

SEMESTER - I OPEN ELECTIVE -I	22PBOTO16-1: ORGANIC FARMING AND BIOFERTILIZERS	CREDITS: 3 HOURS: 30
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COURSE OBJECTIVES

1. Increase genetic diversity.
2. Promote more usage of natural pesticides.
3. To exploit the microbial diversity in various agro-ecologies for biofertilizer application in diversified systems.
4. To study the impact of soil management practices on microbial functions and soil health.
5. To improve biofertilizer technology to ensure high quality and improved delivery.

Unit I : Importance of Organic Farming

Introduction: Farming, organic farming, concept and development of organic farming. Historical development of Organic Agriculture in India, Present status of Organic Agriculture. Types of organic farming, Benefits of organic farming. Conventional farming v/s organic farming, Scope and Present state of organic farming, national and international status.

Unit II : Organic manure

Organic Manure, advantages of organic manure, Farm Yard Manure /Rural compost, Citycompost, Oil cakes, Animal wastes, etc. Green Manure – Green Manure with Leguminous crops in crop rotation. In-situ incorporation of crop residues –Benefits.Preparation of Compost- Different Methods, Enrichment of compost and Nutrientcomposition. Preparation of vermin compost.

Unit III : Bio-fertilizer

Fertilizer, chemical fertilizer, Bio-fertilizers, types of Bio-fertilizer, advantages and disadvantages. Study of growth characteristics of various microbes used in biofertilizers production. Storage, shelf life, quality control and marketing. Types of biofertilizer– Bacteria (*Azospirillum*), Cyanobacteria (*Nostoc*), Fungi (*Glomus*) Nitrogenous Biofertilizers(*Rhizobium*) phosphate and Seaweed Liquid Fertilizer.

Unit IV : Bio-pesticides

Biological control, History and concept of biopesticides. Importance, scope and potentialofbiopesticide. Classification of biopesticides, botanical pesticides and biorationales.Mass production technology of bio-pesticides. Major classes- Properties and uses of Fungicides, Bacteriocide and Herbicides. Importance of Neem in organic Agriculture.

Unit V : Standards for organic products

Organic crop management, quality of organic foods and Human Health, Organic Standard, Organic Certification Process, Operational Structure of Organic Certification, Farm inspection and certification, Marketing of Organic Products. Conversion to organicfarming, Process, Income generation activities: Apiculture,

Mushroom production, Terrace farming. Organic Farming and national Economy
Socio Economic impacts.

COURSE OUTCOMES

On the completion of this paper, students will able to

1. Role of NGOs in producing organic products .
2. Selection of crops and varieties for organic produce
3. Certification of organic produce .
4. Students will be acquiring the technical knowledge in Bio fertilizer production technology
5. Knowledge of different manure and fertilizers used in different crops according to soil condition

Text Books

1. Joshi, M., Setty, T.K.P. and Prabhakarasetty 2006. Sustainability through Organicfarming.1st Edition.Kalyani Publishers, Ludhiana, India.
2. Bavec, F. and Bavec, M. 2007. Organic Production and Use of AlternativeCrops.CRC Press, Boca Raton, FL.
3. SarathChandranUnni M.R Sabu Thomas, 2019. Organic Farming, 1st Edn. GlobalPerspectives and Methods, Elsevier.
4. Niir Board 2004. The Complete Technology Book On Bio-Fertilizer And Organic Farming, National Institute Of Industrial Re.

Supplementary Readings

1. Gaur, A C 2011. Handbook of Organic Farming and Biofertilizers
2. Shalini Suri. 2011. Biofertilizers and Biopesticides, Aph Publishing Corporation
3. Lakshman, H.C. and A. Channabasava 2014 Vedams eBooks (P) Ltd (New Delhi,India)
4. NPCS Board of Consultants & Engineers2008, the Complete Book on Organic Farming and Production of Organic Compost, Asia Pacific Business Press Inc.
5. hmadMehraban. 2013. The Basis of Organic Fertilizers, LAP LAMBERT Academic Publishing.
6. Singh, M 2018. Organic Manure: Sources Preparation and Usage in Farming Lands,Siya Publishing House

OUTCOME MAPPING

CO/ PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2
CO2	3	2		2	
CO3	3	2	3	3	3
CO4	3	2	3	3	3
CO5	3	3	3	3	2

