

20BT015 BIOACTIVE COMPOUNDS AND NATURAL PRODUCTS

Hours Per Week :

L	T	P	C
3	-	-	3

Total Hours :

L	T	P	W/RA	SSH/HS	CS	SA	S	BS
45	-	-	-	-	-	-	-	-

Course Description and Objectives:

The subject is designed to provide detailed knowledge about the medicinal compounds from natural origin and general methods of structures of such compounds. It also emphasizes isolation, purification and characterization of medicinal compounds from natural origin.

Course Outcomes:

At completion of this course it is expected that students will be able

- To understand different types of natural compounds and their chemistry and medicinal functions of important natural products and their application.
- To acquire knowledge of the classification the natural products by their molecular structures and biosynthesis
- To know the importance of natural compounds as lead molecules for new drug discovery
- To acquaint the concept of rDNA technology tool for enhanced production of bioactive compounds
- To Isolate, purify and characterize of simple chemical constituents from natural source
- To know the requirements for setting up the herbal/natural drug industry and the guidelines for quality of herbal/natural medicines and regulatory issues, patenting to IPR of herbals/natural drugs

SKILLS:

- ✓ Get experience in enhancing the bio-active molecules in transformed cultures
- ✓ Evaluate the scope for bioentrepreneurship.
- ✓ Student can able to modify media to enhance the molecules based on structures of molecules
- ✓ Ability to test the anti microbial activity and biopesticidal activity
- ✓ Analyzing bioproducts market trend.

ACTIVITIES:

- Isolation and purification and characterization of bioactive compounds from plant
- Knowledge and awareness on the guidelines for herbal/ natural medicines for regulatory issues and IPR
- Classification and importance of Natural compounds in drug discovery

UNIT - I

Study of Natural products as leads for new pharmaceuticals for the following class of drugs: Herbals vs Conventional drugs, Efficacy of Herbal medicine products, Pharmacodynamic and Pharmacokinetic issues, Pilot plant scale –up techniques, case studies of herbal extracts.

a. Drugs Affecting the Central Nervous System: Morphine Alkaloids

b. Anticancer Drugs: Paclitaxel and Docetaxel, Etoposide, and Teniposide

c. Cardiovascular Drugs: Lovastatin, Teprotide and Dicoumarol

d. Neuromuscular Blocking Drugs: Curare alkaloids

e. Chemistry of macrolid antibiotics: Erythromycine, Azithromycine, Cephalosporins (New generation)

UNIT - II

Biological screening of herbal drugs: Introduction and Need for Phyto- Pharmacological Screening, New Strategies for evaluating Natural Products, *In vitro* evaluation techniques for Antioxidants, Antimicrobial, Anticancer drugs, Antiinflammatory, Antiulcer, Anticancer, Wound healing, Antidiabetic, Hepatoprotective, Cardio protective, Diuretics and Antifertility.

UNIT - III

Active constituent of certain crude drugs used in Indigenous system: *Gymnemasylvestre*, *Salacia reticulata*, *Pterocarpus marsupium*, *Swertia chirata*, *Trigonella foenumgraccum*; *Phyllanthus niruri*; *Curcuma longa* Linn.

Analytical Profiles of herbal drugs: *Andrographis paniculata*, *Boswellia serata*, *Coleus forskholii*, *Curcuma longa*, *Embelica officinalis*, *Psoraleacorylifolia*.

Testing of natural products and drugs: Effect of herbal medicines on clinical laboratory testing. Regulation and dispensing of herbal drugs. Stability testing of natural products, protocols.

Analytical Profiles of herbal drugs: *Andrographis paniculata*, *Boswellia serata*, *Coleus forskholii*, *Curcuma longa*, *Embelica officinalis*, *Psoraleacorylifolia*.

Testing of natural products and drugs: Effect of herbal medicines on clinical laboratory testing. Regulation and dispensing of herbal drugs. Stability testing of natural products, protocols.

UNIT - IV

Bioactive compounds derived from the plants and its activity: Formation of pharmacologically active compounds in plants, Biosynthesis (1hr) /primary metabolites, Photosynthesis, Biosynthetic pathway, Classification of natural products, Research in biosynthesis pathways of natural products, Primary metabolites Monosaccharide/disaccharides/ polysaccharides, Natural products closely related to carbohydrates, Peptides and proteins, Substances formed from phenylpropanes by shortening of side, Natural products biosynthetically deriving from acetate, Natural products biosynthetically deriving from amino acids, Marine Natural products, Antimicrobials from natural origins, drug interaction and synergistic effect of phytomedicines

UNIT - V

Herbal remedies – Toxicity and Regulations: Formulation production management. Current challenges in upgrading and modernization of herbal formulations project report, technical knowledge, Capital venture, plant design, layout and construction.

Monographs of herbal drugs: Study of monographs of herbal drugs and comparative study in IP, USP, Ayurvedic pharmacopoeia, American herbal pharmacopoeia, British herbal pharmacopoeia, Siddha and Unani Pharmacopoeia, WHO guidelines in quality assessment of herbal drugs.

TEXT BOOKS:

1. Modern methods of plant analysis – Peech and M.V.Tracey.
2. Phytochemistry Vol. I and II by Miller, Jan Nostrant Rein Hld.
3. Chemistry of natural products Vol I onwards IWPAC.
4. Plant drug analysis by H.Wagner and S.Bladt, 2nd edition, Springer, Berlin.

REFERENCE BOOKS

1. Phytochemical Dictionary. Handbook of Bioactive Compounds from Plants by J.B.Harborne, (1999), 11nd Edition, Taylor and Francis Ltd, UK.
2. Biotechnology by Purohit and Mathoor.
3. Phytochemical methods of Harborne.