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Chemical and Microbial Composition of Khakassia Saline Lakes with Regard to Their Ecological State

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Abstract

Khakassia is a unique region with semi-arid climate in the Russian Federation where there are a lot of saline lakes. These lakes are visited by a great number of people every year. As a result, saline lakes in Khakassia are exposed to anthropogenic influence. In this article distinctive features of the chemical and microbial composition of some saline lakes are considered. The distribution of such various bacteria physiological groups as enterobacteria, mesophilous saprophytes, psychrophilic saprophytes, oligotrophs and etc. is shown. A special attention is paid to the assessment of ecological state of some saline lakes. The ecological state of all lakes is found to be moderately polluted and polluted, but their self-purification potential is not still exhausted.

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Keywords: Saline lakes; microbiological composition; Khakassia; water quality; ecological state; self-purification aquatic systems

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1. Introduction

Khakassia is a unique region with semi-arid climate in the Russian Federation where there are a lot of saline lakes of different sizes and chemical compositions. A great number of people visit these lakes every year for camping, swimming and spa procedures so the impact of human activity on ecosystem of the lakes, water quality and watershed area is very significant. For this reason the evaluation of the ecological state of these lakes is very important and crucial task. Both microbial and chemical compositions allow to estimate water quality, moreover the first one can be used for appreciation of lakes self-purification capacity.

The chemical composition of the saline lakes (the Shira, the Tus, the Shunet, the Beleyo and etc.) in Khakassia is well studied (Banks et al., 2004, Guseva et al., 2013 and etc.), but there is no much information about microbial composition of these lakes especially about using it for a water quality assessment, except the Shira and the Shunet which were studied very well (Lobova et al., 2004, Rogozin D.Yu. et al., 2012).

2. Materials and Methods

The sampling area is located in South-Central Siberia, within the region of the Altai-Sayan Mountains. This region is characterized by semi-arid climate. The annual average precipitation is 250 mm. The relief is quite various, from mountains of 1100 m height to and alluvial plains of 200 m height.

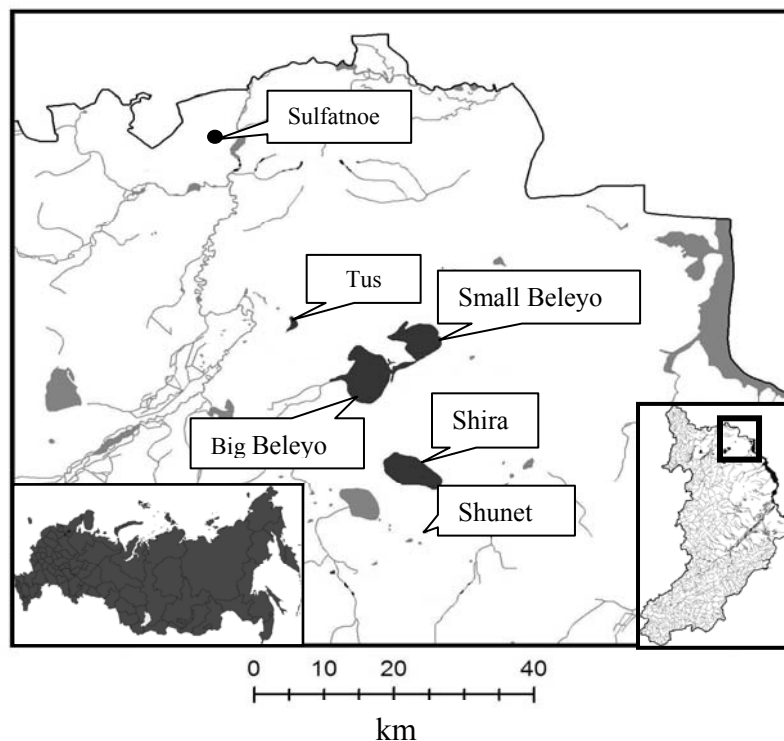


Fig. 1. Scheme of the location of the sampling lakes in Khakassia.

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