

TD-NMR

The minispec mq20

Contrast Agent Analyzer

Innovation with Integrity

TD-NMR Contrast Agent Analysis

The minispec Contrast Agent Analyzer is used to study the effect of pharmaceuticals known as "MRI contrast agents" on the NMR relaxation of protons in water or fat. Contrast agents are used to enhance contrast in Magnetic Resonance images between tissues that otherwise would be difficult to differentiate. These are especially soft tissue of the central nervous, digestive, lymphatic and cardiovascular system, liver, breast and lung.

Design of a successful contrast agent requires conflicting pharmaceutical and MRI properties to be met at once: although metal ions like Mn^{2+} and Gd^{3+} may lead to a very good contrast enhancement, they need to be chelated because the applied concentrations of the 'naked ions' are toxic.

The minispec mq-series of bench-top NMR instruments play a key role in characterizing and validating the properties of contrast agents. The task is to examine the T_1 and T_2 relaxation time shortening of fat and water protons by contrast agents. The fat and water protons are predominantly responsible for the MR image.

The minispec is used to characterize and validate relaxation properties of pharmaceuticals known as "contrast agents" for MRI (Magnetic Resonance Imaging).

- Win expensive MRI time
- Operates all common pulse sequences for T_1 , T_2 relaxation time analysis, at a touch of a button
- Easy siting, benchtop instrument
- Cryogen free permanent magnet
- Simple sample handling and measurement
- Attractive price compared to MRI systems
- Small amount of expensive contrast agent required for characterization

Specifications

Console with Broadband RF Electronics:

- Measuring frequency: 2 to 65 MHz
- Modulator: 0°, 90°, 180°, and 270° RF phase channels with an accuracy better than 0.2°
- Transmitter: maximum power 300 Watts
- Receiver: digital phase sensitive detection via quadrature detection; analogue and digital filters
- Pulse Programmer: resolution 20 nsec; Digitizer: 12-bit, 32K points per experiment

Magnet Unit:

- Fields available: 0.17 T, 0.47 T, and 1.41 T

Probe Temperature Options

- Fixed Temperature: Sample chamber temperature is regulated by magnet heating system at a temperature fixed between 35 and 45 °C
- Variable Sample Temperature, + 5 to + 50 °C (mq40, mq60), - 5 to + 65 °C (mq20)
- Information about a broader temperature range on request

System Requirements

- Footprint: 75 x 65 cm (WxD)
- System Weight: ~ 120 kg depending on magnetic field
- Operating Temperature: 18 °C min., 28 °C max.
- Humidity: 20 - 80%, non-condensing
- Voltage Range: 100 - 240 VAC
- Frequency Range: 50 - 60 Hz.

Options

- Information about possible automation options available on request

GxP

- 21 CFR p 11 compliant minispec Plus software to handle experiment set-up, measurement, data storage, and automated report generation
- IQ/OQ protocols available for instrument qualification at customer site by trained Bruker personnel

A contrast agent will always accelerate the relaxation resulting in a positive or a negative contrast enhancement. Contrast agents like gadolinium, manganese chelates and iron salts lead to a T_1 signal enhancement. Superparamagnetic iron particles (SPIO), barium sulphate, air and clay have been used to lower the T_2 signal. Clinical MRI systems are certainly capable of the measurements, but MRI time is expensive and valuable for clinical investigations. The compact minispec is the perfect solution for such relaxation studies, because it offers systems providing the same magnetic field strength (0.5 T and 1.5 T) like clinical MRI systems.

The minispec Contrast Agent Analyzer is a sophisticated NMR instrument, yet is simple to use. Many researchers have chosen to use the minispec for routine analysis, since it provides a performance advantage due to faster setup and simple single button operation, which triggers acquisition, data processing and reporting. It can be fully automated with an autosampler, for unattended operation.

Bruker is the only vendor offering table-top 40 and 60 MHz systems dedicated to contrast agent research. With Bruker's range of magnet systems available between 7.5 and 60 MHz, and further accessories like sample temperature control systems, full characterization of the designated contrast agent is only a step away.

Contrast Agent Analyzers:

- mq60 - for relaxation time analyses near the field of a 1.5 T Clinical MRI system
- mq20 - for relaxation time analyses near the field of a 0.5 T Clinical MRI system
- mq7.5 - for measurement of relaxation time parameters at 0.17 T

For contrast agent analysis the magnet temperature is typically set to 37 °C, but variable temperature probes are available too.

Regulatory

Bruker offers instrument qualification (IQ/OQ) by our experienced technicians

The Contrast Agent Analyzer can be ordered with the 21 CFR part 11 compliant minispec Plus software, that offers user management, experiment set-up, measurement control, and automated report generation.

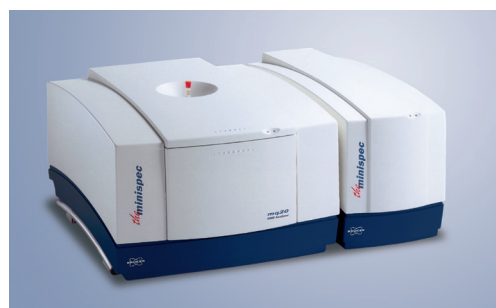


Figure 1: Bruker is the only vendor offering 40 and 60 MHz systems for contrast agent research.

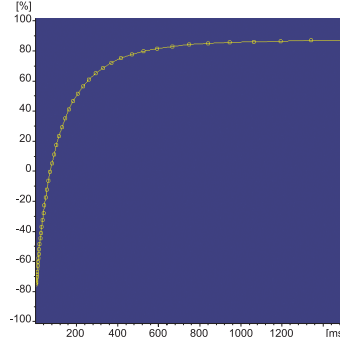


Figure 2: T_1 analysis performed at 60 MHz using the minispec system.

Bruker BioSpin is ISO 9001 certified. Magnetic safety measures apply to the operation of the minispec.

Bruker BioSpin
info@bruker.com

bruker.com

Customer Support

<https://www.bruker.com/en/services/support.html>

Online information

bruker.com/

