

Course Code	Course Name	Credits
26BY606	PHYTOCHEMISTRY AND PHARMACOGNOSY	04

Course Objectives

- To provide knowledge of extraction techniques, solvent selection, and methods for isolation, purification, and characterization of natural products.
- To explain the phytochemistry, classification, and structural aspects of glycosides, vitamins, steroids, and terpenoids.
- To develop understanding of natural pigments and highlight the biological and pharmaceutical importance of natural products in drug discovery.
- To impart pharmacognostic knowledge, including identification, evaluation of medicinal plants, and detection of adulteration..

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Apply extraction techniques and select appropriate solvents for isolating natural products.
- Understand and explain the structure, classification, and chemistry of glycosides, vitamins, steroids, and terpenoids.
- Identify natural pigments and analyze the role of natural products in biological systems and drug discovery.
- Perform pharmacognostic evaluation of crude drugs and detect adulteration and active constituents in medicinal plants.

Unit 1 - Extraction and Natural Products (12 Hrs.)

Introduction, principles, types of extraction methods with merits and demerits. Selection and purification of solvents. Isolation, purification, and characterization of natural products: Citric acid, Pectin, Sennosides, Lawsone, Phyllanthin, Bacosides, Lycopene, Hesperidin, Diosgenin, Curcumin, Lemongrass oil, and Caffeine.

Unit 2 – Glycosides and Vitamins (12 Hrs.)

Introduction, definition, classification, nomenclature, sources, importance, structure, and chemistry of glycosides. Structural elucidation of cardiac glycosides (digoxin) and anthracene glycosides (sennosides). Vitamins: Introduction, definition, classification, nomenclature, sources, importance, structure, and chemistry. Structural elucidation of ascorbic acid.

Unit 3 – Terpenoids and Natural Pigments (12 Hrs.)

Introduction, definition, classification, nomenclature, sources, and importance of terpenoids with reference to citral, menthol, and zingiberene. Natural pigments: Introduction, definition, classification, nomenclature, sources, and importance of carotene, lycopene, bixin, chlorophyll, quercetin, and indigotine.

Unit 4 – Steroids and Natural products (12 Hrs.)

Introduction, definition, classification, and nomenclature of steroids. Sources, structure, chemistry, and biological importance of cholesterol. Natural products as markers for new drug discovery. Evaluation of crude drugs and a brief account of drug constituents, including active and inactive principles.

Unit 5 - Pharmacognosy (12 Hrs.)

Introduction and scope of pharmacognosy. Indigenous traditional drugs and their market adulteration. Types of plant drugs and their pharmacognostic study: root drugs (*Glycyrrhiza*, *Ipecac*, *Rauwolfia*, *Shatavari*, *Colchicum*, *Withania*); rhizome drugs (*Ginger*); leaf drugs (*Andrographis*, *Clitoria*, *Senna*); bark drugs (*Terminalia arjuna*, *Holarrhena*); flower drugs (*Saffron*); seed drugs (*Piper longum*, *Mucuna*); fruit drugs (*Cumin*, *Amla*, *Senna pods*); whole plant drugs (*Catharanthus roseus*).

Reference Books:

1. Trease, G. E., and Evans, W. C. (2016). Pharmacognosy, 16th Edition. Elsevier, London, UK.
2. Tyler, V. E., Brady, L. R., and Robbers, J. E. (2012). Pharmacognosy and Phytochemistry. CBS Publishers & Distributors, New Delhi, India.
3. Kokate, C. K., Purohit, A. P., and Gokhale, S. B. (2014). Pharmacognosy, 50th Edition. Nirali Prakashan, Pune, India.
4. Dewick, P. M. (2009). Medicinal Natural Products: A Biosynthetic Approach, 3rd Edition. Wiley, UK.
5. Nakanishi, K., Goto, T., Ito, S., Natori, S., and Nozoe, S. (1999). Natural Products Chemistry. Academic Press, New York, USA.
6. Evans, W. C. (2009). Trease and Evans Pharmacognosy, 16th Edition. Saunders Elsevier, UK.
7. Agarwal, O. P. (2013). Organic Chemistry of Natural Products. Goel Publishing House, Meerut, India.
8. Herbert, R. B. (1989). Introduction to Natural Products Chemistry. Oxford University Press, UK.