

**DEPARTMENT OF PHARMACEUTICAL SCIENCES
MAHARSHI DAYANAND UNIVERSITY, ROHTAK.**

REVISED SYLLABUS

M. PHARM. PHARMACOGNOSY

Semester-I

MPHPCOG-02

**Pharmacognosy-I
(Advanced Pharmacognosy-I)**

Theory (2 hrs/week)

Unit-I

1. Herbal production, formulation & development: Introduction, volume, trade, commerce, resources, status in India and abroad.
2. Problems encountered in and prospects of discovering new drugs from plants.
3. Regulatory requirements for manufacture and distribution of herbal formulations in India and comparison with other countries.

Unit-II

4. Recent developments and scope of bioactive drugs obtained from Marine sources.
5. Herbal Cosmetics: Scope, Formulation development and quality control of Herbal cosmetics used in:
Hair care,
skin care,
anti-wrinkles &
anti-aging.
6. Volatile oils of commercial significance:
 - a. Review of Indian Spices Industry
 - b. Perfumery Industries.

Practicals (6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Books Recommended:

- 1) Introduction to spices, plantation crops, medicinal and aromatic plants : N. Kumar et al, Oxford & IBH Publishing Co. pvt. Ltd., New Delhi, 1997.
- 2) Herbal Drug Industry : R.D. Chudhary, Eastern Publishers, New Delhi 1996.
- 3) Wealth of India, CSIR, New Delhi (Related Volumes)
- 4) Cultivation & Utilization of medicinal plants : Atal & Kapoor, RRL, Jammu.
- 5) Cultivation & utilization of aromatic plants : Atal & Kapoor, RRL, Jammu.
- 6) Drug & Cosmetic act, (with latest amendments including Ayurvedic GMP), Govt. of India.
- 7) Pharmacognosy : Trease W. C., Evans G.E. Bailliere & Tinball, London, 14th edtn.
- 8) British Herbal Pharmacopoeia, (Vol. I, II & III) Her Majesty's Services, U.K.
- 9) Ayurvedic formulary of India, Govt. of India, 1962.
- 10) Research in Education : John w. Best & James V. Kahh, Practice Hall of India Pvt. Ltd., New Delhi, 1996.

Theory (2 hrs/week)

Unit-I

1. Modern techniques involved in the investigation and development of biogenetic pathways.
2. Bioactive Compounds: Occurrence, methodology for extraction and biogenesis of sennosides, digoxin, ginsenosides, solasodine, sterols, anthraquinones, saponin glycosides and flavonoid compounds of pharmaceutical significance.

Unit -II

3. Plant Tissue Culture:
 - a. History of Plant tissue culture, totipotency, Ingredients used in plant tissue culture media.
 - b. Callus Culture, Suspension cultures, meristem culture, protoplast culture, haploid culture, organogenesis.
 - c. Regeneration of plants from tissue culture.
 - d. Immobilized plant cell culture systems, immobilization techniques, effect of immobilization on secondary metabolism.
 - e. Biosynthetic potential of tissue culture and factors affecting production of secondary metabolites by tissue culture technique.
 - f. Application of plant tissue culture in Pharmacognosy/ production of phytopharmaceuticals.

Practicals (6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Recommended Books:

1. Elements of Biotechnology : P.K.Gupta
2. Molecular biology and biotechnology: J.M. Walker, E.D.Gingo
3. Essentials of molecular biology: Dovid F.A., George M.M.
4. An introduction to plant tissue culture : M.A.Razdan
5. Plant biotechnology: Samtel
6. Plant tissue culture: Narayanswamy
7. Plant tissue culture: Angela Stafford, Open University press, Buckingham, 1991.
8. Plant tissue culture: Dixon
9. Pharmaceutical Biotechnology: Vyas, Dixit, CBS Publishers, New Delhi, 1998.
10. Pharmcognosy: Trease W.C., Evans g.E., Bailliere & Tindall, 15th edth.

