

ACHARYA NAGARJUNA UNIVERSITY

DEPARTMENT OF CHEMISTRY

M.Sc. ORGANIC CHEMISTRY :: SEMESTER-III

PAPER-III (Elective-A): ALKALOIDS, TERPENOIDS, QUINONES & PHENOTHIAZINES
(R22OC33A)

(For the students admitted from the A.Y. 2022-2023 onwards)

Max. Marks: 100

(Internal-30M & External-70M)

SYLLABUS

Learning Objectives:

- ✓ To learn about definition and importance of various alkaloids.
- ✓ To know the structure elucidation and synthetic methods of important alkaloids.
- ✓ To know the classification of terpenoids, isoprene rule, structures and their natural sources.
- ✓ To know the structure characterization and synthesis of quinines and phenothiazines.
- ✓ To learn the about the stereochemistry of alkaloids.

UNIT-I

14H

Alkaloids-I: Definition, General methods of identification of alkaloids - nomenclature – occurrence – isolation - chemical tests for identification-general methods of structural elucidation-degradation–classification based on nitrogen heterocyclic ring-role of alkaloids in plants.

- a) Structure and synthesis of Atropine, Caffeine.
- b) Quinoline alkaloids: Chemistry and synthesis of Quinine, Cinchonine, and their stereochemistry.

UNIT-II

12H

Alkaloids-II:

- a) Isoquinoline-Morphine Group Alkaloids: Papaverine, Hydrastine, narcotine, canadine, Coclawrine, Morphine, Codeine, emetine, Apomorphine, Glaucine.
- b) Stereochemistry of emetine, and morphine alkaloids.
- c) Biogenesis of alkaloids.

UNIT-III

10H

Alkaloids-III:

- a) Indole alkaloids: Reserpine, strychnine, brucine, lysergic acid, ergotamine.
- b) Structure, stereochemistry, synthesis and biosynthesis of Ephedrine, Conine and nicotine.

UNIT-IV

10H

Terpenoids: Classification, sources, isolation, synthesis and stereochemistry with special reference to zingiberene, santonin, eudesmol, abietic acid, Biosynthesis of terpenoids.

Quinones and Phenothiazines:

Quinones: Identification of quinones, Lapachol. Chrysophenol and Physcion-chemistry and synthesis.

Phenothiazines: Classification, pharmacological properties of phenothiazines, general methods of synthesis of phenothiazines with reference to Promazine, Prochlorperazine and Thioriazine.

Reference Books:

- 1) Alkaloids by K.W. Bentley Vols. I & II.
- 2) Text Book of Organic Chemistry I.L. Finar Vol. II 3. An introduction of alkaloids by G.A. Swain.
- 3) Naturally occurring quinines – R. H. Johnson Vol. I & II, Academic Press, London.
- 4) Chemistry and physiology of alkaloids by Manske Vol. I & II, VII.
- 5) Medicinal Chemistry by A. Burger.
- 6) Isoquinoline Alkaloids by M. Shamma.
- 7) Heterocyclic Chemistry by J.A. Joule et al., Chapman – Hall.

Learning Outcomes:

- ✓ Students can understand the definitions and importance of various alkaloids.
- ✓ Students can understand the structure elucidation and also know the synthetic processes application and synthetic methods of studied alkaloids.
- ✓ Basic ideas of isoprene rule, terpenoids classification, their natural sources, synthesis.
- ✓ Students can understand the structure characterization and synthesis of quinones and Phenothiazines.
- ✓ Students can understand the stereochemistry of alkaloids.



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