

Change in the spin-lattice relaxation time T1 of water protons as a result of exposure to the antibiotic gentamicin through the device "Imedis-BRT-A "in the" drug testing "mode

M.S. Korobov¹, G.S. Borodkin¹, M.Yu. Gotovsky², A.E. Kudaev³, K.N. Mkhitaryan², O.A. Roic², N.K. Khodareva⁴

(¹Research Institute of Physical and Organic Chemistry Federal State Educational Institution of Higher Professional Education "Southern Federal University", Rostov-on-Don, ²Center for Intelligent Medical Systems "IMEDIS", Moscow, ³LLC "MCIT "Artemis", Rostov-on-Don, ⁴Center for Restorative Medicine and rehabilitation No. 1 RO, Rostov-on-Don)

SUMMARY

This work investigates the change in the spin-lattice relaxation time T1 of protons in water samples, which were exposed to the antibiotic gentamicin in the "drug testing" mode using the IMEDIS-BRT-A apparatus manufactured by the IMEDIS Center. It has been shown experimentally that the spin-lattice relaxation time T1 of protons in experimental and control water samples is statistically significantly different.

Key words: alternating electromagnetic field (EMF), physical properties of water, nuclear magnetic resonance, "IMEDIS-BRT-A".

RESUME

We studied the spin-lattice relaxation time T1 of the protons of water samples that were subjected to the signal of gentamycin from the mode "medicament test" of the "IMEDIS-BRT-A" apparatus produced by the Imedis Center (Moscow). Experimental results showed that the spin-lattice relaxation time T1 of protons in the exeriment samples showed statistically significant variation from those of the control samples.

Introduction

The problem of experimental confirmation and scientific substantiation of changes in the physical properties of a carrier substance, which is exposed to the influence of technical devices for bioresonance therapy, requires a detailed study.

The study of changes in the physical properties of water exposed to low-intensity EMFs, simulating, in particular, geomagnetic fields, has been carried out since 1959 by Piccardi, Bordi, Papeschi, and Vannel [1–4]. The noted effects were evaluated by changes in the physicochemical properties of water - surface tension [1], pH value [2], electrical conductivity [3] and electrocapillary curves [4], differed in instability and small deviations from the initial values of indicators. Despite this, further studies on the effect of PEMP on the physical properties of water have formed an independent line of research, a review of which

can be found in [5]. The results of the study of homeopathic preparations, in terms of changes in the physical properties of their carriers, have been published in our country since 1998, in particular, in the works of F.R. Chernikova, V.N. Sorokin and A.M. Stepanova [6–10], E.A. Fomicheva, M.N. Lyakina, Z.P. Kostennikova [11, 12] and others.

Purpose of the study

Investigation of the change in the spin-lattice relaxation time T1 of water protons, for which with the help of the "IMEDIS-BRTA" apparatus (LLC "CIMS" IMEDIS ", Moscow, registration number FS 022a3066 / 0414-04 dated July 08, 2004). the antibiotic gentamicin was exposed in the "drug testing" mode.

Materials and methods

The work was carried out on the basis of the NMR laboratory of the Research Institute of Physical and Organic Chemistry of the Federal State Educational Institution of Higher Professional Education "Southern Federal University" (Rostov-on-Don).

In the experiments, we used distilled water, aged for at least 15 days after distillation, to which 10% D was added²O.

The measurement of the spin-lattice relaxation time T1 [13, 14] was carried out on a UNITY-300 high-resolution NMR spectrometer (operating frequency of 300 MHz) manufactured by VARIAN (USA) at a temperature of 25 ° C using the inversion-recovery technique. The OH group of water molecules was taken as an indicator group.

The T1 value and standard error of measurement were calculated automatically using the software using the Sun-SPARC Ultra-10 workstation included in the UNITY-300 spectrometer kit.

For the preparation of experimental water samples, identical borosilicate cuvettes 15 mm in diameter with tightly screwed lids were used, with an inlet diameter of 8 mm, in which 0.8 ml of water was placed. Then 0.65 ml of water was transferred into the spectrometer ampoule (ampoule diameter 5 mm), which was also tightly closed with a lid. The impact on the experimental water samples was carried out using the "IMEDISBRT-A" apparatus in the "drug testing" mode. The control samples were kept under identical conditions without exposure to the apparatus. The exposure time of the experimental water sample in all experiments was 30 s. The study was carried out in three experimental series: one experimental and two control ones.

Series No. 1. The impact on the experimental water sample was carried out by placing a cuvette with water in container No. 1 of the IMEDIS-BRT-A apparatus, switched on in the "Drug testing" mode, and in container No. 3 of the apparatus, a 4% solution of the antibiotic gentamicin in a 2 ml glass ampoule (2 ml) was placed.

