

MMO 102-T MARINE MICROBIAL PROSPECTING AND TECHNOLOGY [T]

Theory Course Credits : 3

Contact Hours : 45

1. **Bioprospecting:** Concept of exploiting marine microbial resource and their cellular components from marine environment and marine invertebrates. (02)
2. **Sampling and search strategies for novel targets under:** microbial cultures, enzymes, therapeutics, antimicrobials, biotransformations and biofuels. (05)
3. **Legal framework for collection and conservation of marine niches and microbes.** Convention on Biological Diversity, Rio (1992/1994). Biosafety Protocol, Quarantine regulations, Biopiracy, Cartagena & Montreal, FAO International Treaty (2001-2004), Bonn Declaration on Access and Benefit-sharing (ABS). (08)
- 4.1 **Conventional and high throughput screening strategy:**
 - A. **Conventional:** Plating, Enrichment, Extinction culturing; Microscopic techniques, Micro manipulations (FISH), Optical tweezers, Microautoradiography. (05)
 - B. **Novel:** Function based screens (proteomics and metabolomics), Sequence based screens (genomics), substrate induced gene expression screens (SIGEX) catabolic gene expression screens. Metagenomics, Microarrays, Combinatory chemistry, combinatory biosynthesis and biochemistry assays. Data bases, Natural product libraries. (07)
- 4.2 **Deposition of microbes and biomolecules:**

Culture collection/ Repository, deposition of sequences of nucleic acids, proteins and structures of microbial molecules and products. (03)
5. **Case studies on marine products and process development using microbes:** archaea, cyanobacteria and proteobacteria; microbial products; MEOR and such others. (15)

MMO 102-P MARINE MICROBIAL PROSPECTING AND TECHNOLOGY [P]

Practical Course Credit : 1

Contact Hours : 30

1. Sampling, isolation and screening for marine microbes from marine waters, sediments, marine organisms (bivalves/mussels/squid/fish) for:
 - 1.1. Pigments.
 - 1.2. Hydrolytic Enzymes.
 - 1.3. Antibiotics.
 - 1.4. Dye decolourization.

Reference Books (Composite list for theory and practicals)

1. Kennish, M. J., Practical Handbook of Estuarine and Marine Pollution, CRC Press.
2. Goldman, E. and Green, L. H., Practical Handbook of Microbiology, CRC Press.
3. Kennish, M. J., Practical Handbook of Marine Science, CRC Press.
4. Chaney, R. C., Sampling and Preparation of Marine Sediments, Foundation Engineering Handbook, Springer Publishers.
5. Wolton, A. G., Methods For Sampling and Analysis of Marine Sediments and Dredged Material, Volume 1, Ocean Dumping Report, Department of Fisheries and the Environment.
6. Bull, A. T., Microbial Diversity and Bioprospecting. ASM Press.
7. Reddy, S. M., Charya, M. A. S. and Girisham, S., Microbial Diversity: Exploration and Bioprospecting, Scientific Publishers.
8. Thomas, T. R., Kavlekar, D. P., Lokabharathi, P. A. (2010) Marine drugs from sponge-microbe association : a review. Marine Drugs, 8: 1417-1468.
9. Borkar, S., Bioprospects of Coastal Eubacteria, Springer Publishers.