

ACHARYA NAGARJUNA UNIVERSITY
DEPARTMENT OF CHEMISTRY
M.Sc. ORGANIC CHEMISTRY :: SEMESTER-III

PAPER-IV (Elective-A): CHEMISTRY OF NATURAL PRODUCTS (R22OC34A)
(For the students admitted from the A.Y. 2022-2023 onwards)

Max. Marks: 100

(Internal-30M & External-70M)

SYLLABUS

Learning Objectives:

- ✓ To know about classification and general methods of synthesis of various flavonoids.
- ✓ To know the structures and synthesis of Fat and water soluble vitamins.
- ✓ To know the classification of hormones, and synthesis of some steroidal and non-steroidal hormones.
- ✓ To know about aminoacids, proteins, enzymes, cofactors and prostaglandins.
- ✓ To know about the structures and synthesis of insecticides, Rotenoids and Isobutylamines.

UNIT-I

12H

Flavonoids and Prostaglandins

Flavonoids: Classification, sources, isolation, general methods of synthesis of flavones, flavanones, flavonols. Chemistry and synthesis with special reference to quercetin and kampferol.

Prostaglandins: Prostaglandins with special reference to PGE and PGF.

UNIT-II

12H

Vitamins

Fat Soluble Vitamins: Chemistry, Synthesis & biosynthesis of vitamin A₁, vitamin E (α , β , γ , δ -tocopherols) and vitamin K

Water soluble Vitamins: Chemistry, Synthesis, and biosynthesis of B₁ and C.

UNIT-III

12H

Steroidal Hormones

Chemistry & synthesis of equilenine, oestrone, progesterone, androsterone, testosterone, cortisone.

Non-Steroid Hormones: Chemistry & synthesis of thyroxin, epinephrine, and oxytocin.

UNIT-IV

12H

Amino Acids: Classification of amino acids. Specific methods of preparations –Malonic ester synthesis and Erlenmeyer azlactone synthesis. Isoelectric point.

Proteins: General nature of proteins – annealing, Biuret reaction, Ninhydrin test. Classification of proteins. Merrifield solid phase peptide synthesis. Primary, secondary, tertiary, and quaternary structure of proteins.

- a) Enzymes: classification, kinetics, and mechanism of enzyme action
- b) Coenzymes and cofactors: NAD FAD folic acid citric acid cycle.

UNIT-V

12H

Insecticides

Naturally Occurring Insecticides: Introduction, general properties, sources, isolation, synthesis, and stereochemistry of Pyrethrin I and II; Jasmolin I & II; Structure activity relationship (SAR) studies and biosynthesis of pyrethrins.

Rotenoids: Chemistry and synthesis of rotenone.

Isobutylamines: Chemistry and synthesis of anacyclin, and spilanthol .

Minor Insecticides of Plant Origin: Pachyrrhizin and custard-apple.

Reference Books:

- 1) Steroids by Fieser and Fieser,
- 2) The Vitamins by S.F. Dykes,
- 3) The Natural Pigments by K.W. Bentley,
- 4) Biological Chemistry by Holum,
- 5) Organic Chemistry Vol.II by I.L.Finar,
- 6) Naturally occurring insecticides by M. Jacobson and D.G. Crosby, Marcel- Decker Inc, New York.
- 7) General Organic and Biochemistry by F.A. Bettelheim and Jerry March, Saunders College, Publishing.
- 8) The terpenoids by Simonsen,
- 9) The steroids by Shoppee,
- 10) Chemistry of Carbon compounds by Rodd.

Learning Outcomes:

- ✓ Students can understand the classification and general methods of synthesis of various flavonoids.
- ✓ Students can understand the synthesis of fat and water soluble vitamins.
- ✓ To know the classification of hormones, and synthesis of some steroidal and non-steroidal hormones.
- ✓ Students can able to understand functions, structures and synthesis amino acids, proteins, enzymes, cofactors and prostaglandins.
- ✓ Students able to understand different types of naturally occurring insecticides and their specific and commercial importance.



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