

Ph.D PROGRAMME
DOCTORAL COMMITTEE REPORT

1. Name of the scholar : **S.MAHADEVAN**
2. Registration Number : **Ref.No: 16983/Ph.D. K1/ Microbiology/ Fulltime/ July 2016/ Date: 09.06.2016**
3. Research Centre : **Dept. of Botany & Microbiology,
A.V.V.M. Sri Pushpam College (Autonomous),
Poondi-613 503, Thanjavur Dt.**
4. Research Supervisor : **Dr. S.VIJAYAKUMAR**
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5. Doctoral Committee Members : **1. Dr. H.SAYED JAHANGIR**
Assistant Professor,
Department of Botany,
Jamal Mohamand College (Autonomous)
Trichy-620020.
- 2. Dr. M.AYYANAR**
Assistant Professor,
Department of Botany and Microbiology,
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Poondi-613 503, Thanjavur Dt
6. Date of Doctoral committee Meeting : **26.10.2016**
7. Coursework and credit by the Doctoral Committee from the syllabi offered by : **Doctoral Committee Members**

S. No	Subject Code	Subject Title	Credits
1.	Ph. D Paper 1	Medical botany& Pharmacognosy	4
2.	Ph. D Paper 2	Nanotechnology	4

Total 8

Doctoral Committee Members

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2. Dr. M.AYYANAR

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NANOTECHNOLOGY

Unit-I

Introduction to nanotechnology. Properties of Nanomaterials and their applications, Nanostructures and biocompatible materials. Status of Nanotechnology in India. Development of nanotechnology.

Unit-II

Molecular nanotechnology-DNA based artificial nanostructure. Carbon nanotubes., Biosensors, Nanorobot, Biochips and their application in agriculture. Nano analytics & Nanotoxicology.

Unit-III

Bioactive nanomaterials in bone grafting and tissue engineering, Nanocomposites in replacement therapy. Nanoparticles and microorganisms.

Unit-IV

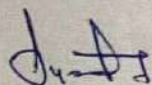
Nanofibers and their application in tissue Engineering, Nanomaterials and drug delivery- Molecular Nanosystems-Molecular manufacturing-Products of molecules manufacturing.

Unit-V

Medical benefits of Nanotechnology and diagnostics, Industrial application of Nano-sized materials-safe utilization of Advanced Nanotechnology, Nanoethics.

References

1. Nanotechnology Information center :properties, Applications, Research, and Safety Guidelines American Elements Retrieved 13 may 2011.
2. S.k Prasad, Modern Concepts in Nanotechnology PP31-32, Discovery Publishing House, 2008 ISBN 8183562965.
3. Cristina Buzea, Ivan Pacheco, and Kevin Robbie (2007) Nanomaterials and Nanoparticles: Sources and Toxicity Biointerphases 2:
4. Analysis: This is the first publicly available on-line inventory of nanotechnology-based consumer products The Project on Emerging Nanotechnologies. 2008 Retrived 13 May 2011.



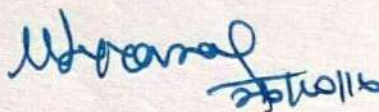
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Medical botany and Pharmacognosy

Unit I

Ethnomedicine – definition, history and its scope – Inter disciplinary approaches in ethnobotany
– Collection of ethnic information.

Unit II

Importance of medicinal plants – role in human health care – health and balanced diet (Role of proteins, carbohydrates, lipids and vitamins).

Unit III

Tribal medicine – methods of disease diagnosis and treatment – Plants in folk religion – Aegle marmelos, Ficus benghalensis, Curcuma domestica, Cyanodon dactylon and Sesamum indicum.

Unit IV

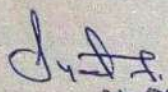
History, Definition and scope of pharmacognosy; Systems of Indian Medicines – Siddha, Unani, Ayurveda, Homeopathy; Terminologies

Unit V

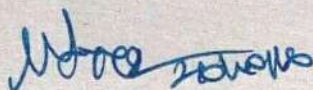
Unit II Classification of Crude drugs – Taxonomical, Morphological, Pharmacological and chemical classifications; Chemistry of drugs and its evaluation.

Reference:

1. Tribal medicine – D.C. Pal & S.K. Jain 1998, Naya Prakash, 206, Bidhan Sarani, Calcutta – 700 006.
2. Contribution to Indian ethnobotany – S.K. Jain 1995, 3rd edition, Scientific publishers, P.B.No. 91, Jodhpur, India.
3. A Manual of Ethnobotany – S.K.Jain, 1995, 2nd edition.
4. Pharmacognosy, S.B.Gokhale, Dr.C.K. Kokate, A.P. Purohit
Publisher: Nirali Prakasham, Pune.