MPHPCOG-04 Pharmacognosy-III
(Screening and standardization of Natural products-I)

Theory

2 hrs/week

Unit-I

1. Present status and Importance of standardization and quality control of natural products in the National and International scenario.
2. Physical and microscopic methods involved in the standardization and quality control of Natural products.
3. Traditional and Modern aspects of Phytochemical screening of Herbals drugs and formulations.

Unit-II

4. Traditional and recent techniques adopted for the extraction of phytoconstituents (such as super critical fluid extraction and SAP box employed for extraction of active constituents of drugs)
5. Recent advances in the various chromatographic techniques such as paper, column, UV, TLC, HPTLC, Preparative TLC, HPLC, GC and DCCC in the identification, isolation, and purification of the phytoconstituents.

Practicals (6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Recommended Books :

1. New Natural products and plant drugs with pharmacological, Biological or Therapeutical activity. Eds. H. Wagner and Wolf, Springer Weslong, NY.
2. Natural products as medicinal agents, ed. J.L. Beal & E.Reinhard, Hippocrates Verlag Stuttgart.
3. Pharmacognosy, Ed. W.C. Evans Gopsons Papers Limited, Noida.
4. Biogenesis of natural Compounds, Bernfeld
5. Practical evaluation of phytopharmaceuticals, Brain and Turner, Wright-Scientehnica.
6. Phytochemical methods, Harborne, J.B., Champman Hall
7. Modern Methods of Plant analysis, Peach and Tracey, All Volumes, Springer-Verlag
8. Isolation and Identification of Drugs, Clark E.C.G, The Pharmaceutical Press, London.
9. Phytochemical methods: J.B.Harborne
10. Thin layer chromatography: Stahl.

Semester-II

MPHPCOG-05

**Pharmacognosy-IV
(Advanced Pharmaognosy-II)**

Theory (2hrs/week)

Unit-I

1. Recent trends of Herbal Drugs in the area of :
Herbal Safety
Novel Herbal Drug Delivery system
2. Study of the Hallucinogenic, allergic, teratogenic and other toxic plants.

Unit-II

3. Significance/importance of cultivation of Medicinal and Aromatic plants. Factors affecting plant drug cultivation, characteristics of soil, exogenous and endogenous factors essential for plant growth. Fertilizers and their management. Pest management. Diseases management of medicinal and aromatic plants.
4. Study of the following methods of quality improvement of plants:
a) Chemodemes b) Hybridisation c) Mutation d) Polyploidy

Practicals

(6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Recommended Books:

1. The Nature and Properties of Soils (Latest Edn.)– Hyle C. Brady, Macmillian Publishing Co. NY.
2. Natural Products for Innovative Pest Managment, Ed. David L. Whitehead & William S. Bowers, Pergamon Press, Oxford, 1983 or Latest)
3. Pharmacognosy by Trease and Evans, 14th Edn, Baillier-Tindall)
4. Remington — The Science and Practice of Pharmacy — Vol. I & II, A.R. Gennard
5. Ayurvedic Formulary of India.
6. All Pharmacopoeias relevant, current editions.
7. New Natural products and plant drugs with pharmacological, Biological or Therapeutical activity. Eds. H. Wagner and Wolf, Springer Weslong, NY.
8. Natural products as medicinal agents, ed. J.L. Beal & E.Reinhard, Hippocrates Verlag Stuttgart.
9. Pharmacognosy, Ed. W.C. Evans Gopsons Papers Limited, Noida.
10. Modern methods of plant analysis by Peach & M.V. Tracey, Vol. I to VII
11. Recent advances in Phytochemistry-Vol. I to IV scikel runeckles-Appletaon century crofts.
12. Chemistry natural products-Vol.I onwards IWPAC.
13. Natural products-A Laboratory guide by Raphel Ikhan

Theory (2 hrs/week)

Unit-I

1. Bioactive Compounds: Occurrence, methodology for extraction and Biogenesis of alkaloids like, Berberine, quinine, scopolamine, atropine, emetine, ergot, caffeine, taxol, withanolides, podophyllotoxin.
2. Introduction to Plant genetics and Molecular biology and its importance to Pharmaceutical Industry.

