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Semester 5 - Practical Notes

Pharmacognosy and Phytochemistry II

Complete Subject Manual

19 practicals and activities. Use the PDF bookmarks to move between practicals. Page numbers restart within each practical; the page counts below exclude the promotion pages.

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Morphology, Histology and Phytochemical Study of Cinchona

Practical 01 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Cinchona, and interpret the recorded observations.

Principle

- Bark with characteristic fissuring/quill form and prepared sections showing cork, fibres and other bark elements; the principal teaching chemical group is quinoline alkaloids.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated cinchona specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Bark form	_____
Cork and fibres	_____
Powder features	_____
Alkaloid-class observation	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Cinnamon

Practical 02 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Cinnamon, and interpret the recorded observations.

Principle

- Bark studied for quill structure, cork/cortical characters and powder elements; volatile-oil constituents include cinnamaldehyde. The assigned species determines the comparison characters.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated cinnamon specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Quill and surface	_____
Section characters	_____
Powder fibres/cells	_____
Oil/aldehyde evidence	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Senna

Practical 03 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Senna, and interpret the recorded observations.

Principle

- Leaflets are studied for shape, epidermal/stomatal features and crystal-bearing tissues. Sennosides are anthraquinone-related glycosides and require a suitable assigned detection method.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated senna specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Leaflet shape	_____
Epidermis/stomata	_____
Calcium oxalate features	_____
Glycoside detection	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Clove

Practical 04 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Clove, and interpret the recorded observations.

Principle

- Dried flower buds are studied for the unopened head, stalk and prepared oil-gland tissue. Eugenol is a characteristic major constituent of clove volatile oil.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated clove specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Bud shape	_____
Oil-gland tissue	_____
Powder fragments	_____
Phenolic-oil evidence	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Ephedra

Practical 05 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Ephedra, and interpret the recorded observations.

Principle

- Jointed stems are compared with authenticated teaching material for nodes, reduced leaves and prepared tissue features. Ephedrine-family alkaloids are a characteristic chemical group.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated ephedra specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Jointed stem/nodes	_____
Reduced leaves	_____
Prepared section	_____
Alkaloid evidence	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Fennel

Practical 06 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Fennel, and interpret the recorded observations.

Principle

- Fruits are studied for paired mericarps, ridges and oil ducts or vittae in prepared sections. Anethole is a characteristic constituent in many fennel-oil teaching materials.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated fennel specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Fruit shape/ridges	_____
Mericaip section	_____
Vittae	_____
Volatile-oil evidence	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Morphology, Histology and Phytochemical Study of Coriander

Practical 07 | Pharmacognosy and Phytochemistry II

Aim

To study Morphology, Histology and Phytochemical Study of Coriander, and interpret the recorded observations.

Principle

- Fruits are studied for their globular appearance, mericarps and prepared pericarp/oil-duct characters. Linalool is a characteristic major volatile-oil constituent.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- Extraction study: compare the plant part, target constituent class and solvent-selection rationale in the prepared demonstration.
- Detection study: record the method, comparison/control and observed result. A class reaction alone does not prove the identity of every constituent.

Materials and Apparatus

- Authenticated coriander specimen, prepared sections/powder mounts and instructor-prepared extract or completed detection records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Fruit form	_____
Pericarp features	_____
Prepared powder	_____
Volatile-oil evidence	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Isolation and Detection Study of Caffeine from Tea Dust

Practical 08 | Pharmacognosy and Phytochemistry II

Aim

To study Isolation and Detection Study of Caffeine from Tea Dust, and interpret the recorded observations.

Principle

- Caffeine is a methylxanthine alkaloid. Isolation study separates it from the complex tea matrix and confirms identity with suitable comparison evidence.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.

Materials and Apparatus

- Tea teaching extract, instructor-prepared isolated fraction and comparison identity data.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Identify the plant part and target chemical class in the provided teaching material.
2. Review the completed demonstration and explain the purpose of its separation stages.
3. Compare the labelled fractions with the target-class detection or standard data supplied.
4. Record the identity/purity evidence separately from a general class-test observation.
5. Calculate recovery only if a verified dry mass and defined starting-material basis are supplied.
6. Explain the separation rationale and the limitations of the identity evidence.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Starting material	_____
Prepared fraction labels	_____
Separation rationale	_____
Comparison identity evidence	_____
Recovery data	_____

Calculations and Interpretation

- Recovery (%) = recovered dry fraction mass/defined starting-material mass × 100, when valid masses are supplied.
- Call this fraction recovery unless purity and active-constituent content have been established.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Isolation and Detection Study of Diosgenin from Dioscorea

Practical 09 | Pharmacognosy and Phytochemistry II

Aim

To study Isolation and Detection Study of Diosgenin from Dioscorea, and interpret the recorded observations.