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Course work 1:

RESEARCH METHODOLOGY -RM

UNIT I

Research design – choosing the problem for research – review of literature –Primary, secondary and tertiary sources. Bibliography indexing and abstracting-Reporting the results of research in conference- oral presentation –poster presentation-planning and preparing a thesis – proof correction.

UNIT II

Principles and applications of bright field,dark field,phase contrast, fluorescence Polarization, scanning and transmission electron microscopy – fixation and staining of Materials for electron microscope. Basic knowledge in nano technology.

UNIT III

Principles, instruments and applications: pH meter-centrifuge – rotors – ultraCentrifuge – radio active isotopes and half life of isotopes – autoradiography –Scintillation counter , GM counter – chromatography – types – affinity and HPLC –Colorimeter, UV. Vis spectrophotometer – flame photometer – atomic absorptionSpectrophotometer – electrophoresis – vertical and horizontal types, SDS PAGE.

UNIT IV

Scope of biostatistics – graphical and diagrammatic representation- mean, Median, mode – standard deviation – standard error – test of significance ‘t’ test,One-way ANOVA – simple correlation and simple linear regression.

UNIT V

Basic knowledge of computers and bioinformatics – organization of a computer(CPU,input devices, output devices and memory) – internet basic (internet browsing) –Websites and web pages – links, website addresses – information in the web – internetFile types – saving internet text, E.mail, attaching files- searching the net. Data bases:Nucleic acid sequence databases (EMBL, Gen bank, DDBJ) and protein sequence data Bases (PIR, SWISS-PROT, PDB)

Books for reference

1. Jayaraman, j., (1972) Techniques in biology, Higginbothams, pvt ltd, Madras.
2. Jayaraman. J., (1985) laboratory manual in biochemistry, wiley eastern ltd. Newdelhi.
3. Connor & peter woodford, (1979) writing scientific paper in English pitman Medical pub. Co., ltd, England.
4. Balagurusamy, e., (1985) Programming in BASIC, 2nd ED, Tata McGraw, Hill pub co., newdelhi

Dr. S. GOMATHI, M.Sc., M.Phil., Ph.D., (1987) Computer science vol-I tata mcgraw hill pub. Co., ltd, newdelhi.

Dr. P. Srinivasan, A (1994) fundamentals of biostatistics, vikas pub., hyderabad.
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AGRICULTURAL MICROBIOLOGY

UNIT I

Food microbiology – food as a substrate for microbes, sources of contamination, food spoilage- general principles and causes – factors (intrinsic and extrinsic) affecting growth, chemical changes caused by microbes. Spoilage of cereal and cereal products, vegetables, fruits, meat, fishes and eggs.

UNIT II

Microflora of milk – sources of contamination, method and minimizing contamination, milk borne infections - milk preservation methods – pasteurization, sterilization. Fermented dairy products butter, milk, cream, yoghurt, kaffir, cheese and its types.

UNIT III

Food preservation, physical and chemical methods- use of high and low temperature – use of chemical preservatives, drying and irradiation – food borne infections and intoxications, sources, symptoms and prevention – food hygiene and quality control

UNIT IV


Agricultural microbiology – microbial interaction in soil – bacterial and fungal, fungi and plants. Organic amendments in soils biological and chemical control, manipulation of physico-chemical and biological parameters in soil integrated pest management systems (IPM) – soil fertility and management.

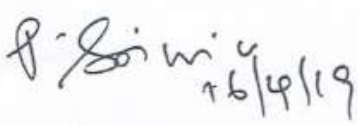
UNIT V


Diseases in crop plants – bacterial : leaf blight and citrus canker. Fungal – brown spot of paddy, takka diseases of groundnut, viral; tungro virus and TMV, biopesticides.

Books for reference

- Frazer, W.C. and Westheff, D.C., (1989) food microbiology 8th ed., Tata McGraw Hill Pub. Co. Ltd., New Delhi
- Jay, J.M., (1987) modern food microbiology, CBS publishers and distributors, New Delhi
- Subba Rao N.S. (1995) soil microorganisms and plant growth. Third edition Oxford and IBH Pub Co Pvt Ltd New Delhi.
- Rangaswami, G., and Mahadevan, A., (2004) diseases of crop plants in India fourth edition. Prentice Hall of India Pvt Ltd New Delhi.


