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Semester 4 - Practical Notes

Pharmacognosy and Phytochemistry I

Complete Subject Manual

16 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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Chemical Identification of Tragacanth

Practical 01 | Pharmacognosy and Phytochemistry I

Aim

To identify Tragacanth, and interpret the recorded observations.

Principle

- Tragacanth is a plant gum rich in polysaccharide fractions; swelling and mucilage behaviour support its 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.

Materials and Apparatus

- Authenticated tragacanth, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Swelling/mucilage behaviour	_____
Assigned carbohydrate test	_____
Comparison	_____

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 Acacia

Practical 02 | Pharmacognosy and Phytochemistry I

Aim

To identify Acacia, and interpret the recorded observations.

Principle

- Acacia is a plant gum with water-dispersion and carbohydrate characteristics that are compared 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.

Materials and Apparatus

- Authenticated acacia, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Dispersion behaviour	_____
Assigned carbohydrate test	_____
Comparison	_____

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 Gelatin

Practical 03 | Pharmacognosy and Phytochemistry I

Aim

To identify Gelatin, and interpret the recorded observations.

Principle

- Gelatin is derived from collagen and exhibits protein-related chemical-test behaviour rather than the polysaccharide behaviour of plant gums.
- 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

- Authenticated gelatin, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Assigned protein test	_____
Gel behaviour	_____
Comparison	_____

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 Starch

Practical 04 | Pharmacognosy and Phytochemistry I

Aim

To identify Starch, and interpret the recorded observations.

Principle

- Starch granule morphology and the assigned iodine reaction support identification; botanical source can affect granule appearance.
- 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

- Authenticated starch, assigned comparison material and class-test demonstrations.
- 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
Granule appearance	_____
Hilum/striations where visible	_____
Iodine observation	_____
Comparison	_____

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 Honey

Practical 05 | Pharmacognosy and Phytochemistry I

Aim

To identify Honey, and interpret the recorded observations.

Principle

- Honey contains sugars, including reducing sugars. Supportive sugar tests must be distinguished from a complete authenticity assessment.
- 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

- Authenticated honey, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Assigned sugar test	_____
Control observation	_____
Identity 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.

Chemical Identification of Castor Oil

Practical 06 | Pharmacognosy and Phytochemistry I

Aim

To identify Castor Oil, and interpret the recorded observations.

Principle

- Castor oil is a fixed oil whose properties reflect its glyceride composition, including ricinoleic-acid-derived components.
- 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

- Authenticated castor oil, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Assigned fixed-oil test	_____
Comparison behaviour	_____
Identity 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.

Chemical Identification of Agar

Practical 07 | Pharmacognosy and Phytochemistry I

Aim

To identify Agar, and interpret the recorded observations.

Principle

- Agar is a seaweed-derived polysaccharide material with gel-forming behaviour; assigned tests distinguish its material characteristics.
- 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

- Authenticated agar, assigned comparison material and class-test demonstrations.
- 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
Appearance	_____
Gel/dispersion behaviour	_____
Assigned carbohydrate test	_____
Comparison	_____

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.

Determination of Stomatal Number and Stomatal Index

Practical 08 | Pharmacognosy and Phytochemistry I

Aim

To determine Stomatal Number and Stomatal Index, and interpret the recorded observations.

Principle

- Stomatal number is a count per area; stomatal index expresses stomata as a fraction of stomata plus ordinary epidermal cells in the same field.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Prepared epidermal mounts and calibrated field-area record.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Calibrate the area represented by a microscope field.
2. Observe the assigned prepared epidermal mounts and use one consistent edge-counting convention.
3. Count stomata and ordinary epidermal cells in the same defined fields.
4. Repeat over the assigned representative fields.
5. Calculate stomata per area and the stomatal index separately.
6. Report the leaf surface, field area and counting convention.

Observation Record

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

Observation / parameter	Record / finding
Field area	_____
Stomata S	_____
Epidermal cells E	_____
Repeated fields	_____

Calculations and Interpretation

- Stomatal number = stomata counted/area examined.
- Stomatal index = $S/(S + E) \times 100$; define the counting convention consistently.

Worked Illustration

Illustration: 20 stomata and 80 ordinary epidermal cells in the same field give a stomatal index of $20/(20 + 80) \times 100 = 20.0\%$.

