



Natural products and Synthetic laboratories



Bruker Nuclear Magnetic Resonance (NMR) Spectroscopy:

is a research technique that exploits the magnetic properties of certain atomic nuclei. This spectroscopy determines the physical, chemical and biological properties of atoms or the molecules in which they are contained. There are more than 25 experiments are being performed in our NMR.



Bruker X-ray Diffraction (XRD) * :

X-ray Diffraction (XRD) helps one to reach the science at atomic scale in the analysis of crystal structure, chemical composition, and physical properties of bulk and thin film crystalline or polycrystalline materials. XRD used to know crystallite size, lattice strain, chemical composition, and crystal orientation. While biological samples such as DNA, vitamins, protein, drug synthesis, use XRD to identify its elements and their crystal structure. It can also be used to identify arrangement of atoms in minerals, alloys, organic and inorganic complex compounds. Thus it has become the backbone of material characterization.

* Shared with National Chair of Material Science and Metallurgy



Agilent Technologies 6530 Accurate Mass Q-TOF LC/MS * :

The Agilent 6530 Accurate-Mass Quadruple Time-of-Flight (Q-TOF) LC/MS system features Agilent Jet Stream Thermal Focusing technology for significantly improved sensitivity, as well as enhanced Mass Hunter Workstation software for superior data mining and analysis capabilities. These new features, coupled with Agilent's True High-Definition TOF (True Hi-Def. TOF) technology, enable the 6530 Accurate-Mass Q-TOF to deliver exceptional sensitivity, excellent mass accuracy, fast data acquisition, and streamlined qualitative and quantitative analyses to meet your most challenging research needs.



Bruker Single crystal X-ray diffraction * :

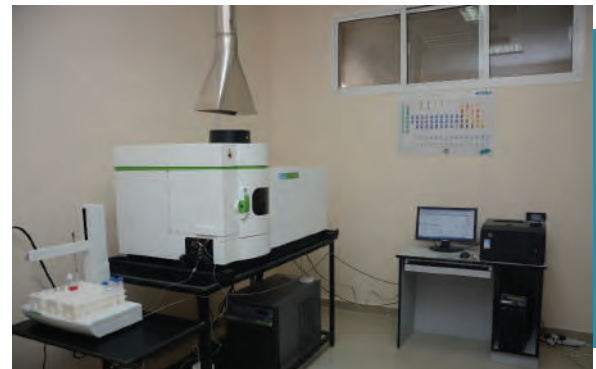
This is the most common experimental method of obtaining a detailed structure of a molecule, that allows resolution of individual atoms. Single crystal X-ray diffraction (SXR) is performed by analyzing the pattern of X-rays diffracted by an ordered array of many identical molecule (single crystal). Many pure compounds, from small molecules to organometallic complexes, proteins, and polymers, solidify into crystals under the proper conditions. Computationally intensive analysis of a set images results in a solution for the 3D structure of the molecule.

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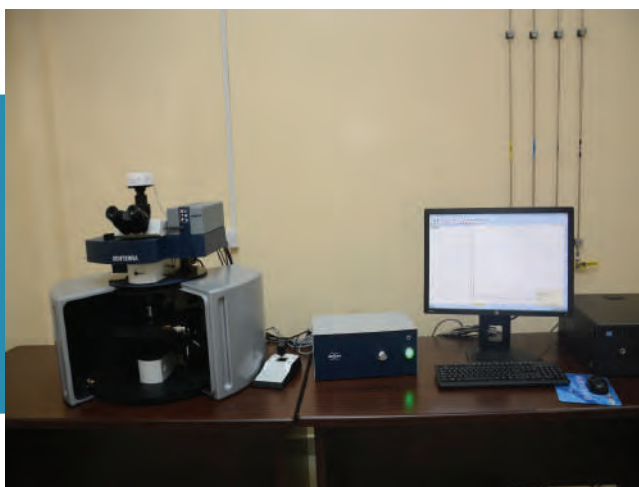
PerkinElmer OPTIMA 8000 Inductively Coupled Plasma Optical Emission Spectrometry ICP-OES * :

The widely used analytical technique for the determination of trace elements in a sample. Using the eponymous Inductively Couple Plasma, an ICP-AES produces excited atoms (by ionization in an intense electromagnetic field) that emit detectable amounts of light at characteristic wavelengths, with intensities proportional to the concentration of the ion. The intensity of this emission is indicative of the concentration of the element within the sample.

