

CERTIFICATE COURSE IN ORGANIC FARMING AND SOLID WASTE MANAGEMENT THROUGH VERMITECHNOLOGY



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Course Co-ordinator: Prof. Arti Prasad

ADMISSION PROCEDURE

Eligibility: 10th with minimum of 50% marks

Seats: Minimum 10; Maximum 30

Fee: 4000/-

Reservation: As per University rule

Mode of instruction: English and Hindi both

Duration of the Course: 6 months

Session: July and January of each year

Course material: Compendium of lectures, Video lecture, hands-on-training by experts, Certificate after course completion and exam

Course assessment: Assessment of students will be carried out on the basis of internal evaluations which include attendance, assignments, viva, test papers and practical skill during training and University exam.

INTRODUCTION

Sustainable development is the successful management of resources to satisfy the changing human needs, maintaining and enhancing the quality of environment and conserving natural resources at the same time. The ultimate aim of sustainable development is to conserve natural resources and human health in long term.

The research on earthworms has gained a lot of priority in India as well as in other countries. Charles Darwin's observation on earthworms is a milestone in understanding the soil biology and an enormous contribution to some aspects of the genesis of humus and of its role in soils. Earthworms are perhaps the best known of all soil inhabiting animals commonly called "friends of farmers" due to the beneficial role that they play in soil. Vermicomposting is the process of decomposition of organic matter in which the mutual actions of earthworms and micro-organisms are used to convert the organic waste into vermicompost, a rich soil fertilizer. Almost any agricultural, urban or industrial organic material can be used for vermicomposting providing that it does not contain any toxic material that can harm the earthworms.

Organic waste possess a serious environmental problem globally. This can be solved by combination of effective technologies like Biodung composting and Vermitech (incorporating earthworms for the production of vermicompost

Due to increasing urbanisation, industrial growth and high cost related to waste treatment facilities, solid waste management is done in an unsustainable manner, mainly in developing countries. This leads to serious environmental problems in terms of air, ground/surface water pollution and contribution to global warming in the absence of the leachate and gas collection systems in landfills. Vermicomposting technology provides a sustainable and low input basis to overcome these problems through the management of organic fraction of solid waste streams.

OBJECTIVES

1. To get an approach of ecofriendly solid waste management
2. To develop the concept of scientific organic natural farming with a key component of making organic manure through earthworms.
3. To provide the knowledge of commercial vermicomposting , including rearing of earthworms and production of earthworm casts
4. To produce high nutritional vermicompost for soil health improvement
5. To produce vermiwash for scientific crop production
6. To introduce indigenous varieties of Rajasthan in vermicomposting
7. To generate self employment by producing worms, compost and vermiwash.
8. To educate educational institutes to use their waste and produce compost for the use of their gardens.

COURSE OUTCOMES

At the end of the course, the candidates will be able to

1. Learn details about important types of earthworms
2. Learn low cost production and marketing of.
3. Take up vermiculture as profession and run it profitably
4. Maintain a compost farm in a hygienic and scientific way
5. Work out the economics of vermiculture
6. Can produce vermicompost in small scale for garden/household plants
7. 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.
8. It will lead towards organic farming & healthy food.

Skills to be provided

1. To provide the knowledge of how to turn all kinds of waste garbage to a valuable compost.
2. To impart the knowledge of converting the weeds into food of earthworms and preparing vermicompost.
3. To impart skills of producing vermicompost and vermiwash
4. Skill in handling earthworms
5. Skill in setting up a compost farm

EMPLOYMENT OPPORTUNITIES

The candidates will become self-reliable and employable and also being equipped with additional skills to meet the challenges in future.

1. Establish and effectively manage a small independent business enterprise by setting up a holistic compost farm or in partnership by liaising with different stake holders
2. Students can generate a source of monthly income of Rs. 7000-8000 by supplying worms, vermiwash, & vermicompost.
3. Those candidates who are engaged in farming can increase the crop yield by using vermicompost in their field
4. Get the jobs in educational institutes as vermicompost/vermiculture technician.

