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ASSESSMENT OF SOIL CONTAMINATION OF THE VILLAGE OF MALYE KOLPANY IN THE GATCHINA DISTRICT WITH PETROLEUM PRODUCTS

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The article presents the results of an ecological and geochemical study of the soils of the village of Malye Kolpany in the Gatchina district. The research methodology is described and recommendations for the rehabilitation of the soil cover are given.

Keywords: Small Kolpany, Gatchina district, petroleum products, soil pollution.

The village of Malye Kolpany in the Gatchina district is a zone of potential chemical pollution, therefore it has become the object of frequent inspections and environmental examinations. The villagers have been complaining about the "smell of gas" and "oil products in the wells" for several years. According to the information published on the Rosreestr website for 2016, «Sibrospererabotka» and «LVZH-70» Company pass the test for the maximum permissible concentrations. Later than this date, there was no information about the environmental situation in the village of Malye Kolpany, so it was decided to assess the environmental situation in this territory [5].

As is known, not only major accidents are dangerous, but also small-scale contamination that occurs during storage and distribution of fuel, in particular when pumping fuel from tanks to tanks for re-transportation. Fuel losses in this case may be small, but with prolonged operation, petroleum products can accumulate in the soils and create a high environmental hazard.

In March 2019, soil samples were examined. To determine the content of petroleum products in soil samples, it was necessary to extract petroleum products from the analyzed sample with hexane, followed by separation of the polar components on a chromatographic column with aluminum oxide and detection of petroleum products in the resulting filtrate. The studies were carried out on a two-beam scanning spectrophotometer UV-1800SHIMADZU.

In the document MU 2.1.7.730-99, a gradation of the values of the degree of contamination of soils with petroleum products is proposed: the background regional value is taken as the MPC. In our case, this is 337 Mg/kg [1].

Table 1 shows the obtained values for the content of petroleum products in the soils of the studied area.

	Average, mg/kg	Max, mg/kg	Min, mg/kg	Background content, mg/kg	MPC, mg/kg
Petroleum products	6602	17190	1720	337	1000

Table No. 1. Indicators of petroleum products in the soil.

Based on the data obtained, it can be concluded that the level of oil product pollution at this site varies from medium to very high on the MU 2.1.7.730-99 scale [1].



Fig. 1. Distribution of petroleum products in the soil.

Thanks to the visualization of research materials in the ArcGIS project, it is clear that the sources of soil pollution can be not only an oil storage facility, but also a highway [2].

For the rehabilitation of soils from petroleum products, it is necessary to use oil destructors belonging to the genera *Pseudoxanthomonas*, *Methylobacterium* and *Nocardioides*, which are most adapted to the soil and climatic conditions in this territory.

A strain of the genus *Pseudomonas* can also be used in this territory, which is capable of destroying petroleum products in the presence of heavy metals and has an initial chromosomal resistance to heavy metals [3, 4].

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