YENEPOYA

(DEEMED TO BE UNIVERSITY)
Recognized under Sec 3(A) of the UGC Act 1956
Accredited by NAAC with 'A' Grade

Yenepoya Pharmacy College & Research Centre

Deralakatte, Mangaluru – 575018

Value Added Course
In
Vermicompost Technology

BPVAC01

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Centre For Environmental Studies

YENEPOYA PHARMACY COLLEGE & RESEARCH CENTRE

&

CENTRE FOR ENVIRONMENTAL STUDIES

YENEPOYA (DEEMED TO BE UNIVERSITY)

Derlakatte , Mangalore.

Value Added Course in Vermicompost Technology

Objectives of the Course :

- **Understanding the composting and decomposing process**
- **Generate employments**
- **Creates interest towards organic farming**
- **Helps in maintaining pollution free environment**
- **To obtain knowledge regarding biodiversity of local earthworms**

Venue: Vermicompost centre, Centre for Environmental Studies
Duration: 3 Months
Year of Commencement: 2017

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Course Coordinator
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VALUE ADDED COURSE IN VERMITECHNOLOGY

Preamble:

Vermicomposting truly is nature's great disappearing act! Aristotle oncesaid, *"Worms are the Intestines of the Earth"*. Using worms to convert decomposing food waste into nutrient-rich fertilizer is simple, inexpensive, energyefficient, and a great way to teach students to become life-long recyclers.

Vermicomposting technology is known throughout the world, albeit in limited areas. It may be considered a widely spread, though not necessarily popular technology. As a process for handling organic residuals, it represents an alternative approach in waste management, in as much as the material is neither land filled nor burned but is considered a resource that may be recycled. In this sense, vermicomposting is compatible with sound environmental principles that value conservation of resources and sustainable practices. Vermicomposting is akin to composting in that similar feedstock-organic residuals are used. Both systems utilize microbial activity to break down organic matter in the moist, aerobic environment. Vermicomposting is however faster, produces fewer odors and produces a superior product. But vermicomposting requires greater surface area, more moisture, and is susceptible to heat, high salt levels, high ammonia levels, and substances that may be toxic to earthworms. Of the 4400 identified earthworm species, specific species of litter dwelling earthworms are required for this purpose. Vermicomposting in developing countries could prove to be useful in many instances. Where accumulation of food wastes, paper, cardboard, agriculture waste, manures and biosolids is problematic, composting and vermicomposting offer potential to turn waste material into a valuable soil amendment. In the past ten years an organization in India has promoted over 3,000 farmers and institutions to switch from conventional chemicals to the organic fertilizer, vermicompost. Vermiculture enables any scale or size of operation. Vermicompost is being used in over 1,00,000 hectare cultivated area in almost all agro-climatic zones in India.

Noted for its ability to increase organic matter and trace minerals in soil, vermiculture has been the primary focus at Maharashtra Agricultural Bioteks in India, an organization that has initiated both commercial and educational ventures to promote vermiculture. In 1985, Maharashtra Agricultural Bioteks was formed and established a small plant to manufacture vermicompost from agricultural waste. Those involved believed that a successful commercial venture based on regenerative principles might convince others to adapt sustainable practices. The organization currently produces 5,000 tons of vermicompost annually. Its real achievement, however, has been in raising awareness among farmers, researchers and policy makers in India about regenerative food production methods. The group is directly responsible for 2,000 farmers and horticulturalists adopting vermicomposting. These converts have begun secondary dissemination of the principles they were taught.

In 1991-1992, Maharashtra Bioteks and the India Department of Science and Technology promoted the adoption of vermicompost technology in 13 states in India. The group has also established a vermicompost unit with Chitrakoot Gramodaya University, Madhya Pradesh which produces five tons of vermicompost per month. Educational institutes in Maharashtra & other states have started conducting certificate/diploma/regular courses on vermiculture, vermiculture biotechnology, and vermiculture & vermicompost technology.

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Aim & Objectives:

- Students will be able to compost in a limited space and describe the decomposing process.
- The interested students will get the knowledge of composting
- Students will get employment
- They can generate employments
- They will also turn towards organic farming
- Will help to maintain the environment pollution free and
- Will get the knowledge of biodiversity of local earthworms.