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MICROBIOLOGY AND PLANT PATHOLOGY

UNIT I

Classification of microorganisms (bacteria –bergeys manual 9th ed) fungi, Viruses, algae and protozoa, bacteriology, morphology, structure, nutrition, reproduction-growth (growth curve and physical conditions required for growth) virology: Morphology of viruses (size, shape and structure) – replication of viruses –transmission of viruses – isolation and purification of viruses, general account of mycoplasmas.

UNIT II

Soil microbiology- common and microflora – influence of environmental factors – Moisture, light, wind, ph, temperature and organic matter, plant surface microbiology Definitions and explanations of the following: rhizosphere, rhizoplane, phylloplane and Spermosphere, industrial microbiology : microbiology of sewage, waste water treatment- General design and applications of a biofermenter, industrial fermentation (alcohol)

UNIT III

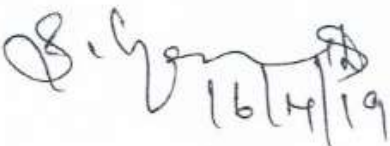
Medical microbiology: systemic mycoses –dermatophytes – therapeutic drugs for Treatment of fungal diseases: antibiotics :structure and mode to action with reference of Penicillin & streptomycin.

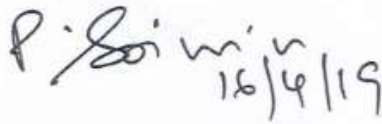
UNIT IV

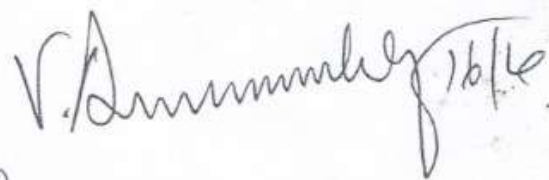
PLANT PATHOLOGY: HISTORY –PRESENT STATUS –KOCHS POSTULATES primary and secondar Sources of inoculums, symptoms of plant disease s – classification of plant diseases. Dissemination of plant pathogens- disease resistance – plant protection.

UNIT V

Diseases caused by fungi (blast of paddy red rot of sugarcane) by bacteria (blight of paddy, black arm of cotton) by virus (bunchy top of banana and TMV) by Mycoplasma (citrus stubborn corn stunt) – control of plant diseases – cultural, physical, Chemical and biological methods.


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7. Kothari, C.R (1991) research methodology – methods and techniques, wiley eastern ltd, newdelhi
8. Sree ramulu, v.s (1988) thesis writing, oxford & IBH pub., newdelhi.
9. Zar, j.h., (1984) biostatistics analysis, prentice hall international , England cliffs, newjerseym.
10. Attwood Teresa, k., parry, smith and david, j., (2001) introduction to bioinformatics cell and molecular biology in action series pearson education (asia) new delhi.
11. Rastogi, s., mendinatta, n and rastogi, p., (2003) bioinformatics concepts skills and applications CBS.publishers, newdelhi.

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V. Ambikapathy 16/4

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Subject code : Ph.D – HSP

Title of the paper : HERBAL SCIENCE AND PHYTOTHERAPY

Research Scholar : N.Sathammai Priya

Reference Number : 16424/Ph.D.K1/Microbiology/ PT/Oct 2017/Dt:03.10.2017

Research Advisor : DR.V.AMBIKAPATHY

Unit I

Introduction to Medical botany – History of Medicinal plants – Classification, Vernacular name Geographical source – Ethomedicobotany – Traditional and Folklore medicine – Native medicine. Ecological habitats of medicinal plants. Traditional Indian systems of medicine: Ayurveda, Siddha, Unani, Homeopathy and Naturopathy.

Unit II

Cultivation, Collection and processing of herbal drugs – Macroscopic characters (Physical and Organoleptic). Therapeutical and Pharmaceutical uses of the following medicinal plants: Rhizome (*Zingiber officinale*, *Curcuma longa*, *Alpinia galanga*), Root (*Glycyrrhiza glabra*), Leaves (*trilobatum*, *Eclipta*), Flower (*rosa-sinensis*), Fruit (*Carica papaya*).

Unit III

Seed (*Strychnos nux-vomica*), whole plant (*Andrographis paniculata*), Fixed oils. Cultivation and utilization of selected medicinal plants – *Bacopa monnieri*, *Phyllanthus amarus* herbal farms and Biotechnological methods - Role of NMPB in cultivation and marketing of medicinal plants.