Principle

- Diosgenin is a steroidal sapogenin; the distinction between a glycoside-containing plant fraction and the liberated aglycone is central to the study.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.

Materials and Apparatus

- Prepared Dioscorea fractions, instructor demonstration and comparison analytical data.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Identify the plant part and target chemical class in the provided teaching material.
2. Review the completed demonstration and explain the purpose of its separation stages.
3. Compare the labelled fractions with the target-class detection or standard data supplied.
4. Record the identity/purity evidence separately from a general class-test observation.
5. Calculate recovery only if a verified dry mass and defined starting-material basis are supplied.
6. Explain the separation rationale and the limitations of the identity evidence.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Starting material	_____
Prepared fraction labels	_____
Separation rationale	_____
Comparison identity evidence	_____
Recovery data	_____

Calculations and Interpretation

- Recovery (%) = recovered dry fraction mass/defined starting-material mass × 100, when valid masses are supplied.
- Call this fraction recovery unless purity and active-constituent content have been established.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Isolation and Detection Study of Atropine from Belladonna

Practical 10 | Pharmacognosy and Phytochemistry II

Aim

To study Isolation and Detection Study of Atropine from Belladonna, and interpret the recorded observations.

Principle

- Atropine is a tropane alkaloid. Study the instructor-prepared fractions and identity data; recovery of an alkaloid-positive fraction does not establish pure atropine.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.

Materials and Apparatus

- Prepared belladonna teaching fractions and completed separation/identity observations.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Identify the plant part and target chemical class in the provided teaching material.
2. Review the completed demonstration and explain the purpose of its separation stages.
3. Compare the labelled fractions with the target-class detection or standard data supplied.
4. Record the identity/purity evidence separately from a general class-test observation.
5. Calculate recovery only if a verified dry mass and defined starting-material basis are supplied.
6. Explain the separation rationale and the limitations of the identity evidence.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Starting material	_____
Prepared fraction labels	_____
Separation rationale	_____
Comparison identity evidence	_____
Recovery data	_____

Calculations and Interpretation

- Recovery (%) = recovered dry fraction mass/defined starting-material mass × 100, when valid masses are supplied.
- Call this fraction recovery unless purity and active-constituent content have been established.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Isolation and Detection Study of Sennosides from Senna

Practical 11 | Pharmacognosy and Phytochemistry II

Aim

To study Isolation and Detection Study of Sennosides from Senna, and interpret the recorded observations.

Principle

- Sennosides are glycosidic constituents studied by comparison with appropriate chromatographic or other analytical standards. A colour-class test cannot alone measure pure sennoside content.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.

Materials and Apparatus

- Prepared senna teaching fractions and completed comparison chromatograms.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Identify the plant part and target chemical class in the provided teaching material.
2. Review the completed demonstration and explain the purpose of its separation stages.
3. Compare the labelled fractions with the target-class detection or standard data supplied.
4. Record the identity/purity evidence separately from a general class-test observation.
5. Calculate recovery only if a verified dry mass and defined starting-material basis are supplied.
6. Explain the separation rationale and the limitations of the identity evidence.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Starting material	_____
Prepared fraction labels	_____
Separation rationale	_____
Comparison identity evidence	_____
Recovery data	_____

Calculations and Interpretation

- Recovery (%) = recovered dry fraction mass/defined starting-material mass × 100, when valid masses are supplied.
- Call this fraction recovery unless purity and active-constituent content have been established.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Separation of Sugars by Paper Chromatography

Practical 12 | Pharmacognosy and Phytochemistry II

Aim

To study Separation of Sugars by Paper Chromatography, and interpret the recorded observations.

Principle

- Paper chromatography separates assigned sugar standards and mixtures by their distribution in the chosen paper/mobile-phase system.
- Compounds separate because they interact differently with the stationary and mobile phases.
- Identity assessment uses an appropriate comparison standard and method conditions; one migration or retention value alone is not conclusive.

Materials and Apparatus

- Prepared sugar standards and mixtures, chromatography paper and the assigned detection system.
- Assigned test extract or mixture, comparison standards and the specified stationary/mobile phase system.
- Appropriate chromatographic apparatus, application equipment, developing chamber or instrument and the assigned detector.

Method

1. Record the stationary phase, mobile phase and the purpose of the separation.
2. Prepare test and comparison solutions at suitable concentrations for the assigned method.
3. Introduce measured test and comparison portions without overloading the separation system.
4. Develop or run the separation under the assigned conditions, recording the relevant operating details.
5. Locate separated bands, spots or peaks using the specified observation method.
6. Compare the test pattern with the standard and calculate the appropriate separation metric.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Sugar standard	_____
Spot distance	_____
Solvent-front distance	_____
Rf	_____
Mixture comparison	_____

Calculations and Interpretation

- For planar chromatography: $R_f = \text{distance travelled by spot centre} / \text{distance travelled by solvent front}$.
- R_f is dimensionless and normally lies between zero and one under a valid development.

