

**VEER NARMAD SOUTH GUJARAT UNIVERSITY,
Advanced Post Graduate Diploma in Medicinal Plants**

Quality control and Phytochemical methods (DMP 202)

Pharmacognosy:

- I. Morphological examination
- II. Microscopical evaluation
- III. Development of Standardization parameters
 - b. Solvent extractive values
 - c. Ash values
 - d. Crude fiber
 - e. Moisture content
 - f. Microbial infestation
 - g. Bitter value
 - h. Foaming index
 - i. Swelling index
 - j. Heavy metals
 - k. Contaminations & Aflatoxins
- IV. Adulteration and deterioration

Quality Control

- V. Quality Assurance and stability testing
 - a. GMP
 - b. Physical quality assurance
 - c. Stabilization
 - d. Validation
 - e. Marker compound evaluation
- VI. Methods of isolation
 - a. Solvent extraction
 - b. Thin layer chromatography
 - c. HPTLC

- d. Column Chromatography
 - e. HPLC
- VII. Methods of characterization
- a. Spectroscopic methods
 - i. UV
 - ii. Visible
 - iii. IR
 - iv. NMR
 - b. Mass Spectrometry
 - c. Atomic absorption
 - d. GC-MS
 - e. LC-MS
- VIII. Intellectual property rights and Patent laws

SUGGESTED READINGS

- Agnivesh (1968): **Charak Samhita (Volume I-II)** (2nd Edn.). Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Ambasta S. P. (1986): **The Useful Plants of India**. Publication & Directorate, CSIR, New Delhi.
- Anjaria J., Parabia M.H. and Dwivedi S. (2002): **Ethnovet Heritage-Indian EthnoVeterinary Medicine: An Overview**. Pathik Enterprise, Ahmedabad.
- Anonymous (1998): **Quality Control Methods for Medicinal Plants Materials** (Authorized Reprint). World Health Organization, Geneva.
- Anonymous (1999): **Indian Herbal Pharmacopoeia (Volume I – II)**. Joint Publication of Regional Research Laboratory (CSIR), Jammu and Indian Drug Manufacturers' Association.
- Anonymous (2002): **WHO Monographs on selected Medicinal Plants (Volume I-II)**. World Health Organization, Geneva
- Bahl A. and Bahl B.S. (2001): **Textbook of Organic Chemistry** (16th Edn.). S. Chand & Company Ltd., New Delhi.

- Behramji D. J. (1952): **Aushadhakar- Ayurveda Ane Unani Vaidya Vidya no Mahagranth** (1st Edn.). Gandiv Sahitya Mandir, Surat.
- Bobitt J.M., Schwarting A.E. and Gritta R.J. (1968): **Introduction to Chromatography**. Van Nostrand Reinhold Company, NewYork.
- Bolliger H.R., Brenner M., Ganshirt H., Mangold H.K., Seiler H., Stahl E. and Waldi D. (1965): **Thin Layer Chromatography – A Laboratory Handbook**. Springer-Verlag Academic Press Inc. NewYork, London
- Cappuccine J.G. and Sherman N. (2004): **Microbiology – A Laboratory Manual** (2nd Ind. Reprint). Pearson Education (Singapore) Pte. Ltd.
- Chatwal G.R. (2001): **Synthetic Organic Chemistry** (3rd Edn.) (Reprint). Himalaya Publishing House, New Delhi.
- Chauhan M. (): Microscopic profile of powdered drug used in Indian System of Medicine (Volume I).
- Chopra R.N., Nayar S.L. and Chopra I.C. (1969): **Glossary of Indian Medicinal Plants**. Publication and Information Directorate, CSIR, New Delhi
- Cracker L.E. and Simon J.E. (edt. by) (2002): **Herbs, Spices and Medicinal Plants : Recent Advances in Botany, Horticultuire and Pharmacology (Volume I-IV)** (Ind. Reprint). CBS Publishres & Distributors, New Delhi
- DerMarderosian A. and Beutler J.A. (Co edt. by) (2002): **The Review of Natural Products (Volume I- II)** (2nd edn.). Facts and Comparisons, Missouri, USA.
- Evans W.C. (2002): **Pharmacognosy** (15th Edn.). Saunders Publications.
- Grieve M. (1982): **A Modern Herbal (Volume I-II)**. Dover Publications, Inc. NewYork.
- Handa S.S. and Kaul M.K. (edt. by) (1997): **Supplement to Cultivation and Utilization of Medicinal Plants**. Regional Research Laboratory, CSIR, Jammu-Tawi, J&K, India

