

Application a stress related gene as a possible biosphere prognostic indicator of extreme heliogeophysical events and an efficiency marker of water-based protection remedies

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Abstract

The aim of the investigation was an assessment of a biotrophic influence of the laser-hologram-treated potable water (under the simulated reduced geomagnetic field; patents RF no: 2239860 and 2342149) on the activity of gene *dps* in *Escherichia coli* cells with a genosensor-based method. Gene *dps* as a possible indicator of the stress induction by certain heliogeophysical factors was examined. It is known that the *dps* gene and the corresponding protein are involved in different cell processes associated with a stress and adaptive reactions. *Dps* protein interacts with cell DNA and takes part in its stabilization, protects bacterial cells from high concentrations of copper and iron ions via different mechanisms, and from active oxygen species by its deactivation; moreover, this protein can function as a transcription factor and regulates a gene expression directly. The genosensor is the *Escherichia coli* cells containing the artificial plasmid construction that produces a green fluorescent protein quantitatively under a promoter activation of the *dps* gene, was used in the investigation. In this case, the fluorescence intensity of the cell genosensor served as a marker of stress in the biological system. The model stress inductor in the study was hydrogen peroxide that is a well-known factor of an oxidative stress. The possibility of investigated gene *dps* to serve as a marker of the cell changes associated with the influence of the water-holographic mediums had been estimated by measure of the fluorescence intensity in the experiments with the model stress inductor. The effect of laser-hologram treated water on induction process and development dynamics of the stress response of *Escherichia coli* had been determined. Additionally, it had been shown whether the water had advancing stress-protection properties before and during the changes of heliogeophysical activity.

Biography

Danil Serdyukov is a Molecular Biologist and has received his Post-graduation degree from the Department of Natural Sciences of Novosibirsk National Research State University. He is a Scientific Worker of Institute of Laser Physics and a Researcher of International Scientific Research Institute of Cosmoplanetary Anthropoecology named after Academician V P Kaznacheev. His scientific interests are effects of an external electromagnetic radiation on living matter, an ultra-weak photon emission from cells, non-thermal genetic effects of artificial millimeter and sub millimeter waves.

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