

Subject Code: 1PH1010506	Subject Title: PHARMACOGNOSY-III
Pre-requisite Subject	- NONE -

Objectives of course:

- To make students familiar with pharmacognostic study of glycosides containing crude drugs.
- To provide the knowledge about plant tissue culture techniques and their applications.

Learning outcomes:

At the end of semester student will be able to:

- Understand the pharmacognostic aspects specifically sources, morphology, microscopy, chemical constituents, identification tests and important uses of crude drugs belongs to glycosides.
- Acquire the comprehensive knowledge of plant tissue culture techniques.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)					
Lecture	Tutorial	Practical	Credit	Theory(T)		Practical(P)		Total Marks	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Theory	Practical
3	NA	3	6	80	20	80	20	100	100

Subject Contents			
Sr. No.	Topic	Total Hours	Weight (%)
1	<p>Glycosides: Definition, classification, Physico-chemical properties, general methods for isolation, biological sources, agronomy (cultivation, collection), commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following drugs:</p> <p>a) Saponins: Liquorice, Ginseng, Dioscorea, Arjun, Aritha, Achyranthus, Brahmi, Gokhru, Methi, Satavari, Dhamaso, Gymnema, Sarsaparilla, senega</p> <p>b) Cardioactive Sterols: Digitalis, Squill, Strophanthus, Thevetia, Nerium</p> <p>c) Anthraquinone cathartics: Aloe, Senna, Rhubarb, Cascara, <i>Cassia fistula</i>, <i>Cassia tora</i>, Majith</p> <p>d) Bitter glycosides: Gentian, Picrorrhiza, Chirata, Kalmegh, Quassia</p> <p>e) Coumarins: Psoralea, Ajmoda, Bhangro, Calophyllum</p> <p>f) Cyanogenetic glycosides: Almond, Linseed, Prunus</p> <p>g) Isothiocyanate glycosides: Mustard, Black mustard</p> <p>h) Flavanoids: <i>Ruta graveolens</i>, Butea, Bhilama</p> <p>i) Others: Salix</p>	35	78
2	Plant tissue culture: Introduction, basic requirements, types of culture, nutritional requirements, laboratory requirements and applications	10	22

List of Experiments: (45 Hours)

Practical exercises should be based on theoretical topics. The practical should broadly cover the following:	
1	General methods for isolation and chemical tests of different glycoside containing drugs.
2	<p>Study of Morphology, Microscopy and TLC of crude drugs: (T.S., Powder and TLC of underlined drugs):</p> <p>a. Anthraquinone: <u>Majith</u>, <u>Senna</u>, Aloe, Rhubarb, <u>Cassia fistula</u>, <u>Cassia tora</u></p> <p>b. Cardioactive Sterols: <u>Digitalis</u> (Powder), Squill, Thevetia, <u>Nerium</u> (leaf)</p> <p>c. Saponins glycosides: <u>Liquorice</u>, Achyranthus, <u>Satavar</u>, Ginseng, Dhamaso, Brahmi, Methi, Dioscorea, Sarsaparilla, Senega</p> <p>d. Bitter glycosides: Gentian, <u>Chirata</u>, <u>Kalmegh</u>, Quassia</p> <p>e. Coumarins: Psoralea, Ajmoda, <u>Bhangro</u></p>

	f. Cyanogenetic and Isothiocyanate glycosides: Almond, <u>Linseed</u> , Mustard
3	Study of Morphology and Chemical test for following drugs: Bhilama, Palash.
4	Introduction to basic laboratory requirements, maintenance of plant tissue culture and production of callus culture.
5	Estimation of sennosides from senna.
6	Estimation of aloin from aloe.
7	Isolation of Andrographolide from Kalmegh.