- Handa S.S. and Kaul M.K. (edt. by) (1997): **Supplement to Cultivation and Utilization of Aromatic Plants**. Regional Research Laboratory, CSIR, Jammu-Tawi, J&K, India
- Harborne J. B. (1973): **Phytochemical Methods**. Chapman and Hall, London.
- Jacobs M.B. (1999): **The Chemical Analysis of Food and Food Products** (3rd Edn.). CBS Publishers and Distributors, Daryaganj, New Delhi
- Kirtikar K.R. and Basu B.D. (1998): **Indian Medicinal Plants (I to VIII Volumes)** (Text + Icons) (2nd edn.) (4th Reprint) BishenSingh Mahendrapal Singh, Dehradun
- Kutumbiah P. (1969): **Ancient-Indian Medicine** (2nd Edn.) Sahgam Books Limited, London
- Lindley J. (1993): **Encyclopaedia of Useful Plants of the World (Volumes I – IV)** (Reprint). Arihant Publishing House, Jaipur.
- Mitra R. (1985): **Bibiliography on Pharmacognosy of Medicinal Plants**. Economic Botany Information Service, National Botanical Research Institute, Lucknow, India
- Mukherjee P.K.(2002): **Quality Control of Herbal Drugs- An Approach to Evaluation of Botanicals** (1st Edn.). Business Horizons Pharmaceutical Publishers, New Delhi, India
- Munshi V.D. (trans.) () : **Astang Hridaya**. Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Parabia M.H. and Pathak S.S. (2002): **Apni Vanushadhi**. Manav Vikas Sansthan,Piplod, Surat.
- Parikh R.J. (Trans.) (1975): **Madhav Nidan** (3rd Edn.).Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Parikh R.J. (Trans.) (1981): **Sharangdhar Samhita** (4th Edn.). Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.

- Ragunathan K. and Mitra R. (comp. & ed. by) (1999): **Pharmacognosy of Indigenous Drugs (Volumes I – II)** (Reprint). Central Council for Research in Ayurveda and Siddha, New Delhi, India.
- Raman N. (2005): **Phytochemical Techniques and Plant Tissue Culture**. Department of Botany, University of Madras, Chennai.
- Rastogi R.P. and Mehrotra B.N. (1993): **Compendium of Indian Medicinal Plants (Volumes I – VI)**. CSIR, Lucknow and Publication & Information Directorate, New Delhi.
- RaviKumar K. and Ved D.K. (2000): **100 Re-Listed Medicinal Plants for Conservation Concern in Southern India** (1st Edn.) Foundation for Revitalization of Local Health Traditions, Bangalore.
- Sadasivam S. and Manickam A (1996): **Biochemical Methods** (2nd Edn.).New Age International Publishers, Tamilnadu Agriculture University, Coimbtore.
- Shah B., Mhaskar and Parabia M.H. (2002): Prathmik Arogya ma Vanaspati Aushadhiyo. Arogya Karyakaro mate ni pustika.
- Shah G.L. (1978): **Flora of Gujarat State (Volume I-II)**. Sardar Patel University, Vvnagar, Gujarat, India
- Shah N.C. (compd.) (1993): **Bharat Bhaishjya Ratnakar- Encyclopaedia of Ayurvedic Formulations** (Volumes I-V) (3rd edn.) B.Jain Publishers (P) Ltd., New Delhi.
- Shastri G.M. (Trans.) (2000): **Yog Ratnakar (Volumes I - II)** (2nd edn). Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Shastri G.M.(Trans.) (1981): **Bhav Parakash (Volumes I – II)** (4th edn.). Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Shastri K.G. (Trans.)(1957): **Shushrut Ayurveda (Volume I-II)** (2nd Edn.). Sastu Sahitya Vardhak Karyalaya, Bhadra, Ahmedabad.
- Sumy, Ved D.K. and Krishnan (2000): **Tropical Indian Medicinal Plants Propagation Methods** (1st Edn.) Foundation for Revitalization of Local Health Traditions, Bangalore.

Vaidya B.G. (1965): **Nighantu Adarsh (Volume I-II)** (2nd Edn.) Shri Swami Atmanand Saraswati Ayurvedic Sakhari Pharmacy Ltd. Surat.

Wagner H. and Bladt S. (1996): **Plant drug Analysis- A Thin layer Chromatography Atlas** (2nd Edn.). Springer Publications

Waller G.R. and Nowacki E.K. (1978): **Alkaloid Biology and Metabolism in Plants**. Plenum Press, New York, London.

Wallis () : Pharmacognosy

Warrier P.K., Nambier V.P. K. and Ramakutty C. (ed.) (1994): **Indian Medicinal Plants. A Compendium of 500 species (Volume I to V)**. Orient Longman Limited, Hyderabad,A.P. India.