Gas Chromatography Demonstration

Practical 12 | Instrumental Methods of Analysis and Novel Drug Delivery Systems

Aim

To study Gas Chromatography Demonstration, and interpret the recorded observations.

Principle

- GC separates sufficiently volatile, thermally suitable components carried through a column by a gas. Inlet conditions, column temperature and detector choice affect the chromatogram.
- The construction and operating principle determine the function of the equipment.
- The practical distinguishes the input, working zone, controlled variables and output.
- Major parts: carrier-gas control, injection inlet, column in a temperature-controlled oven, detector and data system.
- Explain why nonvolatile or thermally unstable compounds may be unsuitable without a separately validated preparation approach.
- Retention and detector response must be interpreted in the exact method context.

Materials and Apparatus

- Instructor-operated GC system, assigned reference/test chromatograms and method record.
- Assigned equipment demonstration, labelled schematic or manufacturer-approved training material.
- Observation sheet and any instructor-supplied performance readings.

Method

1. Identify the major components on the actual equipment or training diagram.
2. Trace the material, energy or signal path through the system.
3. Observe the instructor demonstration and note the purpose of each control.
4. Record the operating variables and the output relevant to the exercise.
5. Relate the equipment principle to its pharmaceutical application.
6. Summarize the variables that influence performance and the checks required before operation.

Observation Record

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

Observation / parameter	Record / finding
Carrier gas	_____
Inlet/column	_____
Temperature programme	_____
Detector	_____
Retention and peak response	_____

Calculations and Interpretation

- Calculate concentration using the assigned external-standard or internal-standard calibration.
- For an internal standard, retain the defined analyte/standard response and amount ratios.

Result

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

Finding: _____

Conclusion: _____

Precautions

- Use equipment demonstrations and trained operation for moving, hot or pressurized components.
- Do not bypass guards, interlocks or the assigned operating limits.
- Distinguish operating performance from the appearance of the machine.

Viva Questions

1. Why does GC use temperature control?

It affects vaporization and component partitioning, and therefore retention and separation.

2. Why trace the material or energy path?

It connects the equipment construction to the process it performs.

3. Why are operating variables recorded?

They are needed to explain or reproduce the observed performance.

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