The details of the course are as follows:

Focus: To convert unwanted, organic matter, particularly food scraps and paper into fertile compost.

Name of the course: Vermicompost Technology

Level: Certificate

Stream: Science or any stream

Subject: Environmental Science

Duration: 3 Months

Language: English

Selection /Admission Criteria: First come first serve

Attendance: 90%

Lecture/practical timing: 4.00 PM to 5.00 PM

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Academic calendar for the course: Five days in a week (4days theory periods & 1day practical)

Available infrastructure: Well equipped laboratory, small & large scale vermiculture units

Teaching Staff: Qualified and experienced staff from Centre for Environmental Studies will engage theory classes and provide the training.

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Examination structure & schedule:

At the end of course the examination will be conducted. Its notice & time table will be displayedfor communication to the students at least before 15 days of the date of examination.

1. Course BPVAC01T - Theory paper (objective/short answer type) = 50 marks, two hours duration.
2. Course BPVAC01P - Practical paper =50 marks, two hours duration

Marking scheme & Award of grades: Average of the marks obtained in each paper will be calculated as: 50+50 = 100/2 = 50

i) 08-10 marks = 1point, C' grade – pass

ii) 10-20 marks = 2 points, B' grade – pass

iii) 20-30 marks = 3points, B+ grade – pass

iv) 30-40 marks = 4points, A' grade – pass

v) 40-50 marks = 5points, A+ grade – pass

Award of Certificate carrying grades: after successful completion of course certificateindicating grade will be awarded to the candidate.

Reservation: NA

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Course Content:

Syllabus/Program:SCHEME

Vermicompost technology as one of the Certificate Course at undergraduate level

Credits to be earned	: 04
Theory paper	: 03
Practical	: 01

Proposed distribution of the course structure

Sr. No.	Code	Title of the paper	Credit pattern in L:T:P	Credit value
1	BPVAC01T	Vermicompost technology	3:0:0	03
2	BPVAC01P	Vermicompost technology related to theory	0:0:1	01

Value added course for any students enrolled in the College from different disciplines.

Title of the Course: Vermicompost technology

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Theory Course BPVAC01T

Theory **3 Credits**

	Unit-I General **Vermiculture/ Vermicompost**	**12Hrs**
1	Introduction to vermiculture. definition, meaning, history, economic important,their value in maintenance of soil structure, role as four r's of recycling reduce, reuse, recycle, restore.	
2	His role in bio transformation of the residues generated by human activity and production of organic fertilizers. How does nature works.	
3	The matter and humus cycle (product, qualities). Ground population,	

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	transformation process in organic matter.	
4	Choosing the right worm. Useful species of earthworms. Local species ofearthworms. Exotic species of earthworms. Complementary activities of autoevaluation.	
	Unit-II **Earthworm Biology and Rearing**	**12Hrs**
5	Key to identify the species of earthworms.	
6	Biology of Eisenia fetida. a) Taxonomy Anatomy, physiology and reproduction of Lumbricidae. b) Vital cycle of Eisenia fetida: alimentation, fecundity, annual reproducer potential and limit factors (gases, diet, humidity, temperature, PH, light, andclimatic factors). Complementary activities of auto evaluation.	
7	Biology of Eudrilus eugeniae. c) Taxonomy Anatomy, physiology and reproduction of Eudrilidae. d) Vital cycle of Eudrilus eugeniae: alimentation, fecundity, annual reproducerpotential and limit factors (gases, diet, humidity, temperature, PH, light, and climatic factors). Complementary activities of auto evaluation.	
	Unit-III **Vermicompost Technology (Methods and Products)**	**12Hrs**
7	Small Scale Earthworm farming for home gardens - Earthworm compost for home gardens	
8	Conventional commercial composting - Earthworm Composting larger scale	
9	- Earthworm Farming (Vermiculture), Extraction (harvest), vermicomposting harvest and processing.	
10	Nutritional Composition of Vermicompost for plants, comparison with other fertilizers	
11	Vermiwash collection, composition &use	

