PTFE (column 4). Wear track surface roughness of the composition UHMWPE + 10 wt. % PTFE is also the lowest. Thus, despite a slight decrease in tensile strength, UHMWPE-PTFE composite is characterized by more than double increase in wear resistance under dry sliding friction.

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Investigation of contaminated soil by oil of Shapshinskaya group of oilfields

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Today the problem of protection natural environment as a whole, and in particular treatment of soils from oil pollution is quite acute, which defines relevance of the topic [1]. Despite the use of modern technologies in the field of production, transportation and refining of petroleum hydrocarbons the level of pollution of the environment remains very high [2]. Physical and chemical properties and structure of biocenosis are change after contact oil and oil products with soil.

The aim is to research oil-contaminated soil and study the effect of oil pollution on the enzymatic and microbial activity of the soil when it is self-healing.

For the experiment were taken two samples of oil from Shapshinskaya group of oilfields of Khanty-Mansiysk Autonomous Okrug (Khanty) with a viscosity of 15 mm^2/sec sec and a density of 0.868 g/sm^3 at 20 °C. In two containers with a mass of 0.465 and 0.425 kg fertile soil were added samples of oil at a concentration of 7% (70 g/kg) 15% (150 g/kg). Within 60 days

in containers with soil to maintain a constant humidity of 60 % and systematically tested the enzymatic activity of the indigenous microflora: catalase, dehydrogenase enzyme activity [3], as well as sowing was carried out on samples of culture medium (meat-peptone agar). After 30 days in samples with oil-contaminated soils was added fertilizer of 10 % solution of the composition NINKA in a volume of 25 ml containing nitrous substrate.

After soil contamination by oil of different concentrations, a decrease in the number of all investigated groups of microorganisms. This is due to the loss of unstable groups of soil microflora that occurs as a result of the toxic effect of the oil. The first 15 days there is a gradual increase in all the enzymes studied, it is because there is a process of adaptation of microorganisms and enzymes due to soil. Active growth of the enzymes studied falls from the 12th on the 17th day of the study. During this period of time is an active oxidation of petroleum hydrocarbons by microorganisms. After the 30th day with addition on containers with 7 % and 15 % concentrations of pollution feeding a 10 % solution of the composition NINKA containing nitrous substrate is observed intensive increase the number of enzymes.

The percentage of destruction of hydrocarbons polluting oil in the soil is determined by extraction method on the device of Soxhlet. The total concentration of polluting oil for 30, 45, 60 days is shown in Table 1.

Table 1. The total concentration of 7 % and 15 % of soil contamination with oil for 30, 45, 60 days

Investigated parameters	Initial pollution	30 days	45 days	60 days
The oil content in the soil (7 %), g/kg	70	63 (–10 %)	57 (–19 %)	41 (–42 %)
The oil content in the soil (15 %), g/kg	150	146 (–3 %)	128 (–15 %)	96 (–36 %)

Evaluation of biodegradation processes showed that the utilization oil from Shapshinskaya group of oilfields for 30 days (7 % and 15 % of the pollution concentration) was 63 g/kg (10%) and 146 g/kg (3 %), for 45 days was 57 g/kg (19 %) and 128 g/kg (15 %), for 60 days was 41 g/kg (42 %) and 96 g/kg (36 %). In the process of complex recultivation the total concentration of polluting oil decreased to 60 days in the first case from 7 % to 3 %, and the second from 15 % to 5.4 %.

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Obtaining lactide in the presence para-toluene sulfonic acid

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Biodegradable polymers have recently been gained much more attention as the potential replacement for conventional synthetic (petroleum-based) materials [1]. Among the new biodegradable polymers, polylactides (PLA) are of particular interest [2]. Moreover, because of their excellent properties [3], they are widely used in medicine (surgical sutures, orthopaedic applications, tissue engineering). For the same reason, they are also applicable in packaging field as an environmental friendly substitute [4]

Polylactide can be synthesized in several methods: thermal polycondensation of lactic acid (LA); polycondensation of lactic acid with azeotropic distillation of water; obtain lactide and its the ring-opening polymerization in the presence of various catalysts and initiators. The latter method the most common and effective for of obtaining biodegradable polymer with high molecular weight [5].

Synthesis of lactide includes the following stages: concentration of LA solution; preparation of LA oligomers using a catalyst; preparation and purification of raw lactide. One of the stages in the preparation of lactide is oligomerization LA, which determines the yield and purity of the lactide [6].

For the synthesis of lactide oligomer LA using catalysts such as metals (such as tin, zinc), oxides of zinc, antimony, aluminum, tin salts and metal complexes, and many others. It is known that para-toluene sulfonic acid is the active catalyst, which is widely used for the production of esters based on carboxylic acids and alcohols.