List of References:

Reference books:

1. Cultivation and Utilization of Medicinal Plants, Atal C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989.
2. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K., 1996. RRL, CSIR Publication, Jammu Tawi.
3. Quality Standards of Indian Medicinal Plants, Volume I to XI (2003 to 2013) Editor: Neeraj Tundon & Parul Sharma; By: Medicinal plant Unit, ICMR, New Delhi.
4. Plant Drug Analysis: A Thin Layer Chromatography Atlas, H. Wagner, S Bladt, Springer, New York, 2nd Edition, 2007.
5. Medicinal plants glycosides- Sims. Toronto.
6. Indian Medicinal Plants by Kirtikar and Basu, 1st Edition, International Book Distributors, Dehradun, 1999.
7. The Wealth of India (Raw Material & Industrial Product), Published by Council of Scientific Industrial Research, New Delhi, 1st and 2nd Edition, 2005, 2nd (1950-2014)
8. Pharmacognosy, Phytochemistry Medicinal Plants, Jean Bruneton, Intercept Publications, Ltd., TEC & DOC Paris, 2nd Edition, 1999.
9. Microscopic profile of powdered drugs used in Indian system of medicine, Volume I, Bark drugs, Malati G Chanhani & A. P.G Pillai, Institute of Ayurvedic medicinal plant science, Gujarat ayurved unit Jamnagar, CPTA, 2005.
10. Microscopic profile of powdered drugs used in Indian systems of Medicine, Leaf Drugs, Vol 2, Malati G Chauhan & A.P.G Pillai, Institute of P.G Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar, 2007.
11. Microscopic profile of Drugs used in Indian system of Medicine, Seed drugs, Volume- 3, part- 1, Malati G Chauhan & A.P.G Pillai, Publisher: Prof Malati G Chauhan, P.G T- S.F C cell, I.P. G T. & R.A, Gujarat Ayurved University, Jamnagar, 2011.

Text books:

1. Textbook of Pharmacognosy, C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmadabad, 15th Edition, 2009.
2. Textbook of Pharmacognosy, T. E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
3. Trease and Evans Pharmacognosy, William Charles Evans, W. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto, 16th Edition, 2009.
4. Pharmacognosy, C. K. Kokate, A. P. Purohit, S. B. Gokhale, Nirali Prakashan Pune, 42nd edition, 2008.
5. Textbook of Pharmacognosy and Phytochemistry, Biren Shah, A. K. Sheth, Elsevier Publication, 1st edition, 2010.
6. Essentials of Pharmacognosy, Ansari S. H., Birla Publications Pvt. Ltd., 4th Edition, 2011.
7. Practical Pharmacognosy, Technique and Experiment by C. K. Kokate and S. B. Gokhale, Nirali Prakashan, Pune, 8th edition, 2005.

8. Atlas of Microscopy of Medicinal Plants, Culinary Herbs and Spices, Betty P. Jackson, Derek W. Snowdon, CBS publishers, 1992.
9. Pharmacognosy and Pharmacobiotechnology, Ashutosh Kar, 2nd Edition, New Age International Pvt. Ltd.; New Delhi, 2007.
10. Comprehensive Biotechnology, 'The Principles, application and regulation of biotechnology in Industry, agriculture and Medicine Vol. 1-4 Alan T, Howard Dalton and Murray Mao-Young.
11. An introduction to Plant Tissue Culture Kalyan Kumar De, New Central Book Agency (P) Ltd., Calcutta
12. Plant Tissue Culture, Sharma Rajni, Campus Books International, 1st Edition, 2007.
13. Textbook of Industrial Pharmacognosy, A. N. Kalia, CBS Publishers & Distributors Pvt. Ltd., 1st Rev. Edition, 2011.

e- Resources:

1. <https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/glycosides>
2. <http://www.cvpharmacology.com/cardiostimulatory/digitalis>
3. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-tissue-culture>
4. http://www.e-pharmacognosy.com/2012/04/glycosides_15.html
5. <http://www.inchem.org/documents/jecfa/jecmono/v30je18.htm>