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Microbial community of the extremal ecosystems of the Uzon caldera (Kamchatka)

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There are many unique extreme natural environments that are still poorly studied. Those include the Uzon caldera and the Geyser Valley (Kamchatka, Russia) that harbors multiple outlets of thermal water and volcanic gases. In our study we investigated a wide range of microbial communities from the Uzon caldera and the Geyser valley, determined their composition and structure and their dependence on a complex of geochemical parameters. As an example, the studied oil field is located in the Uzon caldera and is a small area of a thermal field that is characterized by oil film on the surface of thermal springs. We obtained over 300000 sequences (at least 250 bp long) of bacteria and archaea. Over 1400 of microbial species was found, some of which were able to metabolize hydrocarbons. We performed correlation analysis of environmental factors and completness of metabolic pathways. We found that pathways associated with biodegradation of hydrocarbons had the highest positive correlation with the biodiversity of the studied communities. The Uzon caldera may be a natural laboratory of modern oil formation from organic sediments, where microbial communities adapted to high temperatures, Eh-pH fluctuations and high content of sulfides, arsenic, antimony and mercury. Our results suggest that the studied microbial communities are promising objects for fundamental and applied studies and can be used as sources of unique genes and enzymes.

Biography

Alla Bryanskaya has completed her PhD and Postdoctoral studies from Institute of General and Experimental Biology of the Siberian Branch of Russian Academy of Sciences, Ulan-Ude. She is a Senior Researcher in the Laboratory of Molecular Biotechnology of the Institute of Cytology and Genetics SB RAS, Novosibirsk. She has published more than 30 papers in reputed journals.

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