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 temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Vein-Islet, Vein-Termination and Palisade Measurements

Practical 09 | Pharmacognosy and Phytochemistry I

Aim

To determine Vein-Islet, Vein-Termination and Palisade Measurements, and interpret the recorded observations.

Principle

- Vein-islet and termination counts use a defined leaf area; palisade ratio relates underlying palisade cells to the selected epidermal-cell area.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Prepared cleared-leaf/palisade teaching mounts and calibrated viewing area.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Area	_____
Vein islets	_____
Vein terminations	_____
Epidermal cells	_____
Underlying palisade cells	_____

Calculations and Interpretation

- Vein-islet number = islets counted/area examined.
- Vein-termination number = terminations counted/area examined.
- Palisade ratio = palisade-cell count associated with the selected epidermal cells/number of those epidermal cells, using the assigned convention.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Starch-Grain and Calcium-Oxalate Crystal Size

Practical 10 | Pharmacognosy and Phytochemistry I

Aim

To determine Starch-Grain and Calcium-Oxalate Crystal Size, and interpret the recorded observations.

Principle

- An ocular scale has no fixed length until calibrated against a stage micrometer for the selected objective.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Prepared starch/crystal mounts and stage/ocular micrometers.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Calibrate the ocular micrometer for the chosen objective.
2. Identify the prepared starch grains and crystals using the assigned comparison material.
3. Record the specific dimension and ocular divisions for each object.
4. Convert readings to micrometres using that objective's calibration.
5. Repeat across representative objects rather than choosing only extremes.
6. Present mean/range and state the object type and measured dimension.

Observation Record

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

Observation / parameter	Record / finding
Objective	_____
Calibration	_____
Object dimension in divisions	_____
Calculated micrometres	_____

Calculations and Interpretation

- Calibration = known stage-micrometer length/corresponding ocular divisions.
- Object size = ocular divisions × calibration.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Fibre Length and Width

Practical 11 | Pharmacognosy and Phytochemistry I

Aim

To determine Fibre Length and Width, and interpret the recorded observations.

Principle

- Micrometric measurements distinguish longitudinal length from transverse width and require a suitable calibrated objective for each.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Prepared fibre mounts and calibrated microscope.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Calibrate the objective used for the longitudinal and transverse measurements.
2. Identify fibres in the prepared mount.
3. Record the endpoints used for fibre length and width.
4. Measure representative fibres without confusing folded or broken objects with intact fibres.
5. Convert divisions to micrometres and summarize the readings.
6. State the preparation and measurement limitations.

Observation Record

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

Observation / parameter	Record / finding
Fibre identity	_____
Length divisions	_____
Width divisions	_____
Calibration	_____
Replicates	_____

Calculations and Interpretation

- Length or width in micrometres = measured divisions $\times$ applicable calibration.
- Report the range and mean for the assigned number of fibres.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Starch-Grain Number by Lycopodium Method

Practical 12 | Pharmacognosy and Phytochemistry I

Aim

To determine Starch-Grain Number by Lycopodium Method, and interpret the recorded observations.

Principle

- A known spore-count standard allows a ratio estimate of test particles in a uniformly represented teaching mixture.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Instructor-prepared counting mounts, known lycopodium standard and microscope.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Review the known standard mass and its stated spores-per-gram value.
2. Identify the test mass and the instructor-prepared mixture/mount.
3. Count test grains and standard spores in representative comparable fields.
4. Retain repeated counts and check whether the preparation supports a ratio estimate.
5. Apply the count-ratio and mass correction in the stated equation.
6. Report the estimated number per gram and the standard/counting basis.

Observation Record

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

Observation / parameter	Record / finding
Test mass w	_____
Standard mass l	_____
Spores per gram S	_____
Grain count n	_____
Spore count s	_____

Calculations and Interpretation

- Estimated grains per g = $(n/s) \times (l \times S)/w$.
- Use consistent mass units, representative fields and the assigned standard count.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Ash Values of Crude Drugs

Practical 13 | Pharmacognosy and Phytochemistry I

Aim

To determine Ash Values of Crude Drugs, and interpret the recorded observations.