Unit IV

Pharmacognosy – Definition and scope, Drug adulteration, Drug evaluation - Chemical, Physical and Biological methods. Phytochemical investigation, Standardization and Quality control of herbal drugs. Drugs containing Glycosides (*Cassia angustifolia*), Tannins (*Terminalia chebula*), Lipids (*Arachis hypogaea* oil) Resin (*Cannabis sativus*) and Alkaloids (*Vinca rosea*). IPR and patenting

Unit V

Subject code
Title of the paper
Research Scholar
Reference Number
Research Advisor

: Ph.D- CB
: CLINICAL BIOCHEMISTRY
: N. Sathammai Priya
: 16424/Ph.D.K1/Microbiology/PT/Oct 2017/Dt:03.10.2017
: Dr.V.AMBIKAPATHY

Credit:5

UNIT- I: LABORATORY SETUP AND SAFETY

Requirements of setting up clinical laboratory, SI units in clinical Laboratory, collection preparation, preservation and handling of clinical samples, quality control, Safety measures in clinical laboratory. Formulation of clinical and diagnostic kits, safety aspects.

UNIT-II METABOLIC DISORDERS

Disorders of Carbohydrate metabolism- Diabetes mellitus, glucose and galactose tolerance tests, sugar levels in blood, renal threshold for glucose, factors influencing blood glucose level, glycogen storage diseases, pentosuria, galactosemia.

Disorders of lipid metabolism- Plasma lipoproteins, cholesterol, triglycerides and phospholipids in health and diseases-hyperlipidemia, hyper lipoproteinemia, Gauchers disease, Tay-Sach's and Niemann - Pick disease, ketone bodies, Abetalipoproteinemia.

UNIT-III NEUROLOGICAL AND PSYCHIATRIC DISORDERS

Schizophrenia- types,symptoms,antipsychotic drugs- Affective disorders- Unipolar and bipolar disorders, antidepressants, Alzheimer's disease, Wernicke- Korsakoff syndrome, dementia, Wilson's disease.

Ageing- Physiological and biochemical changes in ageing. Different theories of ageing, importance of superoxide dismutase in ageing, plasticity and regeneration.

UNIT-IV

Disorders of liver and kidney- Jaundice, fatty liver, normal and abnormal functions of liver and kidney. Inulin and urea clearance. Digestive diseases - Maldigestion, Malabsorption, Creatorrhoia, diarrhea and Steatorrhea- Electrolytes and acid base balance- Regulation of electrolyte content of body fluids and maintenance of p^H . Disorders of acid base balance and their respiratory and renal mechanisms.

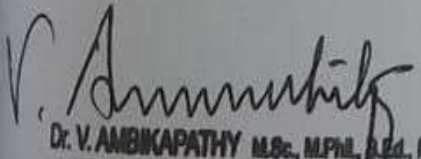
UNIT -V

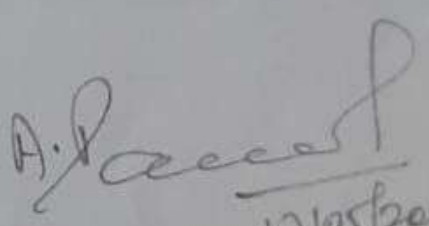
Inborn errors of Metabolism- Disorders of amino acid metabolism- Phenylalanaemia, homocystinuria, tyrosinemia; Disorders of nucleic acid metabolism- Disorders in purine/pyrimidine metabolism.

Hormonal imbalances: protein hormones, steroid hormones, adrenocorticosteroids.

REFERENCE

1. Burger, A., Med. Chem.
2. Wilson and Gisvold, Organic Med. Pharmaceutical Chem.
3. Ariens, Drug Design, Academic press, NY, 1975.


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Ph.D., Course work

Subject code : Ph.D- RM
Title of the paper : RESEARCH METHODOLOGY
Research Scholar : N.Sathammai Priya
Reference Number : 16424/Ph.D.K1/Microbiology/PT/Oct 2018/Dt:03.10.2017
Research Advisor : Dr.V.Ambikapathy

Credit:5

UNIT - I

Choosing the problem for research- Research design- Review of literature, sources of information (Primary, Secondary, Tertiary Sources) – Indexing and Abstracting.

UNIT - II

Written reports: Planning preparing and writing of Thesis – Preparation of manuscripts, full papers, short notes reviews, Bibliography. Reporting the results of research in Conference – Oral presentation, Poster presentation. Proof Correction.