12	Enemies of Earthworms, Sickness and worm's enemies. Frequent problems. How to prevent and fix them. Complementary activities of auto evaluation.	
	Unit-IV **Applied vermiculture.**	**12Hrs**
13	a) The working group experience with E. fetida populations comportment withfarm industrial residues (frigorific, cow places, feed-lot, aviaries exploitations, and solid urban residues). b) Lineaments to vermicomposting elaboration projects.	
14	c) Considerations about economical aspects of this activity. Research and ratability according to different exploitation orientations (worm'smeat production, worm's humus production, or integrated projects). Toxins released by the worms (harmful effects) Complementary activities of auto evaluation.	

Practical Course – BPVAC01P

Practicals 1 Credit

	Unit-V	**18Hrs**
1	Key to identify different types of earthworms	
2	Field trip- Collection of native earthworms & their identification	
3	Study of Sytematic position, habits, habitat & External characters of *Eisenia fetida*	
4	Study of Life stages & development of *Eisenia fetida*	
5	Study of Life stages & development of *Eudrilus eugeniae*	
6	Comparison of morphology & life stages of *Eisenia fetida* & *Eudrilus eugeniae*	
7	Study of Vermiculture, Vermiwash & Vermicompost equipments, devices	
8	Preparation of vermibeds, maintenance of vermicompost & climatic conditions.	
9	Harvesting, packaging, transport and storage of Vermicompost and separation	

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	of life stages	
10	Study of worms diseases & enemies	
11	Study the effects of vermicompost & vermiwash on any two short duration crop plants	
12	Study the effects of sewage water on development of worms	

Total periods in hrs = Theory 12hrs per unit x 4 units = 48hrs x 60 minutes =2880 minutes+18 hrs for practical (i.e. 18x60 minutes =1080 minutes); 2880+1080 =3960 minutes. 66hrs÷5hrs in a week = 13.2 weeks duration i.e. 3 months (92 days)

Initially about 60days are required to set the culture or to form the vermicompost, latter on in about 45 days second culture will be formed. Students will observe 2 succeeding beds (rearing).Total days 60+45 = 105 days. (not recognized by UGC, for UGC 20 credits of which 10 credits for project/ field work/training, it should be of 300 hrs, duration 6 months)

Advantage of the Course & Future Prospects:

I. Students can construct their own compost farm & thereby can get monthly income of Rs.7000-8000.
II. Students/ farmers by using vermicompost in their field can increase the crop yield.
III. Students residing in cities can produce vermicompost in small scale for garden/householdplants.
IV. They can get the jobs in educational institutes as vermicompost/vermiculture technician.
V. The candidate can generate income by supplying verms, vermiwash, & vermicompost.
VI. By developing & propagating vermicompost technology he/she will directly or indirectly help to prevent environmental pollution, by using vermicompost in the field & thereby increasing crop yield he will help to solve food problems.
VII. It will lead towards organic farming & healthy food.
VIII. In today's world, recycling of garbage has become necessary in order to sustain our health and environment. So let's join for **Four R's of Recycling Reduce, Reuse, Recycle, Restore** i.e. certificate course in vermicompost technology.

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Reference books:

1. Bhatt J.V. & S.R. Khambata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi
2. Dash, M.C., B.K.Senapati, P.C. Mishra (1980) " Verms and Vermicomposting" Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, Jyoti Vihar, Orissa.
3. Edwards, C.A. and J.R. Lofty (1977) "Biology of Earthworms" Chapman and Hall Ltd., London.
4. Lee, K.E. (1985) "Earthworms: Their ecology and Relationship with Soils and Land Use" Academic Press, Sydney.
5. Kevin, A and K.E.Lee (1989) " Earthworm for Gardeners and Fisherman" (CSIRO, Australia, Division of Soils)
6. Rahudakar V.B. (2004). Gandul khatashivay Naisargeek Paryay, Atul Book Agency, Pune.
7. Satchel, J.E. (1983) "Earthworm Ecology". Chapman Hall, London.
8. Wallwork, J.A. (1983) "Earthworm Biology" Edward Arnold (Publishers) Ltd. London.

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