



CERTIFICATE COURSE ON VERMICOMPOST

Organized by

Department of Zoology

Adv. M. N. Deshmukh Arts, Science and Commerce College Rajur,

Tal- Akole, Dist- Ahmednagar, Pin-422604

Duration: 30 contact hours.

Coordinator

Prof. J. D. Arote (Head of Department)

Faculty

Prof. Dr. B. K. Tapale

Prof. M. L. Kanawade

Prof. P. B. Daye

Certificate course on VERMICOMPOST

Vermicomposting truly is nature's great disappearing act! Aristotle once said, "Worms are the Intestines of the Earth". Using worms to convert decomposing food waste into nutrient-rich fertilizer is simple, inexpensive, energy efficient, 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 bio solids 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. The duration of courses ranges

from 10 days to six months. The Department of Zoology in collaboration with Geography & Botany Departments running this course

Aims & Objective:

- 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 the 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 detail of the course is as follows:

Focus:

To convert unwanted, organic matter, particularly food scraps and paper into fertile soil.

Name of the course: Certificate Course in Vermicompost

- Level: Certificate
- Stream: Science or any stream
- Subject: Vermiculture/ vermicompost
 - Duration: 3.5months i.e.105 days
 - Intake: 30 seats
 - Available infrastructure: Well-equipped laboratory, small & large scale vermiculture units
 - Teaching Staff: Qualified, Experienced.
 - Title of the Course: Certificate Course in Vermicompost technology

Theory Course

Unit-I General Vermiculture/ Vermicompost

- 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, transformation process in organic matter.
- 4 Choosing the right worm. Useful species of earthworms. Local species of earthworms. Exotic species of earthworms. Complementary activities of autoevaluation.

Unit-II Earthworm Biology and Rearing

- 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, and climatic 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 reproducer potential and limit factors (gases, diet, humidity, temperature, PH, light, and climatic factors). Complementary activities of auto evaluation.

Unit-III Vermicompost Technology (Methods and Products)

- 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.

13 a) The working group experience with *E. fetida* populations' comportment with farm 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's meat production, worm's humus production, or integrated projects). Toxins released by the worms (harmful effects) Complementary activities of auto evaluation

Practical Course

Practical Unit-V

- 1 Key to identify different types of earthworms
- 2 Field trip- Collection of native earthworms & their identification
- 3 Study of Systematic 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 vermibeds, maintenance of vermicompost & climatic conditions.
- 9 Harvesting, packaging, transport and storage of Vermicompost and separation 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

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/household plants.
- 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.

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.

TIME TABLE OF THE COURSE
TITLE OF THE COURSE: VERMICOMPOST

Sr. No.	Date	Day	Time	Teacher	No. of Lecture	Practical
1	05/07/2020	Friday	2 PM to 3 PM	J.D.Arrote	01	Theory
2	06/07/2020	Saturday	2 PM to 3 PM	B.K.Tapale	01	Theory
3	12/07/2020	Friday	2 PM to 3 PM	M.L.K	01	Theory
4	13/07/2020	Saturday	2 PM to 3 PM	P.B.Daye	01	Theory
5	19/07/2020	Friday	2 PM to 5 PM	J.D.Arrote	03	Practical
6	20/07/2020	Saturday	2 PM to 3 PM	B.K.Tapale	01	Theory
7	26/07/2020	Friday	2 PM to 3 PM	P.B.Daye	01	Theory
8	27/07/2020	Saturday	2 PM to 5 PM	M.L.K	03	Practical
9	02/08/2020	Friday	2 PM to 3 PM	J.D.Arrote	01	Theory
10	03/08/2020	Saturday	2 PM to 3 PM	B.K.Tapale	01	Theory
11	09/08/2020	Friday	2 PM to 3 PM	M.L.K	01	Theory
12	10/08/2020	Saturday	2 PM to 5 PM	P.B.Daye	03	Practical
13	16/08/2020	Friday	2 PM to 3 PM	J.D.Arrote	01	Theory
14	23/08/2020	Friday	2 PM to 3 PM	B.K.Tapale	01	Theory
15	24/08/2020	Saturday	2 PM to 3 PM	M.L.K	01	Theory
16	30/08/2020	Friday	2 PM to 5 PM	P.B.Daye	03	Practical
17	31/08/2020	Saturday	2 PM to 3 PM	J.D.Arrote	01	Theory
18	06/09/2020	Friday	2 PM to 3 PM	P.B.Daye	01	Theory
19	07/09/2020	Saturday	2 PM to 3 PM	M.L.K	01	Theory
20	13/09/2020	Friday	2 PM to 5 PM	B.K.Tapale	03	Practical
21	14/09/2020	Saturday	2 PM to 3 PM	P.B.Daye	01	Theory