UNIT - III

Biostatistics- Presentation of Data, Measures of Averages, Measures of Dispersion. Principles and applications of Bright field, dark field, phase contrast, fluorescence, polarization, scanning and transmission microscopy.

UNIT - IV

Electronicbiological datavases. Important databases such as biological abstract medicine, Current contents- Genetic Compouter Group databases- BLAST, FASTA, Gen bank, EMBL, PIR, Swiss Prot, Protein Motif databases (Prosite).

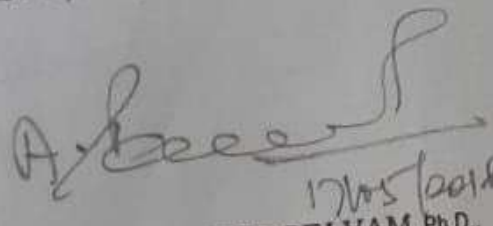
UNIT -V

Intellectual Property Rights- Protection of IPR in India – Patent – Copyright – Trademark, Design – Trade secrets –Plant Variety and farmers right protection – Biodiversity and Biopiracy.

References

- Anerson J.Duslon, B.H. Poole M. 1970. Thesis and Assignment writing, Wiley Eastern Ltd, New Delhi.
Gurumani N., 2006. Research Methodology for Biological Sciences. MJP Publishers. A unit of Tamil nadu Book House. Chennai.
Kothani, C.R., 2005. Research Methodology 2nd edition New Age International Publishers (P) LTd, New Delhi.
Jayaraman, J., 1972. Techniques in Biology, Higginbothams Pvt, Ltd., Madras.

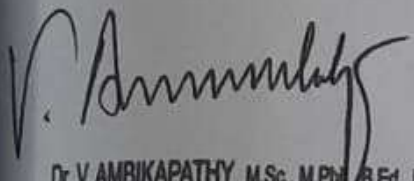

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Preparation of Herbal Powders, Shampoo, Oil, Infusions, and Tinctures; Herbal Foods-
Salad, Sprouts - Herbal Drinks - Tea, Soup; Herbal medicines for Human ailments: Heart, Lung,
Kidney, Liver, Skin, Hair, Stomach, Diabetes, Cold, Cough, Joint Pain disorders.

Books for Reference:

- Kumar, N.C. 1993 An Introduction to Medical Botany and Pharmacognosy,
- Balu, S, Pandiyan, P. and Murugan, R. (2005) Herbal Technology, Dept. of Botany & Microbiology, A.V.V.M Sri Pushpam College, Poondi.
- Nadkarni, 1981 Indian Materia Medica,
- Gamble, J.S. Flora 1973. of the Madras Presidency,
- Jani, S.K., 1980 Indian Medicinal plants.,
- Michael Heinrich, Joanne Barne, Simon Gibbons and Elizabeth, M. Williamson. 2012, Fundamentals of Pharmacognosy and Phytotherapy Elsevier Ltd ISBN: 978-0-7020-3388-9
- Kirtikar, K.R. Basu, B.D. (1991.) Indian Medicinal plants Vol. I to V. Dehradun.


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Identification and analysis of proteins by 2D analysis. Chromatography- principle, instrumentation and application; GC-MS, MALDI-TOF.

Unit V

Bioinformatics- introduction, history and development. Biological databases- primary and secondary databases- Gen Bank, EMBL, DDBJ, NCBI, SWISSPORT, PIR, PROSITE. Sequence alignment BLAST, FASTA, phylogenetic tree, sequence analysis using EMBOSS. Multiple sequence alignment.

REFERENCE

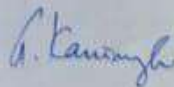
- Old, R.W., and primrose, S.B., (1987). Principles of gene manipulation , Blackwell scientific Publications,, Oxford, UK.
- J. Sambrook and D.W, Russel; molecular cloning: A Laboratory Manual, Vols 1-3, CSHI. 2001.
- Pennington. S-R and M.J. Dann, proteomics and protein sequences to function, Nova Books Private limited, India, 2002.
- Campell AM & Heyer L.J, Discovering Genomics, Proteomics and Bioinformatics, 2nd Edition, Benjamin Cummings 2007.
- Fundamentals of Biotechnology P. Prave, V.Favst and W.Sitting.



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Ph.D course work syllabus
A.V.V.M Sri Pushpam College, Poondi
Ph.D Part – II Examinations

No.of.credit:4

Course paper II: core Recombinant DNA Technology

For the candidate

S.MADHANA,

Research Scholar in Microbiology

Name of the Guide

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Poondi-613 503.