Principle

- Total ash, acid-insoluble ash and water-soluble ash describe different residues. Each result must state the exact ash test and mass basis.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Assigned drug, weighed crucible and completed ashing/residue records or supervised apparatus.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Drug mass	_____
Crucible tare	_____
Total residue	_____
Specified insoluble residue	_____
Ash basis	_____

Calculations and Interpretation

- Ash (%) = specified residue mass/test-material mass $\times$ 100.
- For water-soluble ash, use the defined difference between total ash and water-insoluble residue.

Worked Illustration

Illustration: 0.100 g of the specified ash residue from 2.00 g material gives 5.00% ash on that stated test basis.

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 temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Extractive Values of Crude Drugs

Practical 14 | Pharmacognosy and Phytochemistry I

Aim

To determine Extractive Values of Crude Drugs, and interpret the recorded observations.

Principle

- An extractive value measures residue obtained under a specified solvent/extraction method. It is not automatically the percentage of one active constituent.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Assigned drug, specified extraction system and weighed residue records.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Drug mass	_____
Total extract volume	_____
Aliquot volume	_____
Dry residue mass	_____
Solvent	_____

Calculations and Interpretation

- Extractive (%) = $\text{dry aliquot residue} \times (\text{total extract volume} / \text{aliquot volume}) / \text{test-material mass} \times 100$.
- State any prescribed moisture correction.

Worked Illustration

Illustration: 0.0500 g residue from a 10.0 mL aliquot of a 100 mL extract made from 5.00 g material gives 10.0% extractive.

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 temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Moisture Content of Crude Drugs

Practical 15 | Pharmacognosy and Phytochemistry I

Aim

To determine Moisture Content of Crude Drugs, and interpret the recorded observations.

Principle

- Water-specific methods and loss on drying are different measurements. Volatile oils can contribute to a drying loss in some crude drugs.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Assigned drug and the specified moisture or drying method.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Initial mass	_____
Final mass or water reading	_____
Method	_____
Reporting basis	_____

Calculations and Interpretation

- For the assigned LOD method: $\text{loss (\%)} = \text{mass loss/initial material mass} \times 100$.
- Use a water-specific equation only for the stated water-specific method.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Keep temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

Determination of Swelling Index and Foaming Index

Practical 16 | Pharmacognosy and Phytochemistry I

Aim

To determine Swelling Index and Foaming Index, and interpret the recorded observations.

Principle

- Swelling index describes the occupied volume of swollen material per unit mass. Foaming index uses a specified dilution series and persistent-foam endpoint.
- The property is obtained from a defined observable under controlled conditions.
- Replicate measurements, instrument checks and consistent units are needed before comparison.

Materials and Apparatus

- Completed swelling-volume and foaming-dilution teaching readings.
- Assigned test material and calibration or comparison material.
- The apparatus specified for this property, a balance or volumetric equipment where relevant, and a record sheet.

Method

1. Identify the measured property, units and controlled variables before setting up the apparatus.
2. Check the instrument, zero or calibration and record the relevant operating conditions.
3. Prepare a representative measured portion without changing its intended composition.
4. Obtain the readings specified for the property and repeat under the same conditions.
5. Calculate the required property, including corrections stated for the apparatus or method.
6. Summarize the replicate results and explain the effect of the variable studied.

Observation Record

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

Observation / parameter	Record / finding
Material mass	_____
Swollen volume	_____
Dilution aliquot a	_____
Foam endpoint	_____
Replicates	_____

Calculations and Interpretation

- Swelling index = occupied swollen-material volume in mL/material mass in g.
- For the standard foaming-index dilution basis: foaming index = $1000/a$, where a is the qualifying decoction aliquot in mL.
- Use the prescribed endpoint and state when the result lies outside the dilution range.

Worked Illustration

Illustration: 1.00 g material occupying 12.0 mL after the assigned swelling test gives 12.0 mL/g. A qualifying foaming aliquot a = 5.0 mL gives a foaming index of 200 on the standard dilution basis.

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 temperature and test conditions consistent across comparative readings.
- Record raw readings before rounding calculated values.
- Do not compare results obtained with different methods as if they were interchangeable.

Viva Questions

1. Why control the test conditions?

A change in conditions may alter the measured property independently of the intended variable.

2. Why retain replicate readings?

They show repeatability and help identify an anomalous measurement.

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