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Spin-lattice relaxation of water protons in plant and animal cells

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Abstract

NMR-spin echo method has been used to study spin-lattice relaxation time of protons T1 in plant and animal cells - muscle tissue of fish, the cells of which unlike plant cells have no developed system of vacuoles, plastids and a solid cell wall. According to the values of T1 time a new NMR parameter K, a coefficient of relaxation effectiveness of a cell structure, has been calculated. This parameter can be used for quantitative characterization of the influence of different cell structures, the tissue water interact with, for a time of spin-lattice relaxation of water protons. It has been ascertained that the values of K coefficient in animal tissue and in storing tissues of some plants differ little; it may be stipulated by permanent transmembrane water exchange which occurs at high rate in the living cell. It has been concluded that there exists a certain similarity between water state in protoplast of plant and animal cells. © 2012 Pleiades Publishing, Ltd.

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Keywords

coefficient of relaxation effective-ness of a cell structure, NMR-spin echo method, plant and animal cells, spin-lattice relaxation of water protons