

University of Jordan
Faculty of Pharmacy
Department of Pharmaceutical Sciences
Course Title: Phytochemistry I
Course Code: 1201323
Prerequisite (S): Pharmacognosy (1201321)
Course Coordinator: Prof. Dr. Fatma Afifi

Instructor (S):

Name	Office Number	Office Phone	Office Hours	E-mail
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Course Objectives:

This course is intended to introduce pharmacy students to the concept of the drugs from natural resources according to their biosynthetic origin. Isolation/identification and the biological activities of the plant constituents of the acetate-malonate and shikimic acid pathways and drugs containing these constituents will be discussed. The remaining pathways comprise the topics of the Phytochemistry II lectures. The aim of the lectures is not to rely just on factual information but to impart an understanding of natural product structures and the way they are put together in living organisms.

1- Current updated information of the biosynthetic pathways of the acetate malonate and shikimic acid pathways

2-Origin and isolation / identification methods of bioactive substances belonging to these pathways

3-Therapeutic and toxicological activities of these substances

4-Chemical ecology of these substances

Learning Outcomes:

- A) Knowledge and understanding
 - A1) To know the potentially useful medicinal plants of these pathways
 - A2) To know the importance and value of ethnopharmacology in drug discovery
 - A3) To study the biosynthesis of secondary metabolites and major biosynthetic pathways
 - A4) To know the Latin and bilingual (English/Arabic) common names of potentially used medicinal plants
 - A5) To know examples of commonly misused natural drugs and their semisynthetic/synthetic derivatives /analogues
 - A6) To use different references to collect the necessary information

- B) Intellectual skills (cognitive and analytical)
 - B1) To know and to correlate the mechanisms, concepts and principles of biosynthetic pathways in plants
 - B2) To expand the horizon of the organic chemistry
 - B3) To apply the fundamental principles of organic chemistry and biochemistry for construction of natural products
 - B4) To predict the physico-chemical properties of natural products
 - B5) To evaluate the plant/plant, plant/ animal and plant/insect interactions based on the secondary plant constituents

- C) Subject specific skills
 - C1) Ethnobotanical and ethnopharmacological aspects of plant drugs
 - C2) To acquire updated information on old known medicinal plants
 - C3) To be acquainted with the reputed actions and uses of herbal ingredients whether or not these have been substantiated by animal and human studies
 - C4) Chemical, biological and therapeutic activities of plant constituents biosynthesized in the mentioned pathways

- D) Transferable skills
 - D1) Provision of advice on the use of medicinal plants as natural remedies
 - D2) Provision of advice on the limitations and precautions of commonly used herbal medicines especially by pregnant and lactating mothers
 - D3) Provision of advice on the activities and toxicities of important addictive drugs of plant origin

Teaching Methods:

- 1) Lectures: 2 credit hours/week
- 2) Demos: Demonstration of the dried plant materials and isolates from the faculty collection
- 3) Tutorials
- 4) Laboratory: see separate description
- 5) Case study
- 6) Assignments, reports, projects: (At times, when the number of the registered students was not increasing above 100 students, they were assigned to prepare and present a report discussing different aspects of medicinal plants using published papers – not Textbook information-, which is at present with classes 250 or more not possible)

Tests & Evaluations:

Midterm Exam	(30%)
Semester works (quizzes, assignments, etc..)	(20%)
Final exam	(50%)

Course Contents and Schedule:

Topics	Lectures
1. Introduction to secondary metabolites	1
2. Acetate malonate pathway	1
2.1 Naturally occurring acetylenic compounds from plants and microorganisms 1	
2.2 Lichen compounds	1
2.3 Constituents of male fern	1
2.4 Bitter principles of hops	1
2.5 Cannabinoids	2
2.6 Anthracene derivatives (anthraquinones and anthraquinone containing plants. (i.e cascara, frangula , rhubarb , aloe..)	2
2.7 Antibiotics derived from acetate metabolism (Biosynthesis of tetracyclines, griseofulvin, macrolides, polyenes...)	3
2.8 Antineoplastic anthracycline derivatives and their biosynthesis	1
2.9 Chromones and chromans	1
2.10 Flavonoids and related compounds (plants containing flavonoids and their derivatives)	5
3. Shikimic acid pathway & aromatic biosynthesis	1
3.1 Phenols & phenolic glycosides (e.g. arbutin, vanillin...)	2
3.2 Coumarins and coumarin containing drugs, properties and uses	2
3.3 Lignan glycosides and lignin	2
4. Tannins	2

Text book: Pharmacognosy, Phytochemistry, Medicinal Plants (by Jean Bruneton).

References:

1. Pharmacognosy (V.E. Tyler)
2. Medicinal Natural Products (P.M. Dewick)
3. Trease and Evan's Pharmacognosy (W.C. Evans)

Important Regulations: University rules and regulations are applied.