Series No. 2. To assess the possible impact of the operation of the device "IMEDIS-BRT-A "in the" Medication testing "mode for the water sample, the cuvette with water was placed in container No. 1 of the switched on device" IMEDIS-BRT-A "in the" Medication testing "mode, while all other containers of the device

were empty.

Series No. 3. As a control, cuvettes with water were used, notexposed.

Experimental and control water samples were placed in new ampoules of the spectrometer, after which the relaxation time T_1 was measured [15].

In total, during the study, 21 independent measurements of the spin-lattice relaxation time T_1 were carried out.

The measurements were carried out for 5 hours in the following order: a sample of water from series # 1, then from series # 2, then from series # 3, after which another sample from series # 1 was measured, etc. A certain order of measurements was used to minimize the influence of changes in external environmental factors on the results of the experiment.

For the statistical processing of the experimental results, the Wilcoxon test was chosen [16], as a simple and at the same time quite powerful nonparametric criterion for processing experimental data, which makes it possible to reveal a shift between two empirical samples with unknown distributions.

Research results and their discussion

The results of the study are shown in Fig. 1.

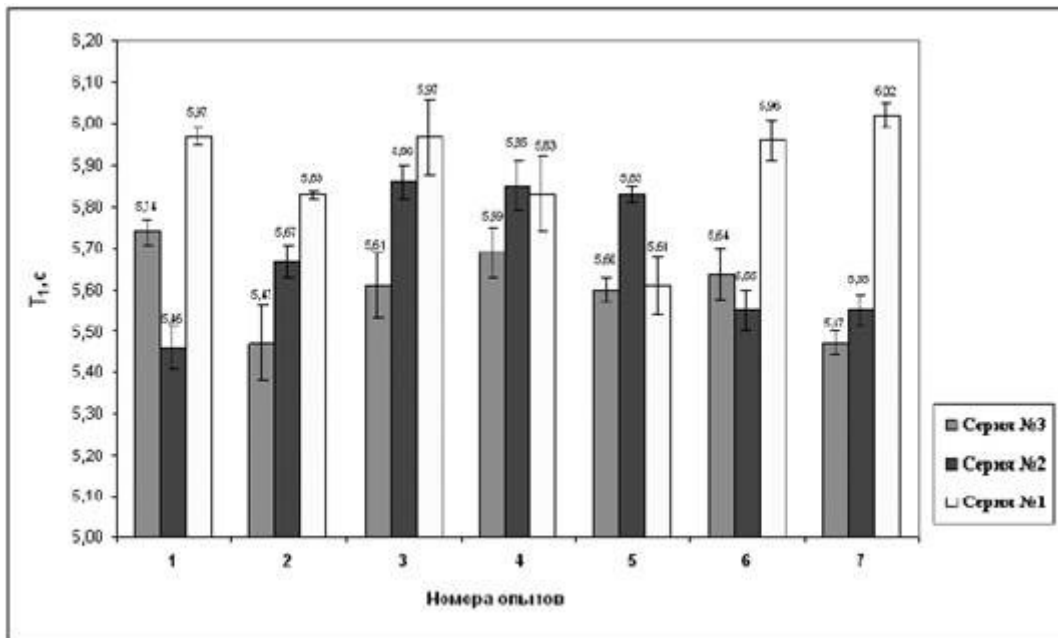


Рис. 1. The spin-lattice relaxation time T_1 protons of water samples in the experimental and control series.

Results of mathematical processing of experimental data
 Statistical processing of experimental data using the Wilcoxon criterion allows us to conclude that there is a statistically significant difference between the spin-lattice relaxation time T_1 of experimental water samples

Series No. 1 and control samples Series No. 3 ($p < 0.01$). There are no statistically significant differences between the results of Series 2 and Series 3. In this case, the spin-lattice relaxation time T_1 of the experimental water samples Series No. 1 and Series No. 2 are statistically significantly different ($p < 0.05$).

Output

As a result of the experiments, a statistically significant difference in the spin-lattice relaxation time T_1 of the protons of water samples was found, which was exposed to the antibiotic gentamicin in the "drug testing" mode using the IMEDIS-BRT-A apparatus manufactured by the IMEDIS Center in comparison with the control samples. water.

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Author's address

Ph.D. M. N. Korobov

Senior Researcher, Research Institute of Physical and Organic Chemistry Federal State Educational Institution of Higher Professional Education "Southern Federal University" 344090, Rostov-on-Don, Stachki Ave., 194/2

Change in the spin-lattice relaxation time T1 of water protons as a result of exposure to the antibiotic gentamicin through the "Imedis-BRT-A" apparatus in the "drug testing" mode / M.S. Korobov, G.S. Borodkin, M. Yu. Gotovsky, A.E. Kudaev, K.N. Mkhitarian, O. A. Roick, N.K. Khodareva // Traditional medicine. - 2009. - No. 1 (16). - P.4-6.

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