SEMESTER - I OPEN ELECTIVE -I	22PBOTO16-2: HERBAL BOTANY	CREDITS: 3 HOURS: 30
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COURSE OBJECTIVES

1. To study the importance of herbal medicine in India
2. To identify the herbal medicine uses plant
3. To cultivation medicinal plants
4. To understand the morphological characters of medicinal plants
5. To learn the survey techniques for evaluating the values of medicinal plants

Unit I : Indian System of Medicines

Introduction to Herbal Botany – A historical perspective of medicinal plants in India – Importance and relevance of medicinal drugs in India – Indian System Medicine – General Information: Ayurveda, Yogic Therapy, Unani, Siddha and Homeopathy (AYUSH) – Study of Phytochemicals – reserve materials, secretory materials and excretory materials.

Unit II : Pharmacognosy

General account on Pharmacognosy– Crude and Commercial drugs – Classification and Evaluation of Crude drugs – Substitution – Adulteration of crude drugs and its detection – methods of adulteration, types of adulteration. Medicinal plants of export values. Rejuvenating herbs—role of non-flowering plants in the field of medicine.

Unit III : Herbal Botany

Morphology of the useful parts, cultivation, collection, phyto-chemical constituents and therapeutic properties of the following medicinal plants; Leaves: *Centella asiatica*; Flower: *Crocus sativus*; Fruits: *Coriandrum sativum*; Seeds: *Terminalia chebula*; Rhizome: *Curcuma amada*; Bark: *Cinchona officinalis*; Root: *Rauwolfia serpentina*; Whole plant: *Phyllanthus amarus*.

Unit IV : Herbal Botany

Allergens – pollen, skin allergens – Poisonous plants of India – Types of Plant poison - active plant poison - treatment for plant poisons – Some important poisonous plants, their toxicity and action.- Remedial plants for the following Disorders – CNS, Cardiac, Cancer, Diabetics.

Unit V : Herbal Botany

Herbal medicine preparation: Decoction, infusion, syrup, tincture and poultice. Food: herbal salad, chutney, soup and Tea. – Exports values of medicinal plants - Bark - *Cinchona officinalis*; Leaves – *Justicia adathoda*; Flower – *Syzygium aromaticum*; Fruits and seed – *Limonia acidissima*, *Papaver somniferum*; Underground stem - *Zingiber officinale*– Unorganized drugs: Gum – *Acacia*; Resin – Turpentine; Fixed oil - Castor oil.

COURSE OUTCOMES

On the completion of this paper, students will able to

1. Understand the different types of medicine systems
2. Know about the basics principles of pharmacognosy and techniques

3. Understand the uses and pharmacological aspects of medicinal plants
4. Know about the remedial plants for various diseases
5. Gain knowledge on the preparation of herbal formulations and export values

Text Books

1. Agarwal, O.P,1985. Chemistry of organic – natural products. Vol-II.
2. Chopra,R.N., Chopra,I.C ., Handa, K.L.,and Kapur,L.D.1994.Indigenous drugs of India.
3. Tilgner, SharolMarie . 2018. Herbal ABC's: The Foundation of Herbal Medicine.
4. Bhagwan Das—Fundamentals of Ayurveda.
5. Kandasamy Pillai,1972. History of Siddha medicine. Govt. of Tamilnadu.
6. Roseline, A. 2011. Pharmacognosy, MJP Publications, Chennai.

Supplementary Readings

1. Krup,P.V. Handbook of medicinal plants Vol I &II, CCRIMH, NewDelhi.
2. Nadkarni,K.M.,1976.Indian Materia Medica Vol I &II, Popular Prakashan Pvt. Ltd.
3. Wallis,T.E.,1967. Text book of Pharmacognosy, J.A. Churchill Ltd.
4. C.K. Kokale, C.K. Kokate& Purohit – Pharmacognosy, NiraliPrakasan, New Delhi.
5. Edwin Jerald &Sheeja Edwin Jerald – Text Book of Pharmacognosy and Phytochemistry, CBS Publishers & Dist., NewDelhi.
6. Pagare, P.K. 2007. Medicinal Plants, APH Publishing Corporation, New Delhi.
7. RasheeduzZafer, 1994. Medicinal Plants of Inida, CBS Publishers & Distributors, Delhi.
8. Panda. H. Hand Book of Herbal Medicines, Asia Pacific Business Press, New Delhi.
9. Panda. H. Hers Cultivation and Medicinal Uses, National Institute of Industrial Research, Delhi.
10. Daniel, M. 2013. Useful Herbs of Planet Earth, Scientific Publications, New Delhi
11. NIIR Board of Technologists, Hand Book of Herbal Products, Vol. I and II, National Institute of Industrial Research, Delhi.

