed as an alternate solution for the disposal of groundnut shell and toddy palm shell waste but also minimizes the application of chemical fertilizers to crops and encourage organic farming. Good organic fertilizer obtains all necessary micro and macronutrients which is a key to enhance sustainability and productivity of crops. Well bio-composted organic matter applied under the soil would not only improves moisture condition and the structure of the soil but also provide the crop necessary resistance against pest and disease. To conclude the integrated management of groundnut shell and toddy palm shell converted as an organic fertilizer in different combination improved the vegetative and yield parameters of the test crops Bhendi (*Abelmoschus esculentus* (L.) Moench Var. Co 4), Cluster bean (*Cyamopsis tetragonoloba* (L.) Taub Var. MDU 1), Coriander (*Coriandrum sativum* L. Var. Co 4) and Fenugreek (*Trigonella foenum-graecum* L. Var. Co 2).

Examiners

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