Unit I

Introduction- definition and concepts of r DNA technology, principles and applications.
Enzymes involved in rDNA technology. Cloning strategies – isolation of desired DNA. Genetic engineering and strain improvement.

Unit II

Vectors- plasmids, cosmids, phagemids, expression vectors and artificial chromosomes.
Identification of colony and plaque method.

Unit III

Blotting technique: Southern, Northern and Western Blotting. PCR – types and applications. Chromosomes walking. cDNA and genomics libraries. DNA fingerprinting- RAPD and RFLP. Insertion of foreign DNA into host cells; Transformation, Expression cloning; jumping and hopping libraries.

Unit IV

Genomics- definition, whole genome analysis. Automated sequences- physical methods of sequencing- Maxam and Gilbert and Sanger's method. Gene Expression studies. Functional Genomics; Global gene expression analysis. Micro array and micro chips. Proteomics-

Ph.D course work syllabus
A.V.V.M Sri Pushpam College, Poondi
Ph.D Part – I Examinations

No. of credit 6

Course paper I: core Marine Biotechnology

For the candidate

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Research Scholar in Microbiology

Name of the Guide

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Unit I

Marine ecosystem: concept of ecosystem, characters of marine habitat, classification of marine habitat. Importance of marine biological diversity: species, ecosystem, genetic biodiversity, value of biodiversity.

Unit II

Methods of studying the marine microorganisms. Methods of collection and enumeration (Total and viable count), isolation, culture and identification based on morphological, physiological and biochemical characteristics; preservation of marine microbes. Types of marine environment – physical, chemical and biological aspects and their interaction with marine life.

Unit III

Pollution: marine pollution- major pollutants (heavy metals, pesticide, oil, thermal radioactive, plastics, litter and microbial); biological indicators (marine microbes, algae and crustaceans) and accumulators.

Unit IV

Marine habitat: Estuaries, mangroves, deep sea. Xenobiotics: definition and concept of xenobiotics. Degradation of xenobiotic compounds. Biodegradation of natural and synthetic waste materials. Advantages of biodegradation, bioremediation, separation, purification and bio removal of pollutants.


Unit V

Aquaculture- definition and concept of aquaculture. Aquaculture- shrimp aquaculture and fish aquaculture. Application of aquaculture. Disease control in shrimp aquaculture with probiotic bacteria. Application of probiotic bacteria. Importance of coastal aqua culture; aqua farms; design and construction; criteria for selecting cultivable species; culture systems and mangement practices – extensive, semi intensive and intensive culture practices

REFERENCES

- ❖ Krichman, D.L., 2000. Microbial ecology of the oceans. Wiley – liss, New York.
- ❖ Recent advances in marine Biotechnology Volume 3. Milton fingerman *et al.*, 1999.
- ❖ Bradach, J.E., H.H. Ryther and W.D. MC larney, Aquaculture, farming and marine organisms, Wiley interscience, New York, 1972.
- ❖ Recent advances in Microbiology M. Fingerman and Mary Frances Thomson.
- ❖ Glick B.R and Pasternak J.J 2001. Molecular biotechnology Asm, Press Washington DC.


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Ph.D., Course Work

Credit: 4

Subject code : Ph.D- MT
Title of the paper : MUSHROOM TECHNOLOGY
Research Scholar : K. Sangeetha
Reference Number : 16425/Ph.D.K1/Microbiology/PT/Oct 2017/Dt:03.10.2017
Research Advisor : Dr.G.SENTHILKUMAR

UNIT -I

Introduction- History-Scope of Edible Mushroom cultivation- Types of Edible mushrooms available in India- *Calocybe indica*, *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*.

UNIT - II

Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization- preparation of test tube slants to store mother culture - culturing of *Pl* *Pleurotus* mycelium on petriplates, preparation of mother spawn in saline bottle and polypropylene bag and their multiplication.

UNIT -III

Cultivation Technology- Infrastructure- Mushroom bed preparation - Paddy straw, Sugarcane thrash, maize straw, banana leaves. Factors affecting the mushroom bed preparation -low cost technology. Composting technology in mushroom production.

UNIT -IV

Storage and nutrition: Short- term storage(refrigeration- upto 24 hours) long term storage(Canning, pickles,papads), drying, storage in salt solutions. Nutritive value- proteins- amino acids, mineral elements, carbohydrates, crude fiber content, vitamins.

UNIT - V

Food preparation- types of food prepared from mushroom; soup, cutlet, omelette, dosa, pickles, curry- research centers- National level and regional level- cost benefit ratio- marketing in India and Abroad, export value.