SYLLABUS

THEORY I: BIOLOGY OF EARTHWORMS

CODE: CC VT -CT01

UNIT I - Morphology & Anatomy:

Earthworms Taxonomic position ,external features- shape , size,colour,segmentation,setae&clitellum.Bodywacoelom,locomotion,digestive,excretory & nervous system.

UNIT II - Biology

Reproductive system-Male & Female, copulation, cocoon formation & fertilization, development of earth worm.

UNIT III - Habitat Ecology:

Burrowers, casts, nocturnal, poikilothermal, ecological grouping – Epigeic species, Endogeic species and Anecics.

UNIT IV - Diversity of species:

Detailed study of Lumbricus terrestris, Eisenia eugenia,Eudrilus Eugenia, Amynthas gracilus, Perionyx excavates.

UNIT V - Economic importance of Earthworms:

In sustainable agriculture, organic farming, earthworm activities, soil fertility & texture, soil aeration, water impercolation, decomposition & moisture, bait & food.

THEORY II: VERMITECHNOLOGY AND SOLID WASTE MANAGEMENT

CODE: CC VT -CT02

UNIT – I

Vermitechnology- Definition, history, growth and development in other countries & India, significance.

UNIT – II

Vermiculture – definition, scope and importance; common species for culture; Environmental parameters; culture methods – wormery – breeding techniques; indoor and outdoor cultures - monoculture and polyculture – merits and demerits.

UNIT – III

Vermicomposting of wastes in field pits, ground heaps, tank method, roof shed method, static pile windrows, top fed windrows, wedges & bin method, harvesting the compost, storage, Vermiwash-Preparation and application.

UNIT – IV

Applications of vermiculture – Vermiculture Bio-technology, vermi-composting, use of vermicastings in organic farming/horticulture, earthworms for management of municipal/selected biomedical solid wastes; as feed/bait for capture/culture fisheries; forest regeneration.

UNIT – V

Future perspectives – Predator / pathogen control in wormeries; Potentials and constraints for vermiculture in India. Marketing the products of vermiculture – quality control, market research, marketing techniques – creating the demand by awareness and demonstration, advertisements, packaging and transport, direct marketing. Visit to relevant Labs/Field Visits

PRACTICALS (Based on above topics)

CODE: CC VT -CP01

1. Procurement of Worms (Exotic and Inegenous)
2. Procurement of cowdung and different waste collections
3. Decomposition of waste materials
4. Formation of composting pits
5. Preparation of vermibeds
6. Harvesting of worms and compost
7. Chemical analysis of Compost and comparison of FYM and chemical fertilizers
8. Small scale demonstration of compost and vermiwash on any two vegetable grown locally
9. Helping the trainee to get self employment by contacting various agencies

SUGGESTED READING

1. Sultan Ahmed Ismail, 2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.
2. Bhatnagar & Patla,2007. Earthworm vermiculture and vermin-composting, Kalyani Publishers,New Delhi
3. Mary Violet Christy,2008. Vermitechnology,MJP Publishers, Chennai.
4. Aravind Kumar, 2005.Verms & Vermitechnology, A.P.H. Publishing Corporation, New Delhi.
5. Sultan Ahmed Ismail, 2005. The Earthworm Book, Second Revised Edition. Other India Press, Goa, India.
6. Bhatnagar & Patla,2007. Earthworm vermiculture and vermin-composting, Kalyani Publishers, New Delhi.
7. Jordan & Verma,2009. Invertebrate Zoology , Chand & Company Ltd.
8. Edwards, C.A & P.J Bohlen, 1996. Biology and ecology of earthworms III Edn. Chapman & Hall N.Y.U.S.A.
9. Lee, K.E. 1985. Earthworms their ecology and relationships