Nuclear Magnetic Resonance (NMR) 500 MHz

TECHNICAL DETAILS

Manufacturer: JOEL

Model: JNM-ECZ500R/S3

Extras:

- Royal HFX probe (5 mm, triple resonance)

-3 mm probe

-Autosampler

HOW IT WORKS?

The NMR detects the nuclear spin of atoms such as hydrogens. When placed in a magnetic field, these nuclei, which behave like tiny magnetic bars, align up or down, creating two energy levels. By using radiation with appropriate frequency, the transition between levels can be induced. These transitions are sensitive to the magnetic molecular environment surrounding the nucleus and to the presence of other nuclei and are therefore a major source of structural information, allowing the discovery all the details of the molecular environment which lead to chemical structure identification.

APPLICATIONS

The NMR can be used to:

Identify and quantify organic or organometallic compounds;
Follow chemical reactions;
Perform metabolomics studies;

Types of experiments:
Common NMR active nuclei are ^{1}H, ^{13}C, ^{19}F and ^{31}P. Common one-dimensional experiments (1-D) are ^{1}H-NMR and ^{13}C-NMR.
Common two-dimensional studies (2-D) are ^{1}H -^{1}H COSY, ^{1}H -^{13}C HSQC and ^{1}H -^{13}C HMBC.
Other 2-D studies, such as NOESY and DOSY and low-temperature experiments can also be made.
Fluorinated compounds are readily studied by taking advantage of the Royal HFX triple resonance probe.

ANALYSIS REQUIREMENTS

Samples are solutions of compounds prepared in deuterated solvents such as D_2O or $DMSOD_6$. Samples are typically analyzed in 5 mm NMR tubes. The minimum sample volume is 0.6 mL. 1-5 mg of a small molecule (MW ~ 300) is usually necessary to obtain a ^{1}H spectrum in 3-5 minutes. For ^{13}C >20 mg are needed to obtain a spectrum in 5 minutes. Smaller amounts require longer scan times.

ACCESS CONDITIONS

Onsite (requires training) and Remote