Worked Illustration

Illustration: a spot travelling 3.0 cm with a solvent front travelling 6.0 cm has $R_f = 0.50$.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep application concentrated and avoid overloading.
- Record the solvent front immediately for planar chromatography.
- Use retention or migration data only with the stated system and relevant identity evidence.

Viva Questions

1. Why does overloading impair separation?

It broadens bands or spots and can change apparent migration or retention.

2. Why run a comparison standard?

It supplies a relevant reference pattern under the same analytical conditions.

Thin-Layer Chromatography of Herbal Extract

Practical 13 | Pharmacognosy and Phytochemistry II

Aim

To study Thin-Layer Chromatography of Herbal Extract, and interpret the recorded observations.

Principle

- A herbal TLC fingerprint compares the pattern of several constituents in a standardized system. Matching one spot does not establish the entire extract composition.
- Compounds separate because they interact differently with the stationary and mobile phases.
- Identity assessment uses an appropriate comparison standard and method conditions; one migration or retention value alone is not conclusive.

Materials and Apparatus

- Prepared herbal extract, standards, assigned TLC plate and development/detection system.
- Assigned test extract or mixture, comparison standards and the specified stationary/mobile phase system.
- Appropriate chromatographic apparatus, application equipment, developing chamber or instrument and the assigned detector.

Method

1. Record the stationary phase, mobile phase and the purpose of the separation.
2. Prepare test and comparison solutions at suitable concentrations for the assigned method.
3. Introduce measured test and comparison portions without overloading the separation system.
4. Develop or run the separation under the assigned conditions, recording the relevant operating details.
5. Locate separated bands, spots or peaks using the specified observation method.
6. Compare the test pattern with the standard and calculate the appropriate separation metric.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Extract identity	_____
Spot colour/appearance	_____
Migration distance	_____
Rf	_____
Comparison pattern	_____

Calculations and Interpretation

- For planar chromatography: $R_f = \text{distance travelled by spot centre} / \text{distance travelled by solvent front}$.
- R_f is dimensionless and normally lies between zero and one under a valid development.

Worked Illustration

Illustration: a spot travelling 3.0 cm with a solvent front travelling 6.0 cm has $R_f = 0.50$.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep application concentrated and avoid overloading.
- Record the solvent front immediately for planar chromatography.
- Use retention or migration data only with the stated system and relevant identity evidence.

Viva Questions

1. Why does overloading impair separation?

It broadens bands or spots and can change apparent migration or retention.

2. Why run a comparison standard?

It supplies a relevant reference pattern under the same analytical conditions.

Volatile-Oil Distillation and TLC Study

Practical 14 | Pharmacognosy and Phytochemistry II

Aim

To study Volatile-Oil Distillation and TLC Study, and interpret the recorded observations.

Principle

- Distillation co-collects suitable volatile constituents with water, while TLC compares the recovered oil fingerprint with the assigned standard. Distillation recovery and chromatographic identity are separate outcomes.
- Compounds separate because they interact differently with the stationary and mobile phases.
- Identity assessment uses an appropriate comparison standard and method conditions; one migration or retention value alone is not conclusive.
- Trace the demonstration path from vapour formation through condensation and phase separation.
- Discuss losses from incomplete separation, retention in apparatus or altered material composition without assuming that all volatile compounds are recovered equally.

Materials and Apparatus

- Instructor-demonstrated volatile-oil apparatus, prepared oil and TLC standards/records.
- Assigned test extract or mixture, comparison standards and the specified stationary/mobile phase system.
- Appropriate chromatographic apparatus, application equipment, developing chamber or instrument and the assigned detector.

Method

1. Record the stationary phase, mobile phase and the purpose of the separation.
2. Prepare test and comparison solutions at suitable concentrations for the assigned method.
3. Introduce measured test and comparison portions without overloading the separation system.
4. Develop or run the separation under the assigned conditions, recording the relevant operating details.
5. Locate separated bands, spots or peaks using the specified observation method.
6. Compare the test pattern with the standard and calculate the appropriate separation metric.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Plant basis	_____
Recovered oil amount	_____
Oil appearance	_____
TLC pattern	_____
Standard comparison	_____

Calculations and Interpretation

- Oil recovery = recovered oil amount/defined plant-material amount, with the reporting units stated.
- R_f = spot-centre distance/solvent-front distance.

Worked Illustration

Illustration: a spot travelling 3.0 cm with a solvent front travelling 6.0 cm has $R_f = 0.50$.

The values in this illustration are for calculation practice.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Keep application concentrated and avoid overloading.
- Record the solvent front immediately for planar chromatography.
- Use retention or migration data only with the stated system and relevant identity evidence.

