



Structure and enzyme activity of microbial community in water and sediments of Lake Baikal

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Structure and functioning of cultivated microbial community in water (depth 0-1642 m) and in bottom sediments (0-300 cm) of Lake Baikal are represented by results of research of species composition and enzyme activity of bacteria from Lake Baikal. The community composition was analyzed with molecular and biological methods. These methods allowed estimating microbial diversity in the lake.

Studies conducted on bacteria biodiversity in the lake water showed the dominance of representatives of the genus *Pseudomonas*, which made up about 80% of the composition of cultivated community of microorganisms. There were found 7 phylogenetic groups of the genus *Pseudomonas* identified by recent systematization: *P. aeruginosa*, *P. alcaligenes*, *P. mendocina*, *P. putida*, *P. fluorescens*, *P. stutzeri*, and *P. fragi*. Natural strains of *Pseudomonas* (200) isolated from water and bottom sediments of Lake Baikal revealed high activity in production of enzymes: protease – 65%, lipase – 53%, phosphatase – 65%, and phospholipase “C” – 68%.

Sporeforming bacteria of the genus *Bacillus* and actinomycetes dominated in the structure of microbial community of bottom sediments. The most common actinomycetes in Lake Baikal were represented by 28 species of the genus *Streptomyces* and four species of the genus *Micromonospora*. Species *S. globisporus* and *M. echinospora* are common species in water and bottom sediments. There were found some species that occupied the strictly defined niches: *S. viridogenes*, *S. chrysomallus*, *S. helveticus*, *S. longisporoflavus*, *S. pluricolorescens* and *S. flavofuscus* inhabited only the water, while 11 species of *Streptomyces* lived only in bottom sediments. Moreover, viable spores of actinomycetes of the genera *Streptomyces* and *Micromonospora* were ob-

served at the 3 m depth in bottom sediments of the lake. A great number of bacteria of the genus *Bacillus* were found at the depth in sediments up to 300 cm, however, their highest number was detected at the depth up to 150 cm the age of which was 17,000 years. The following species of the genus *Bacillus* were dominant: *B. mesentericus*, *B. cereus*, *B. mycoides*, *B. subtilis*, *B. mycoides B. esterificans*, *B. polymyxa*, *B. mesentericus niger*, *B. mesentericus rubber*, *B. pumilis*, *B. brevis*, and *B. coccoides*. On the whole, cultivated bacteria of the genus *Bacillus* (300 tested strains) revealed high biochemical activity of such enzymes as protease, amylase, lipase, phosphatase and phospholipase. 86% of strains have proteinase activity and 81% - amylolytic activity. Lipase is formed by 23% of cultures, while phospholipase "C" and phosphatase – by 72 and 75% of strains, respectively. Besides potential enzyme activity, Baikal actinomycetes of the genera *Streptomyces* and *Micromonospora* are able to produce antimicrobial matters of antibacterial and antifungal actions. Lake Baikal with its unique and specific characteristics may be inhabited by a great number of known microorganisms that are able to produce a spectrum of bioactive substances.