

CURRENT ASSESSMENT OF THE SHENFLIZ POND CONDITION IN 2018–2019 (KALININGRAD)

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This paper describes condition of one of the artificial reservoirs in the city of Kaliningrad, the Shenfliz pond. The main objective of the research was to study the ecological state of the pond in connection with the significant anthropogenic impact on it. Main indicators include: dissolved oxygen, permanganate value and nutrients. The results presented in the work are based on monitoring data personally conducted by the authors. For most of the studied parameters, except for the content of dissolved oxygen, the water in the pond was assessed as fairly pure, oligosaprobic.

Keywords: environmental monitoring, hydro-chemical characteristics, water quality assessment.

In Kaliningrad, there are several hundred water bodies, which occupy about 3.38 hectares in the city, i.e. 15 % of the city territory [1]. The degree of study of many water bodies is low, many of them are even absent in the register of water bodies. Most of the city reservoirs of Kaliningrad are of artificial origin. Basically, there are two types of ponds: dug and spring ponds. Most of them have a very small size: the area of the water mirror does not exceed 1000 m², many do not even have names.

The object of research – Shenfliz pond, located on the southern outskirts of the city of Kaliningrad-can be attributed to the average. The pond is impenetrable, has an almost regular triangular shape (the coefficient of tortuosity of the coastline is 0,72). According to the measurements and calculations of the authors, its length is 450 m, its maximum width is 290 m. The area of the water mirror is about 8,4 hectares, the length of the coastline is 1,2 km (Fig. 1). In the summer season, the reservoir is used as a recreation area, the sandy beach is located on the Eastern shore (station 1) and attracts a large number of tourists. In winter, baptismal bathing takes place in the pond.

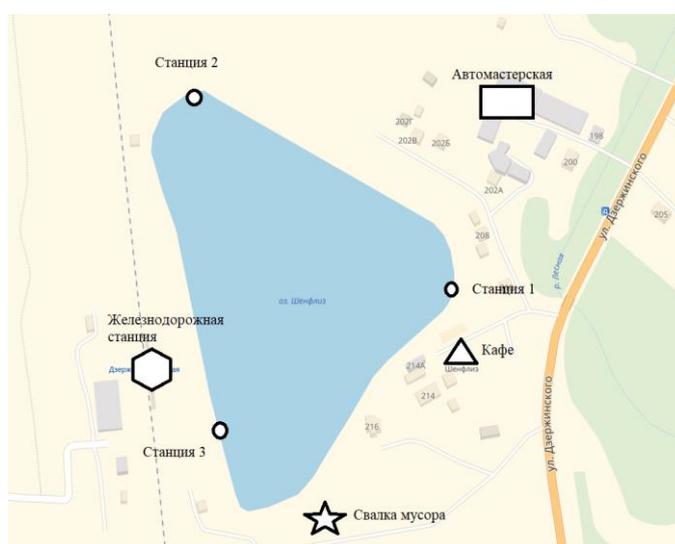


Fig. 1. – Map of the pond Shenfliz

On the West, the pond's catchment is bounded by a railway track in close proximity (60 m) to the water's edge, on the East by a busy street (minimum distance 120 m). Also on the Eastern shore is a restaurant and a beach. To the North of the reservoir is the territory of trade and industrial metallurgical complex.

Despite the fact that Suplise officially allowed bathing, the water is often of dubious quality. So, in the fall identified three unauthorized release into the pond of Senlis. Presumably, it is drainage-storm water coming from the railway tracks of the nearby station [3].

In late summer, there was a rapid flowering of algae in the pond. Also in August, an oily stain was found in the pond, which gradually filled almost the entire water surface. According to the study conducted BY fgbnu "AtlantNIRO", 39,0 mg/dm³ of oil products were found in water samples (780 times higher than the norm). The phenol content was exceeded 2400 times (2,4 mg/dm³ was detected) [4]. In early September, the surface of the pond was covered with coal dust.

In the area adjacent to the pond, were found unequipped, unauthorized garbage dumps, the size of which increased with each passing month. In August 2018, felling works were carried out near station 3, after which a large number of roots and dry grass (deadwood) remained uncollected.

The assessment of the ecological state of the reservoir was carried out on the basis of monthly monitoring of a number of hydrochemical indicators (dissolved oxygen, permanganate oxidability, biogenic substances) at three coastal stations. Water sampling was carried out in the morning, the analysis was carried out in the hydrochemical laboratory of KSTU.

Thus, despite the significant anthropogenic load, identified unauthorized discharges into the reservoir and observed cases of pollution, the water quality in the pond Shenfliz in the warm months of 2018 remained quite high. According to GOST 17.1.2.04-77 [11] the pond waters are assessed as oligosaprobe according to the majority of the studied parameters, which corresponds to the category "sufficiently clean waters". At the same time, the extremely low oxygen saturation allows us to speak about the increased pollution of the reservoir at the end of the growing season, according to this indicator, the water in Shenfleeze is contaminated (betamezosaprobnye).

Concentrations of ammonium nitrogen are high, at the maximum permissible level, sometimes exceeding the MPC. The violation of the correct seasonal changes in the content of dissolved oxygen, permanganate oxidability, nitrite ions was revealed, which apparently occurs due to the intensification of anthropogenic activity and the growing impact on the reservoir, including its pollution. The increased content of organic and biogenic substances can accelerate the process of eutrophication of the pond and lead to negative changes in its trophic status and sanitary condition.

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ENGINEERING OF A GENETIC CONSTRUCTION CONTAINING A KERATINASE GENE FROM BACILLUS LICHENIFORMIS

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The annual global volume of waste chicken feathers is 8.5 million tons. The feathers are composed of 95–98 % protein, mainly β -keratin. Keratins are insoluble in water and exhibit high resistance to physical and chemical treatments, as well as to typical proteolytic enzymes. The degradation of these proteins involves the action of specific microbial proteolytic enzymes such as keratinases. Compared with the common proteases like papain or trypsin, keratinases have many competitive advantages promoting hydrolysis of highly hydrophobic keratinous substrates. Therefore, today the safe and energy-efficient disposal of animal waste is one of the most important challenges.

Keywords: keratin, keratinase, keratinolytic microorganisms, keratin waste, *Bacillus licheniformis*.