**Potentialy pathogenic microfungi in soils of Kola Arctic**

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**INTRODUCTION**

The Murmansk region is characterized by a unique combination of natural and anthropogenic factors: severe climatic conditions and intensive industrial development. As a rule, industrial plants (Kandalaksha Aluminum Plant, Copper-Nickel plants «Pechenganikel», «Slevenonikel») are located near settlements or within their territory, and, consequently, plant emissions may have a negative impact on the health of people living in these areas.

The **potentially pathogenic fungi** (OPF) are fungi that are able to provoke various mycotic diseases, allergic reactions for immunocompromised humans, and in the meantime retaining the ability to develop in other environments. Hoog et al. classified three groups of fungi according to their potential danger to the human health: BSL1, BSL2 and BSL3. The most dangerous mycoses are caused by the BSL3 group. Opportunistic fungi of the BSL2 and BSL1 groups can be found much more frequently in the environments, as most of them utilize a wide range of substrates. The important environmental factors for the growth of opportunistic fungi of these groups are: the availability of organics, the favorable range of moisture, the temperature, and the pH value in their habitat. The typical way of getting an infection by deep mycoses agents in the environment is breathing in their spores. In case of skin injuries the agents may get in also through wounds, often from soil.

The **goal** of this research is to study the species diversity and the structure of opportunistic fungi communities within the polluted soils of the Kola Peninsula, and to determine the potential pathogenicity degree of the fungi strains on the basis of protease and phospholipase activity, and the growth ability at a temperature 37°C.

**OBJECTS & METHODS**

**Opportunistic fungi in the area of the Copper–Nickel Plant emissions**

In the impact area of the Copper-Nickel Plant, 25 fungi species belong to OPF were isolated. Their share in the polluted soil is 45%, and in the background soil is 30% of the total number identified species (Fig. 4). In the soils of both plots, the OPF group is represented with the following genera: Acremonium, Aureobasidium, Aspergillus, Chaetomium, Cladosporium, Lecaniiollum, Mucor, Oidiodendron, Penicillium, Rhizopus, Talbrocyzos, and Trichoderma (Fig. 5).

The increase in the number of g. Aspergillus species in the soil polluted by the emissions from the Copper–Nickel Plant in comparison with the background soil have been revealed. The diversity of OPF genera Aspergillus presented on Fig. 6. At the same time, different authors speak about the increase in the number of “southern” fungi in the polluted soils of the Northern part of Russia.

**RESULTS**

**Opportunistic fungi in the area of the Aluminum Plant emissions**

In the polluted soil of the Aluminum Plant emissions, 17 opportunistic fungi species (belong to 11 genera) were isolated. In the polluted soils, the share of OPF increased up to 50% compared to the background soil, where it made 35% of the total number of the identified species (Fig. 2). Among them, there are agents of mycoses and also the fungi causing diseases of respiratory and digestive systems from genera presented on this slide (Acremonium, Alternaria, Aureobasidium, Aspergillus, Cladosporium, Fusarium, Paeclomycyes, Penicillium, Phoma, Rhizopus, Trichoderma) (Fig.3). The largest number of species belonged to g. Penicillium (4); the other genera were represented with 1–2 sp. (Fig. 6). The share of Mycoses fungi in the polluted soil was 35%, in the background soil – 25%.

**CONCLUSION**

1. The share of the opportunistic fungi in the soils, contaminated by Aluminum and Copper Nickel Plants emissions, by oil products increased to 15-25 % in comparison with the background soil.
2. Most opportunistic fungi isolated in the polluted soils of the Kola Peninsula belong to g. Penicillium, Aspergillus, Mucor, Lecaniiollum and Phoma.
3. The share of opportunistic fungi in the soil polluted by the Copper–Nickel Plant emissions is comparable with the background soil, however, in the polluted soils of the Kola Peninsula belong to g. Penicillium, Aspergillus, Mucor, Lecaniiollum and Phoma.
4. The strains of the fungi isolated from the contaminated soil reveal the potential pathogenicity in a greater degree, than the strains isolated from the clean soil. 55% of the total amount of fungi strains isolated from the soils contaminated by the Aluminum Plant emissions had the potential pathogenicity.