

PHG 474 "Screening, Separation and Analysis of Plant
Constituents" (2+2)
(Prerequisite : PHG 351)

The course covers the methods and techniques employed for screening medicinal plants for their bioactive constituents. It also discusses recent developments regarding methods of extraction, isolation, purification and spectroscopic identification of plant bioactive constituents not covered elsewhere. Emphasis will be given to the chemistry of certain selected classes of these constituents. In addition, the course includes further applications of chromatographic and spectroscopic techniques in the analysis of the isolated compounds. The students will be trained to use spectral data for interpretation of the structures of the compounds that are isolated in the laboratory part of the course.

COURSE CONTENTS

Subject	No. of lectures
1. Introduction	1
1.1 General concepts	
1.2 Medicinal Plants Information Sources	
2. Phytochemical Screening	3
2.1 Methodologies	
- Preparation of the plant material	
- Physicochemical tools and techniques employed.	
- General extraction procedures including infusion, decoction, maceration, percolation, and continuous extraction.	
2.2 Screening for bioactive plant constituents:	3
2.3 Specific extraction procedures:	3
Procedures used for the isolation of certain classes of medicinal plant constituents.	
3. Purification of the individual components of the isolated chemical classes.	2
3.1 Chemical methods, including derivatization and related techniques.	
3.2 Physical methods, including crystallization distillation...etc.	

- 3.3 Further applications of chromatographic separation techniques such as adsorption, partition, ion-exchange, gel-filtration, chromatotron, GLC and HPLC. 6
4. Chemistry and spectroscopic analysis of the isolated compounds.
- 4.1 Characterization of the active constituents by physical and chemical methods, including 2
- a. determination of physical parameters.
 - b. Response to color tests.
 - c. Chromatographic behavior.
 - d. Compliance with pharmacopoeial standards.
- 4.2 Application of the spectroscopic techniques for the identification of the isolated compounds and interpretation of their spectral data. 6
- a. Application to alkaloids
 - b. Application to flavonoids.
 - c. Application to steroids and steroidal glycosides.
 - d. Application to terpenes, vitamins and antibiotics.

Examinations

2

28 hrs

Pharmacognosy Department
 Practical Course PHG 474

"Screening, Separation and Analysis of Plant Constituents"

Practical Periods	Subject
Lab (1)	1.1 Extraction techniques. 1.2 Preparation of certain extracts (<u>Ammi visnaga</u> , <u>Artemisia annua</u> , <u>Piper nigrum</u> and orange peel). 1.3 Development of TLC solvent systems for the separation of complex mixtures of plant constituents.
Lab (2)	2.1 Chemical screening of unknown plant material for alkaloids viz., 1°, 2°, 3°, 4° and N-oxide alkaloids. 2.2 Chemical screening of unknown plant material for glycosides viz., anthraquinones, flavonoids, saponins, glycosides, tannins, coumarins and miscellaneous types of constituents. 2.3 Chromatographic screening of alkaloids and glycosides.
Lab (3)	3.1 Isolation of oil of clove and separation of eugenol from acetyleugenol by a. Acid/base shake-up (TLC) b. Anion-exchange chromatography. 3.2 Isolation of piperine from <u>P. nigrum</u> .
Lab (4)	4.1 Isolation of piperine from <u>P. nigrum</u> (contd) tlc, yield, mp and spectral data of the isolated piperine. 4.2 Analysis of an oleo-gum-resin (eg: Olibanum).
Lab (5)	5.1 TLC and GLC analysis of the essential oils of umbelliferous fruits (Parsely, Anise, Dill, Coriander, Caraway and Fennel).

- 5.2 Determination of the percentage of the major constituents in each oil.
- Lab (6) 6.1 Isolation of pectin from grape fruits and apples.
6.2 Chemical composition of pectin and Olibanum gum (degradation and analysis).
- Lab (7) 7.1 Isolation of lycopene from tomatoes.
Color reactions of lycopene.
7.2 Spectroscopic identification of lycopene.
- Lab (8) 8.1 Isolation of hesperidin from orange peel.
8.2 Color reactions of hesperidin.
8.3 Spectroscopic identification of hesperidin.
- Lab (9) 9.1 Isolation of khellin from Ammi visnaga.
Spectroscopic identification of khellin.
9.2 HPLC determination of khellin in Ammi visnaga.
- Lab (10) 10.1 Separation of blue dextran, yellow dextran and vitamin B₁₂ on sephadex G-100.
10.2 Use of blue dextran in the determination of the void volume (V₀).
- Lab (11) Isolation and identification of glutamine from red beets.
- Lab (12) 12.1 Synthesis of vitamin K₃.
12.2 Identification of vit. K₃ by spectroscopic means.
- Lab (13,14) Two separate practical examinations.

دستگاه خطی اول
۳۴۸/۷/۱۱

بسم الله الرحمن الرحيم
مقره ۴۷۴ مقره ۱۰۰۹
فصل صبیحہ

کتابت اسلامیہ
قسم لسانیہ

آجب تک صحیح پرستہ :

۱۔ : عدد پلاچیمیاٹات البرزہ فی العاقل ص العیات النباتیہ .

۲۔ : لا اذا يكون الاختيار الروي لبعض الباطن يعمل على نباتات تحتوي على قلويدات ؟

۳۔ : False-negative alkaloid Reaction

۴۔ : كيف تكشف عن القلويدات المحل بواسطة spot test using alk. test paper

۵۔ : عدد افعال النبات البيولوجية التي يمكن ان يجمع النبات من أجل

۶۔ : خاص خواص الصابونينات ؟

۷۔ : اذكر طحس بطريقة (A) يستخلص القلويدات من النباتات .

۸۔ : اشر على Medical Botany

والله المحقق

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
تَسْمِيَةُ الْعُقَايِرِ

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
مَقَرٌ - ٤٧٤ عَقْرٌ
سَجْمَةٌ - ١٤٠

الاصطفاة لفضل ليدول
١٤٠١٧١٧ ع

أجب عن جميع الأسئلة :-

- س١ : اذكر جدول استخلاص إقلويدات .
- س٢ : عدد الاضحيات البارزة في العقائل مع اجينات النباتية .
- س٣ : ماهي مصدر الدودييه ؟
- س٤ : ما معنى المصطلحات التالية :-

- a- Authentication.
- b- Herbals.
- c- False-positive alkaloid Test.
- d- Salt out process.

رجب ك جمع برستله :-

- ١ : ماهو الفرقه بين نواتج البريف الادويه ونواتج البريف السائيه ؟
٢ : ماهو شروط الواجب توفرها في الطريقة الكايمه لمح الباتات مساكيمائيا عقاقيريا ؟
٣ : هات كلمته من السائل التي تواجده عند الملح للقلويدات مع ذكر حلها .
٤ : اذكر اسم احد الكواشف الرئيسية للقلويدات ، واذكر واحد البخاخات .
٥ : كيف تحصل الجلوكوزيدات القلبيه من الباتات ؟
٦ : كيف تكلف من القلويدات في الحقل باستعمال انبوجه للاخبار ؟
٧ : وضح كيف ادهال ماصه ملرسة من لبيدي في مجال لتصنيف كيميائي للباتات
و مع اي شئ يعتمد هذا التصنيف ؟
٨ : ماذا تعرف عن ملح الباتات ضد الميكروبات ؟
٩ : تكلم عن اهمية الجينات بالنسبة للبراد الفعالة الموجوده في الباتات .
١٠ : اشرح المصطلحات التاليه :-

- To give characteristic chromogenic response.
- Chemical races.
- False -ve alkaloid test.
- Ethnobotany.
- Herbals.