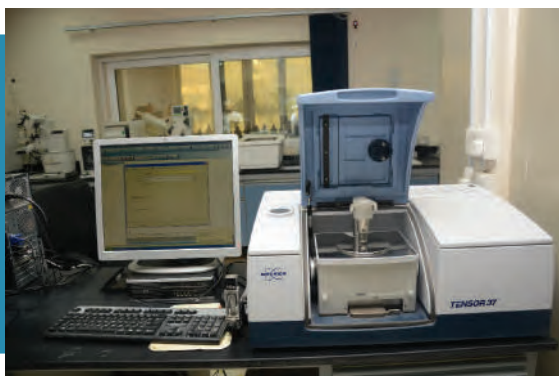


Bruker SENTERRA II Compact Raman Microscope * :

The SENTERRA II allows measuring Raman images and combines the obtained spatially resolved molecular information with high-quality microscopic images of the sample. The analysis is performed contactless and without the need of sample preparation. Chemical images of the sample surface can be achieved with a very high spatial resolution down to less than a micron. In addition depth profiling of optically transparent samples allows non-destructive sample investigation in the third dimension.



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Bruker Fourier Transformer Infra-Red spectroscopy (FTIR; TENSOR 37) * :

FTIR used for the determination of functional groups in the pure natural products and pharmaceutical drugs. FTIR also used for the detection of heavy and essential elements in the medicinal plants, resins, and food products.

Perkin Elmer Near Infra-Red (NIR):

Automatic Preparative HPLC used for the isolation of pure constituents from the mixture of two, three, and four compounds for samples soluble in chloroform (Solvent) only. This recycling HPLC system is being used in the isolation and purification of different types of natural products including enantiomers, diastereomers, epimers, positional isomers, and structurally related or unrelated compounds having similar retention characteristics.



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Agilent Analytical HPLC (Agilent):

Analytical HPLC used for the qualitative and quantitative analysis of vegetables, medicinal plants and resins. It is also used for the standardization of drugs in pharmaceutical and industrial purposes.



JAI Preparative HPLC (Gradient Solvent System):

Preparative HPLC used for the isolation of pure constituents from the mixture of two, three, and four compounds for samples soluble in ethyl acetate or a mixture of ethyl acetate and n-hexane.



Cary 100 UV-Vis with S/W,

The Cary 100 is a cost-effective UV-visible spectrophotometer with a versatile set of accessories for routine laboratory work. It is controlled by the Cary WinUV software, a Windows-based software featuring an easy-to-use modular design. The instrument is shipped with liquid sample holders and can be fitted with a wide range of accessories to provide extra capabilities



PerkinElmer LS-55 Fluorescence Spectrometer (220 VAC)

Versatile, computer controlled Fluorescence spectrometer; incorporates a Watt (8.3 wati@220V), phosphorescence decay time measurements. Excitation 200-800 nm and emission 200-900 nm with zero order selectable. Standard PMT covers 200-650 nm; R928 or R955 PMT optionally available for full range.





Polarimeter:

It is used for the specific rotation of pure drugs, natural/synthetic products. This instrument will allow checking the optical purity of chiral compounds. it measure the angle of rotation caused by passing polarized light through an optically active substance.

Milestone New Microwave Essential Oil System (NEOS):

The NEOS system is based on the Solvent-Free Microwave Extraction technology for rapid extraction of essential oils from aromatic herbs, spices and dry seeds.