Unit-II

3. Isolation, Purification and instrumental interpretation of Phytoconstituents:
Ergometrine, Diosgenin,
Vinblastine, Curcumin.
4. Nutraceuticals: Scope, herbal sources of food supplements, taste enhancers and Colours.

Practicals

(6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Recommended Books :

1. New Natural products and plant drugs with pharmacological, Biological or Therapeutical activity. Eds. H. Wagner and Wolf, Springer Weslong, NY.
2. Natural products as medicinal agents, ed. J.L. Beal & E.Reinhard, Hippocrates Verlag Stuttgart.
3. Pharmacognosy, Ed. W.C. Evans Gopsons Papers Limited, Noida.
4. Tables of Spectral Data for Structural Determination of Organic Compounds, E. Pretsch, T.Clerc, J. Seibl and W. Simon
5. Heterocyclic Chemistry, Albert
6. Biogenesis of natural Compounds, Bernfeld
7. Practical evaluation of phytopharmaceuticals, Brain and Turner, Wright-Scientifica.
8. Phytochemical methods, Harborne, J.B., Chapman Hall
9. Modern Methods of Plant analysis, Peach and Tracey, All Volumes, Springer-Verlag
10. Isolation and Identification of Drugs, Clark E.C.G, The Pharmaceutical Press, London.
11. Herbal drugs industry by R.D. Chaudari.
12. Elements of Biotechnology : P.K.Gupta
13. Molecular biology and biotechnology: J.M. Walker, E.D.Gingo
14. Essentials of molecular biology: Dovid F.A., George M.M.

MPHPCOG-07 Pharmacognosy-VI
(Standardisation and Screening of Natural products-II)

Theory 2 hrs/week

Unit-I

1. Basic Principles, *in vitro* and *in vivo* methods involved in the biological screening of plant drugs used as :
Analgesics and anti-inflammatory drugs.
Hypoglycemic drugs
Antioxidant drugs
Antihyperlipidemic drugs
Plant immunomodulators

Unit-II

2. Recent advances in various spectral techniques like UV, IR, NMR, MS, and Hyphenated technique like LC-MS, GC-MS, LC-MS-MS, LC-NMR for structure elucidation, standardization and quality control of Phytoconstituents.

Practicals (6 hrs/week)

Number of practicals/assignments based on aforementioned theory.

Recommended Books:

1. Spectroscopic Identification of Organic Compounds-Silverstein *et. al.*
2. Instrumental Methods of Analysis-Willard,H.H.,Meritt,L.L. and Dean,J.A.
3. Handbook of Instrumental Techniques for Analytical Chemistry-Frank Settle (Ed.)
4. Pharmaceutical Drug Analysis-A. Kar
5. Practical Evaluation of Phytopharmaceuticals – Brain and Turnetr, Wright Scientechica
6. Modern Methods of Plant Analysis-Peach and Tracy, Springer Verlag
7. Structure Elucidation of Natural Products by Mass Spectroscopy — Vol I & II, H. Budzikiewicz, C.Djerassic and D.H. Williams
8. New Natural products and plant drugs with pharmacological, Biological or Therapeutical activity. Eds. H. Wagner and Wolf, Springer Weslong, NY.
9. Natural products as medicinal agents, ed. J.L. Beal & E.Reinhard, Hippocrates Verlag Stuttgart.
10. Structure Elucidation of Natural Products by Mass Spectroscopy — Vol I & II, H. Budzikiewicz, C.Djerassic and D.H. Williams
11. Tables of Spectral Data for Structural Determination of Organic Compounds, E. Pretsch, T.Clerc, J. Seibl and W. Simon
12. Phytochemical methods, Harborne, J.B., Champman Hall
13. Modern Methods of Plant analysis, Peach and Tracey, All Volumes, Springer-Verlag
14. Screening Methods in Pharmacology Turner, Academic Press