

## **Ph D. in Pharmaceutical Sciences**

### **Subject: Pharmacognosy**

Pharmacognosy deals with scientific study of crude drugs from plants, animals, microbes and minerals. It includes quality control, standardization, isolation & characterization of phytoconstituents and formulation development. The Pharmacognosy specialization of the department provides instructional and research training to the students in the areas of isolation of phytoconstituents, formulation development & standardization of herbal drugs and evaluation of biological activity of medicinal plants.

### **Research Focus**

The major areas of research being conducted under the Pharmacognosy specialization includes:

- Phytopharmaceutics
- Ethnopharmacognosy, Phytochemistry
- Biological evaluation of Medicinal Plants
- Formulation development

The details of research studies being conducted in the department are as follows:

- ✚ General quality control methods for crude drugs and protocol development for specific medicinal plant materials
- ✚ Development of chemical process/technologies for natural products involving extraction, isolation and quantification
- ✚ Development of formulation methods, standardization and stability studies of herbal drugs, nutraceuticals and cosmeceuticals of natural origin
- ✚ Ayurvedic formulation development and standardization with novel approaches
- ✚ Biological evaluation and validation of medicinal plants in various therapeutic areas like antidiabetic, hypolipidemics, immunomodulatory, wound healing, antidiarrheal, hepatoprotective, antioxidants, anti-gastric ulcer, anti- urolithiatic, analgesic and anti-inflammatory.

## PHARMACOGNOSY SYLLABUS FOR SBSU – PET 2021 ENTRANCE EXAM

### UNIT 1:

**Natural Products:** Detailed study of basic metabolic pathways and formation of different secondary metabolites through these pathways.

Detailed pharmacognosy and phytochemical study of crude drugs that contain the following class constituents.

- Alkaloids
- Terpenes and Terpenoids
- Resins and related compounds
- Tannins
- Flavonoids
- Glycosides
- Steroids

Including isolation, chemical tests, and estimation of phyto-pharmaceuticals belonging to the above groups.

Standardization of raw materials and herbal products. Quantitative microscopy including modern techniques used for evaluation of crude drugs. Evaluation of Crude drugs, Adulteration of Crude drugs and their detection by various methods.

### UNIT 2:

**Extraction and Phytochemical studies:** Recent advances in extractions with emphasis on selection of method and choice of solvent for extraction, successive and exhaustive extraction and other methods of extraction commonly used like microwave assisted extraction, Methods of fractionation. Separation of phytoconstituents by latest HPTLC, CCCET, SCFE techniques including preparative HPLC and Flash column chromatography.

### UNIT 3:

**Marine natural products:** General methods of isolation and purification, Study of Marine toxins, Recent advances in research in marine drugs, Problems faced in research on marine drugs such as taxonomical identification, chemical screening and their solution.

**Tissue Culture:** Type, techniques and application of callus, suspension, haploid, embryo, organ and immobilized culture. Organogenesis, embryogenesis, synthetic seed and somaclonal variation. Micropropagation, Production of secondary metabolites – Strategies involving use of precursor, growth regulators and Elicitors, Hairy root culture and Multiple shoot culture and their application, Protoplast culture and protoplast fusion and Biotransformation.

### UNIT 4:

**Conventional and advanced formulations of drug substances;** Tablets, capsules, syrups, fast dissolving/disintegrating dosage forms, transmucosal drug delivery, solid dispersions, hydrogels as drug delivery for herbal actives, emulsions and self-emulsifying delivery systems, liposomes

and proliposomes, nanoparticles mediated delivery of herbal actives carbon nanotubes, plant derived bioadhesives, chemo-herbal combinations.

**Neutraceuticals:** Current trends and future scope, inorganic mineral supplements, vitamin supplements, digestive enzymes, dietary fibres, cereals and grains, health drinks of natural origin. Formulation and standardization of neutraceuticals, regulatory aspects, FSSAI guidelines.

**Ayurvedic formulation:** WHO and AYUSH guidelines for safety monitoring of natural medicine. Regulations for manufacture of ASU drugs- Schedule Z of Drug and Cosmetic act for ASU drugs.

**Herbal Cosmetics:** Raw materials of herbal origin used in cosmetics: Oil, waxes, gums, hydrophilic colloids, colours, perfumes, protective agents, bleaching agents, preservatives, anti-oxidants.

Physiology and chemistry of skin and pigmentation, hairs, scalp, lips and nail. Hair care preparations, Skin care preparations, Dentifrices; including cosmetics of lips and nails. Quality control and toxicity studies as per Drug and Cosmetics Act.

#### **UNIT 5:**

**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, Anti-inflammatory, Immunomodulatory and Anticancer drugs. In vivo evaluation techniques for Anti-inflammatory, Antiulcer, Anticancer, Wound healing, Antidiabetic, Hepatoprotective, Cardio protective, Diuretics and Antifertility, Toxicity studies as per OECD guidelines.

**Challenges and stability testing of natural products:** FDA, EMA, WHO regulations for quality challenges, clinical assessment and patient safety issues. ICH and WHO guidelines for stability testing and determination shelf life.