Kjeldahl Apparatus (KjelFlex K-360):

It is used for the quantification of nitrogen in terms of proteins in vegetables, medicinal plants and other formulations. Due to precision and reproducibility, it has become internationally recognized method for estimating the protein content in soils, waste waters, vegetables, medicinal plants, fertilizers and other food samples.



Moisture Analyzer:

It is used for the quantification of moisture in pharmaceutical drugs, medicinal plants and other formulations.



Melting Point Apparatus:

It is used for the determination of melting point of pure constituents and pharmaceutical drugs.

Microwave Synthesis Reactor (MSR):

MSR used for quick, fast, low cost and environmental friendly synthetic reactions using microwave radiation instead of heat. It provides a completely new and sophisticated approach towards microwave synthesis. Not only polar solvents but also commonly used poor microwave absorbers, such as toluene or dioxane, can be used successfully in high-temperature microwave protocols





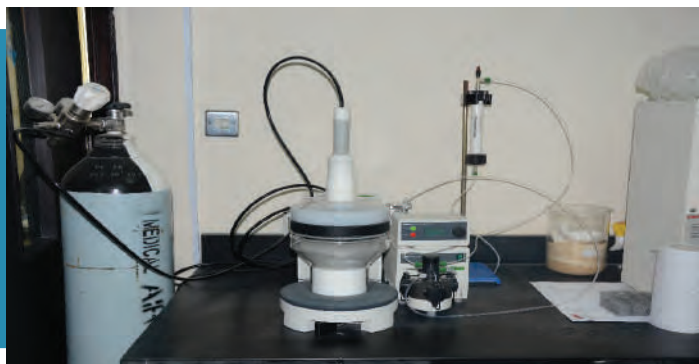
Buchi Rotary Evaporator:

It is used for the quick evaporation of organic solvents.



Karl Fischer Coulometric Titrator:

Classic titration method in analytical chemistry that uses coulometric or volumetric titration to determine trace amounts of water or water content in organic solvents.

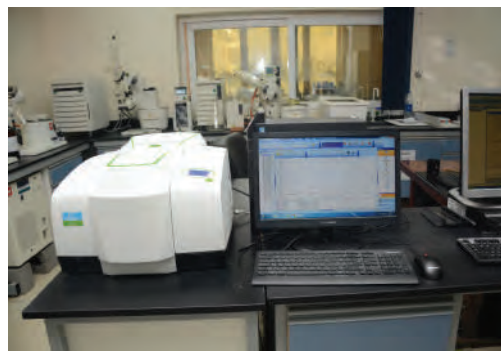


Buchi Medium Pressure Liquid Chromatography (MPLC):

MPLC used for the quick separation of a mixture of two, three and four compounds using pressure pump with gradient solvent system.

Perkin Elmer Near Infra-Red (NIR):

NIR used for the qualitative and quantitative analysis of vegetables, medicinal plants and resins as well as adulteration in milk, milk powder, petrol, diesel etc. It is also used for the adulteration of pharmaceutical drugs. It is fast, sensitive, non-destructive and friendly technique.





Differential Scanning Calorimeter (DSC)

DSC measures temperatures and heat flows associated with thermal transitions in a material, including glass transitions, "cold" crystallization, phase changes, melting, crystallization, product stability, cure / cure kinetics, and oxidative stability. Applications: Common usage includes investigation, selection, comparison and end-use performance evaluation of materials in research, quality control and production applications



Particle size analyzer

The Cilas 1190 is a versatile instrument with a measurement interval of 0.04 microns (40 nanometers) to 2,500 microns. It uses two techniques for its measurement: Laser Ray Diffraction and digitalization with a CCD Camera that measures large sizes. This instrument uses 3 laser beams for its measurement process, 2 which do the same function of a Cilas 1090 and the other laser for the process with the CCD camera.



Texture analyzer

The CT3 can calculate, through compression and tensile data, a number of physical properties that have proven to be highly correlated to human sensory evaluation of food and other consumer products.