REFERENCE

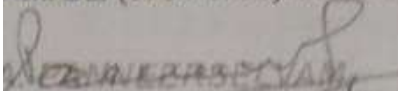
Marimuthu, T., Krishnamoorthy, A.S., Sivaprakasam, K. and Jayaranjan, R., (1991).

Mushrooms, Department of plant pathology, Tamil Nadu Agricultural University, Coimbatore.

Swaminathan, M., (1960). Food and Nutrition. Bappa, The Bangalore Printing and Publishing Co. Ltd., NO.88 Mysore Road, Bangalore 560 018.

Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal publications, Delhi.

Nita Bai (1984-1988). Hand book of Mushrooms, II Ed, Vol, I & II.


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Ph.D., COURSE WORK

Credit: 4

Name : D.Manimekalai
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Research Advisor : Dr.G.Senthilkumar
Subject code : Ph.D- MM

MARINE MICROBIOLOGY

UNIT I

Marine Microbial dissects Marine environment – see benthic & littoral zone, salt pan, mangroves and estuarine loop – marine microbial community – Planktons, bacteria, fungi, protozoa.

UNIT II

Marine Microbial Disease Marine food borne pathogens – *Aeromonas*, *Vibrio*, *Stamonella*, *Pseudomonas*, *Cornybacter*.

UNIT III

Marine Microbial biotechnology production and application of marine microbial products – pigments – Asta xanthin B, carotene – enzyme – antibiotics – polysaccharide – sea food preservation methods.

UNIT IV

Seafood microbiology – normal general associated with fish food spoilage, fish and human pathogens . indicator of pollution – fecal coliform, prevention and control.

UNIT V

Methods of studying the marine microorganism, methods of collection enumeration (total and viral count Microbial nutrition – influence of environment factors on microbial growth, activity and distribution preservation of marine microbes.

REFERENCES

1. Prescott, L.M Harley J.P Klein (1999) Microbiology WCB, Mc Grow Hill Publication
2. Rain M. Maier Ian
3. L. Pepper, Charles P. Gerba (2006) Environmental Microbiology, Academic Press.
4. James W. Nybakker (2001). Marine biology Benjamin Cummings Shimson Belkin
5. 4 R.Colwell (2005) Ocean health : Pathogens in the marine environment, Springer.
6. Scheper, T. (2005) Advances in Biochemical Engineering/ Biotechnology – Marine Biotechnology
7. I.Springer Bhaakuni, D.S.and Rawat D.D. (2005). Bioactive marine natural products.

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Course work 1:

RESEARCH METHODOLOGY -RM

UNIT I

Research design – choosing the problem for research – review of literature –Primary, secondary and tertiary sources. Bibliography indexing and abstracting-Reporting the results of research in conference- oral presentation –poster presentation-planning and preparing a thesis – proof correction.

UNIT II

Principles and applications of bright field,dark field,phase contrast, fluorescence Polarization, scanning and transmission electron microscopy – fixation and staining of Materials for electron microscope. Basic knowledge in nano technology.

UNIT III

Principles, instruments and applications: pH meter-centrifuge – rotors – ultraCentrifuge – radio active isotopes and half life of isotopes – autoradiography –Scintillation counter , GM counter – chromatography – types – affinity and HPLC –Colorimeter, UV. Vis spectrophotometer – flame photometer – atomic absorptionSpectrophotometer – electrophoresis – vertical and horizontal types, SDS PAGE.

UNIT IV

Scope of biostatistics – graphical and diagrammatic representation- mean, Median, mode – standard deviation – standard error – test of significance ‘t’ test,One-way ANOVA – simple correlation and simple linear regression.

UNIT V

Basic knowledge of computers and bioinformatics – organization of a computer(CPU,input devices, output devices and memory) – internet basic (internet browsing) –Websites and web pages – links, website addresses – information in the web – internetFile types – saving internet text, E.mail, attaching files- searching the net. Data bases:Nucleic acid sequence databases (EMBL, Gen bank, DDBJ) and protein sequence data Bases (PIR, SWISS-PROT, PDB)

Books for reference

1. Jayaraman, j., (1972) Techniques in biology, Higginbothams, pvt ltd, Madras.
2. Jayaraman. J., (1985) laboratory manual in biochemistry, wiley eastern ltd. Newdelhi.
3. Connor & Peter woodford, (1979) writing scientific paper in English pitman Medical pub. Co., ltd, England.
4. Balagurusamy, e., (1985) Programming in BASIC, 2nd ED, Tata McGraw, Hill pub co., newdelhi

Dr. S. GOMATHI, M.Sc., M.Phil., Ph.D., (1987) Computer science vol-I tata mcgraw hill pub. Co., ltd, newdelhi.