Viva Questions

1. Why does overloading impair separation?

It broadens bands or spots and can change apparent migration or retention.

2. Why run a comparison standard?

It supplies a relevant reference pattern under the same analytical conditions.

Chemical Identification of Asafoetida

Practical 15 | Pharmacognosy and Phytochemistry II

Aim

To identify Asafoetida, and interpret the recorded observations.

Principle

- An oleo-gum-resin; identification combines physical appearance with the assigned gum, resin and volatile-component evidence.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- State the material type and the constituent class assessed by each assigned reaction.
- Record a positive result only when the relevant comparison and reagent control support it.

Materials and Apparatus

- Authenticated asafoetida teaching material and assigned completed chemical-test/comparison records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Physical appearance	_____
Assigned test	_____
Test observation	_____
Comparison/control	_____
Identification conclusion	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Chemical Identification of Benzoin

Practical 16 | Pharmacognosy and Phytochemistry II

Aim

To identify Benzoin, and interpret the recorded observations.

Principle

- A balsamic resin; characteristic aromatic-acid/resin evidence is interpreted with an authenticated comparison.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- State the material type and the constituent class assessed by each assigned reaction.
- Record a positive result only when the relevant comparison and reagent control support it.

Materials and Apparatus

- Authenticated benzoin teaching material and assigned completed chemical-test/comparison records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Physical appearance	_____
Assigned test	_____
Test observation	_____
Comparison/control	_____
Identification conclusion	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Chemical Identification of Colophony

Practical 17 | Pharmacognosy and Phytochemistry II

Aim

To identify Colophony, and interpret the recorded observations.

Principle

- Rosin is a resin-acid-rich material; resin behaviour and the assigned acid-related test support identification.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- State the material type and the constituent class assessed by each assigned reaction.
- Record a positive result only when the relevant comparison and reagent control support it.

Materials and Apparatus

- Authenticated colophony teaching material and assigned completed chemical-test/comparison records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Physical appearance	_____
Assigned test	_____
Test observation	_____
Comparison/control	_____
Identification conclusion	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Chemical Identification of Aloes

Practical 18 | Pharmacognosy and Phytochemistry II

Aim

To identify Aloes, and interpret the recorded observations.

Principle

- A dried leaf exudate containing anthraquinone-related constituents; prepared class-test evidence is combined with material identity.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- State the material type and the constituent class assessed by each assigned reaction.
- Record a positive result only when the relevant comparison and reagent control support it.

Materials and Apparatus

- Authenticated aloes teaching material and assigned completed chemical-test/comparison records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Physical appearance	_____
Assigned test	_____
Test observation	_____
Comparison/control	_____
Identification conclusion	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

Chemical Identification of Myrrh

Practical 19 | Pharmacognosy and Phytochemistry II

Aim

To identify Myrrh, and interpret the recorded observations.

Principle

- An oleo-gum-resin; the gum/resin proportions and physical/class-test evidence support comparison with authenticated material.
- Crude-drug identity is established through a combination of macroscopic, microscopic and chemical characteristics.
- A chemical class test is supportive and does not alone distinguish all adulterants or substitute materials.
- State the material type and the constituent class assessed by each assigned reaction.
- Record a positive result only when the relevant comparison and reagent control support it.

Materials and Apparatus

- Authenticated myrrh teaching material and assigned completed chemical-test/comparison records.
- Authenticated drug material, a prepared comparison specimen or atlas, and assigned test reagents.
- Hand lens, microscope with prepared sections or powder mounts, glassware and a record sheet.

Method

1. Record the drug name, plant part or material type and the condition of the provided specimen.
2. Examine the macroscopic characters without tasting the material.
3. Study assigned prepared sections or powder mounts and sketch distinguishing structures.
4. Observe the assigned class test with the necessary positive or reagent comparison.
5. Combine the visible, microscopic and chemical evidence rather than relying on one feature.
6. Write a reasoned identification statement and document differences from the authenticated comparison.

Observation Record

Complete this record using actual laboratory findings or the provided teaching data.

Observation / parameter	Record / finding
Physical appearance	_____
Assigned test	_____
Test observation	_____
Comparison/control	_____
Identification conclusion	_____

Calculations and Interpretation

- Qualitative identity exercises usually require a structured comparison rather than a numerical calculation.

Result

Record the actual finding, calculated value with units where relevant, and a conclusion supported by the observations.

Finding: _____

Conclusion: _____

Precautions

- Use an authenticated comparison and retain the specimen identity.
- Do not taste crude drugs or infer a clinical dose from an identification test.
- Distinguish a characteristic finding from a feature that can vary with processing or age.

Viva Questions

1. Why combine several identification features?

One character may be shared by unrelated materials or altered by processing.

2. Does a class test establish drug purity?

No. It indicates a chemical group and must be combined with other evidence.

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