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Water NMR for Protein

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Aggregation Characterization Web
In the present work, we compared conventional techniques for the analysis of protein aggregates with a novel approach that employs the water proton transverse relaxation rate $R_2(1H_2O)$.

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Paramagnetic Metal Complexes as Water Proton Relaxation ...

Spin-lattice (T_1) and spin-spin (T_2) relaxation times of proton, deuterium, and oxygen-17 in muscle water have been measured at 9.21 MHz in the temperature range of 0 degree--40 degrees C. The values

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of the apparent activation energy for the three nuclei are (in kJ . mol⁻¹) 9.1, 19, and 18 for 1/T₁, and -1.3, 4.2, and 14 for 1/T₂, respectively.

NMR water proton relaxation in unheated and heated ...

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NMR relaxation rates for protons in liquid water and neat acetonitrile were computed based on ab initio molecular dynamics (aiMD) with forces from Kohn–Sham (KS) theory as well as force-field (FF) based classical dynamics. Intra- and intermolecular dipole – dipole

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contributions were separated, and nearly quantitative agreement with experiment was obtained for water.

Water Proton NMR: A Tool for Protein Aggregation ...

To promote relaxation, the

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frequency of the reorientation must be at, or close to, the resonance frequency in pure water. If the frequency of this reorientation is much higher than the Larmor frequency of the protons the relaxation is inefficient.

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Nuclear Magnetic Resonance
Transverse Relaxation Times of ...
The presence or absence of H₂O coordinated to a paramagnetic center can in principle be monitored by solvent water ¹H NMR, 69 by exploiting the

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occurrence of a magnetic interaction between the magnetic moments of the unpaired electrons and the nuclear magnetic moments of the water protons. When this interaction fluctuates with time, it causes a shortening of the water-proton relaxation times.*

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Proton NMR relaxation from molecular dynamics ...

These fractions of water are characterized with different nuclear magnetic resonance (NMR) relaxation times and are identified with the different parts

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of tissue water. The water associated with the macromolecules was found to be approximately 8% of the total tissue water and not to exchange rapidly with the rest of the intracellular water.

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04-01 | Relaxation Times and
Basic Pulse Sequences ...

For ^{13}C NMR, dipole relaxation by directly attached protons (if any are present) is the principal relaxation mechanism. Thus quaternary carbons will have long relaxation times (hence their low

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intensity under normal conditions of spectrum acquisition due to saturation).

04-02 | Relaxation Times and Basic Pulse Sequences ...

I would be grateful if you could help me in NMR experiment setup.

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My project entails the study of water proton relaxation in the presence of different MRI contrast agents. I have been trying to setup a standard T1 and T2 relaxation experiment on 90% H₂O+10%D₂O. I am not much familiar with the NMR pulse

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Relaxation (NMR) - Wikipedia enhances the proton relaxation rates of water, referred to as relaxivity, must be sufficient to significantly increase the relaxation rates of the target

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tissue. The dose of the complex at which such alteration of tissue relaxation rates occurs must of course be nontoxic. As small as 10-20% increases in $1/T_1$ could be detected by NMR imaging.

Cellular water and proton

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relaxation times of Thai rice ...
PROTON NMR of water is being
used extensively to probe the
molecular dynamics of water
molecules in biological systems
such as protein solutions, hydrated
macromolecules, cells and tissue.

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Nuclear Spin Relaxation - Georgia
State University

Spin – spin relaxation. In physics,
the spin – spin relaxation is the
mechanism by which M_{xy} , the
transverse component of the
magnetization vector,
exponentially decays towards its

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equilibrium value in nuclear magnetic resonance (NMR) and magnetic resonance imaging (MRI). It is characterized by the spin – spin relaxation time, known as T_2 ,...

Coordinated Water and NMR -

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Chemistry LibreTexts

Relaxation of the nucleus to its ground state (aligned with external magnetic field) is controlled by two mechanisms. 1 is spin-lattice or longitudinal relaxation, equal to time of energy transfer from excited to ground state along z-

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axis, often is defined by interaction between nucleus and media (solvent, diffusion).

T1 Measurements and Estimation - University of Ottawa NMR ...
Nuclear Spin Relaxation In NMR, a strong magnetic field is used to

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partially polarize the nuclear spins. Taking protons as the most common example, the excess of proton spin in the direction of the magnetic field constitutes a small net magnetization of the material.

Study of spin-lattice and spin-spin

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relaxation times of ^1H ...

Proton (^1H) NMR is a unique technique for measuring NMR relaxation times. It was considered the most efficient technique for investigating the different types of cellular water (Khan and Karim, 2017), instead of the techniques

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such as differential scanning calorimetry (DSC), bioelectrical impedance analysis (BIA), and dilatometry (DIL).

Nmr Water Proton Relaxation In
This study shows modifications of

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20-MHz NMR water proton relaxation rates in ultrahigh dilutions of histamine in water and in saline, at dilution levels higher than C_4 (10^{-8}), i.e. beyond the sensitivity of the technique to detect the initial solute. Drastic experimental procedures were

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applied, especially similarly prepared controls and repeated series, and blind measurements, in order to avoid several sources of artefacts.

Cross relaxation and spin diffusion in the proton NMR of ...

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NMR Relaxation Enhancement of Water Protons by Gd-Doped Boron Nitride Nanotubes. The Journal of Physical Chemistry C 2014, 118 (12) , 6473-6479. DOI: 10.1021/jp412091t. Weiran Cheng, Inga E. Haedicke, Joris Nofiele, Francisco Martinez, Kiran Beera,

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Timothy J. Scholl, Hai-Ling
Margaret Cheng, and Xiao-an
Zhang

Paramagnetic metal complexes as
water proton relaxation ...
Proton nuclear spin-lattice
relaxation times (T_1) were

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measured for water in a variety of rat tissues at 13.56 and 100 MHz. The T1 values were found to be longer at the higher frequency.

T1 relaxation - Questions and Answers in MRI
Relaxation (NMR) Jump to

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navigation Jump to search. In nuclear magnetic resonance (NMR) spectroscopy and magnetic resonance imaging (MRI) the term relaxation describes how signals change with time. In general signals deteriorate with time, becoming weaker and broader.

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(PDF) NMR relaxation data of water proton in normal tissues
The fat cannot exchange protons with the water in the muscle tissue. In the case of slow proton exchange, the system will show double exponential relaxation.

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Other biological systems can show a single exponential relaxation behavior, as if they were relaxing governed by a single relaxation time.

8-TECH-1 Relaxation in NMR
Spectroscopy

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Because biological NMR and MRI deals principally with liquids and gels rather than crystalline solids, I prefer to avoid the word "lattice" and call the process either longitudinal or T1-relaxation. As described in a previous Q&A , spontaneous emission of energy is

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extremely unlikely in the NMR
range of frequencies.

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7d65](https://doi.org/10.1002/9781118471995.ch39)

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