Dr. P. Srinivasan, A (1994) fundamentals of biostatistics, vikas pub., hyderabad.
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AGRICULTURAL MICROBIOLOGY

UNIT I

Food microbiology – food as a substrate for microbes, sources of contamination, food spoilage- general principles and causes – factors (intrinsic and extrinsic) affecting growth, chemical changes caused by microbes. Spoilage of cereal and cereal products, vegetables, fruits, meat, fishes and eggs.

UNIT II

Microflora of milk – sources of contamination, method and minimizing contamination, milk borne infections - milk preservation methods – pasteurization, sterilization. Fermented dairy products butter, milk, cream, yoghurt, kaffir, cheese and its types.

UNIT III

Food preservation, physical and chemical methods- use of high and low temperature – use of chemical preservatives, drying and irradiation – food borne infections and intoxications, sources, symptoms and prevention – food hygiene and quality control

UNIT IV


Agricultural microbiology – microbial interaction in soil – bacterial and fungal, fungi and plants. Organic amendments in soils biological and chemical control, manipulation of physico-chemical and biological parameters in soil integrated pest management systems (IPM) – soil fertility and management.

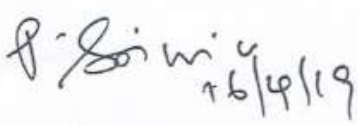
UNIT V


Diseases in crop plants – bacterial : leaf blight and citrus canker. Fungal – brown spot of paddy, takka diseases of groundnut, viral; tungro virus and TMV, biopesticides.

Books for reference

- Frazer, W.C. and Westheff, D.C., (1989) food microbiology 8th ed., Tata McGraw Hill Pub. Co. Ltd., New Delhi
- Jay, J.M., (1987) modern food microbiology, CBS publishers and distributors, New Delhi
- Subba Rao N.S. (1995) soil microorganisms and plant growth. Third edition Oxford and IBH Pub Co Pvt Ltd New Delhi.
- Rangaswami, G., and Mahadevan, A., (2004) diseases of crop plants in India fourth edition. Prentice Hall of India Pvt Ltd New Delhi.


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Ph.D., COURSE WORK

Credit: 5

Name : D.Manimekalai
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Research Advisor : Dr.G.Senthilkumar
Subject code : Ph.D- IB

INDUSTRIAL BIOTECHNOLOGY

UNIT - I

Isolation, preservation and maintenance of industrial microorganisms. Inoculum development - Development of inoculants for yeast, bacteria and mycelium. Aseptic inoculation of the fermenter - sterilization techniques.

UNIT-II

Fermentation technology:

Bioreactors - types- designs, Airlift, stirred tank bioreactor. Specialized bioreactor (Pulsed, Fluidized, Photo bioreactor), Fermentation: Batch, Fed batch and continuous - solid state - submerged.

UNIT-III

Industrial production of organic acids - citric acid, lactic acid, Acetic acid. Organic solvents - glycerol, Antibiotics - penicillium, streptomycin, chlorom phenicol. Amino acids - glutamic acid, lysine, isoleucine, Aspartic acid and proline. Production of SCP. Biomining and oil recovery.

UNIT-IV

Downstream processing - Biomass removal and disruption. Removal of microbial cells and solid matter, centrifugation, sedimentation, flocculation, microfiltration, sonication, bead mills, homogenizer, chemical lysis, enzymatic lysis. Membrane based purification - Ultra filtration; Reverse osmosis, dialysis evaporation, Perstraction, absorption and chromatography. Precipitation, Biological affinity, Electrophoresis. Extraction (solvent aqueous two phase, super critical) Drying and crystallization.

UNIT-V

Fuel Biotechnology - Bioethanol, biobutanol, biodiesel. Production of biogas - methane, bio hydrogen. Commercialization of microbial products: Objectives, market potential, Economics of microbial products (cost of equipments, raw materials, labor recovery, packaging and marketing).

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Ph.D., COURSE WORK

Credit: 4

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Subject code : Ph.D- MM

MARINE MICROBIOLOGY

UNIT I

Marine Microbial dissects Marine environment – see benthic & littoral zone, salt pan, mangroves and estuarine loop – marine microbial community – Planktons, bacteria, fungi, protozoa.

UNIT II

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