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CO/PO	PO1	PO2	PO3	PO4	PO5
C01	3				2
C02	3	3	3	3	2
C03	3	3	3	3	2
C04	2	3	3	3	2
C05	2	3	3	3	3

SEMESTER - I OPEN ELECTIVE -I	22PBOTO16-3: MUSHROOM CULTIVATION	CREDITS: 3 HOURS: 30
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COURSE OBJECTIVES

1. To study the morphology and types of Mushrooms.
2. To know the spawn production technique.
3. To aware the identification of edible and poisonous Mushrooms.
4. To learn the prospects and scope of mushroom cultivation in small scale industry.
5. To understand the Diseases. Post harvesting techniques of Mushrooms.

Unit I : Introduction

Mushroom – introduction, Life cycle of Mushrooms. Types and identification – edible and poisonous Mushrooms - external factors for growth. Economic importance of Mushrooms as food.

Unit II : Mushroom Cultivation Methods

History and scope of mushroom cultivation-early cultivation- domesticated mushroomstoday-other domesticated fungi.-selection-‘starter’-preparation of spawn- preparation of Compost (outdoor and indoor beds) - incubation - Harvesting and marketing

Unit III : Spawn preparation

Spawn production - grain, powder and granular spawn - mother spawn - planting spawn-spawn preparation-spawning techniques-environmental conditions for spawn runpreparation of culture (Tissue culture and spore culture), preservation and storage ofculture - various media (PDA, malt extract, Wheat extract, compost extract)

Unit IV : Different types of Mushrooms

Cultivation of white Button Mushrooms (*Agaricusbisporus*) and Oyster Mushrooms (*Pleurotus spp*) – materials – sterilization – spawning and fruiting – house design forPleurotus– preservation, canning drying, Cultivation of paddy straw Mushrooms – Preparation, Spawn making – Methods of Cultivation.Mushrooms are different types in Tamil Nadu: a) Button Mushroom b) Oyster Mushroom c) Milky Mushroom and their main income source is agriculture.Primary data was collected through questionnaires and secondary data from online.

Unit V : Mushroom Harvesting Technology

Mushroom technology – nutritive value of edible MushroomsProtein, carbohydrate, fat, mineral, and vitamin - Medicinal value of Mushrooms, Advantages of Mushrooms Cultivation – Harvesting & Marketing (Local, National and International level).

COURSE OUTCOMES

On the completion of this paper, students will able to

1. To enable the students to identify the edible and poisonous mushrooms.

2. To provide hands-on training for the preparation of bed for mushroom cultivation and its harvesting, pests and diseases control and post harvesting management.
3. To provide the students awareness about the marketing trends of Mushrooms.
4. To give the students exposure to the experiences of experts in the field and to functioning mushroom farms.
5. To help the students to learn a means of self-employment and income generation.

Text Books

1. Shubhrata R.Mishra,2014. Techniques of Mushroom Cultivation. Discovery Publuishing House Pvt. Ltd.New Delhi.
2. Kannaiyan.S and Ramasamy, K, 1980. A Handbook of Edible Mushroom. TodayandTomorrows. Printers and Publishers, New Delhi, 104 p.
3. Eswari,S.C.and Pankaj Kapoor,2018, Mushroom Cultivation Mittal Publication, New Delhi.

Supplementary Readings

1. Pathak V.N, Nagendra Yadav and Maneesha Gaur. 1998.
2. Mushroom Production and Processing Technology. Agrobios(India) Jodhpur
3. Suman, B.C. and Sharma, V.P.2007, Mushroom cultivation in India. Daya Publishing House New Delhi.
4. Chauhan,M., Gajre.K. andPrajapati.P.2013, Scientific Cultivation of Mushroom. Biotech Books New Delhi

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CO3	3	2	2	2	3
CO4	3	2	3		2
CO5	3	3	3	3	3