MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA – 151001, PUNJAB , INDIA (FOOD TESTING LABORATORY)

GAS CHROMATOGRAPHY-MASS SPECTROMETRY (GC-MS/MS)

An advanced analytical technique that combines gas chromatographic separation with highly selective tandem mass spectrometric detection

- Model: Agilent 8890 Series GC
- Triple Quadrupole Mass Spectrometer (TQ-MS/MS)
- Ion Source: Electron Ionization (EI)
- Mass Range: ~m/z 10–1050
- Mass Analyzers: Q1 – collision cell – Q3
- Mode of Operation: MRM (Multiple Reaction Monitoring)
- Collision Cell: Hexapole with collision gas
- Vacuum system: Turbo-molecular pumps

Detector

- **ECD (Electron Capture Detector)**
- **NPD (Nitrogen Phosphorus Detector)**
- **FPD (Flame Photometric Detector)**

APPLICATIONS

Enables highly sensitive trace analysis for pesticide and drug residues with reliable identification and quantification of unknown compounds

CONTACT US

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High-Performance Liquid Chromatography (HPLC)

A powerful technique used for the separation, identification, and quantification of compounds in liquid samples

KEY APPLICATIONS

- Detection of food additives, preservatives, and contaminants
- Pesticide and mycotoxin residue analysis
- Separation of biomolecules (proteins, peptides, amino acids)
- Quality control in food and beverage industries
- Environmental pollutant monitoring
- Quantitative analysis of pharmaceuticals
- Stability and degradation studies

INSTRUMENT CONFIGURATION

- Model: Agilent 1260 Infinity HPLC
- Configuration: Quaternary pump + Autosampler + Column oven + detector

OPERATIONAL SPECIFICATIONS

- Flow rate range: 0.001 – 10 mL/min
- Maximum pressure: up to 600 bar
- Flow accuracy: ±1%
- Injection volume range: 0.1 – 100 µl
- Sample capacity: 100+ vials

DETECTORS

- Diode Array Detector (DAD / UV-Vis)
- Fluorescence Detector (FLD)
- Variable Wavelength Detector (VWD)

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Inductively Coupled Plasma–Optical Emission Spectroscopy (ICP-OES)

Key features

- Wavelength Range: 167 nm to 785 nm
- Resolution: < 0.007 nm at 200 nm
- Detection: > 30 elements in single sample run
- Sensitivity: detect up to part per billion in sample

Key Applications

- Multi-element analysis of metals and trace elements
- Heavy metal detection in food and water
- Soil, plant, and fertilizer analysis
- Environmental monitoring
- Pharmaceutical elemental impurity testing
- Mineral and metallurgical analysis
- Quality control in industrial materials

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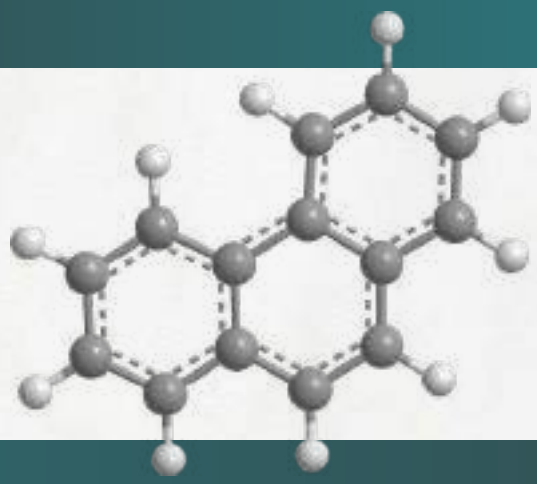
FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR)

An analytical technique to identify and characterize chemical compounds based on their molecular vibrations

- Model: Nicolet™ Summit LITE
- Sampling Module: iD1 Transmission
- Spectral Range: 8000 - 350 cm^{-1}
- Wavenumber Accuracy: ±0.01 cm^{-1}

Key Applications

- Rapid functional group identification
- Material and polymer characterization
- Food quality and adulteration detection
- Pharmaceutical quality control
- Environmental contaminant analysis
- Biomolecular structure studies



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BOD (BIOCHEMICAL OXYGEN DEMAND) INCUBATOR

Specifications:

- *Model: Equitron 7142-250*
- *Temperature Range: Typically 5°C above ambient to 60°C (±0.5°C control)*
- *Temperature Accuracy: ±0.5°C*
- *Capacity: ~250 L inner chamber volume*

Application Areas:

- *BOD testing of water and wastewater*
- *Microbiological incubation studies*
- *Shelf-life and stability studies*
- *Culture growth at controlled temperatures*
- *Storage of biological samples*

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UV-VIS SPECTROPHOTOMETER

An analytical technique used to measure the absorbance or transmittance of ultraviolet and visible light by a sample

Specifications

- **Model: Thermo Scientific Evolution™ One Plus**
- **Wavelength Range: 190 – 1100 nm**
- **Light Source: Xenon flash lamp**
- **Detector: Dual silicon photodiode**
- **Wavelength Accuracy: ±1 nm**
- **Photometric Range: –3 to +3 Abs**

Measurement Modes:
Absorbance, Transmittance, Concentration, Spectrum scanning, Kinetics, Multi-wavelength

Application Areas

- **Quantitative analysis using Beer–Lambert law**
- **Estimation of proteins, phenolics, sugars, and pigments**
- **Drug assay and pharmaceutical quality control**
- **Determination of reaction kinetics**
- **Color measurement and food quality assessment**
- **Enzyme activity and biochemical studies**

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ROTATORY EVAPORATOR

An instrument used for efficient and gentle removal of solvents from samples by evaporation under reduced pressure

Specifications

- Model: Thermo Fisher Scientific Evolution™ Buchi Rotavapor R-100
- Evaporation Capacity: 1,200 mL of water/hr
- Temperature Range: 20 °C to 95 °C
- Temperature Accuracy: ± 2 °C
- Bath Capacity: 4 Litres

Applications: Solvent removal, concentration, sample preparation, extraction, and purification in chemical, pharmaceutical, and food laboratories

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