cordingly. The results were obtained from 2 sample plots in each of the studied forest types. The length of stomata (F) and the area of each needle (K) was also determined (table 1).

Table 1

Indicators		Types of forests			
		1	2	3	4
A	1-year / 2-year	65,6±0,67/65,1±0,59	56,6±0,41/58,1±0,34	50,8±0,89/50,1±1,11	39,8±0,87/38,9±0,94
B	1-year / 2-year	1,63±0,006/1,68±0,01	1,60±0,01/1,62±0,01	1,54±0,01/1,59±0,01	1,54±0,01/1,49±0,01
C	1-year / 2-year	0,78±0,01/0,77±0,05	0,76±0,02/0,77±0,02	0,74±0,01/0,73±0,01	0,73±0,01/0,72±0,01
D	1-year / 2-year	33,9±0,05/33,7±0,05	33,2±0,04/32,5±0,06	33,7±0,05/32,5±0,06	35,8±0,02/34,9±0,09
E	1-year / 2-year	93,7±0,50/92,1±0,34	93,6±0,41/91,1±0,34	93,8±0,96/92,2±1,24	99,6±0,33/98,5±0,71
F	1-year / 2-year	12,1±0,09/12,2±0,08	10,8±0,09/10,5±0,21	10,5±0,08/10,5±0,20	10,1±0,02/9,9±0,11
K	1-year / 2-year	271,21/273,93	229,19/238,25	181,84/202,41	155,03/150,85

The number of resin ducts on the transverse section in the middle part of the needles for all the studied test areas varies quite significantly (20–30 %), however, there is a tendency for their greater quantity in mossy pine for-ests, and a smaller quantity in sphagnum pine forests. As for stomata, their length is directly related to the number in a row along the entire width of the needles: the fewer the stomata in a row, the larger they are. Thus, larger stoma-ta are observed in the sphagnum pine forests, i.e. in conditions of an increase in xeromorphic features (due to physiological dryness of the soil). The coefficient of variation for homogeneous types of forests ranges within 10%. But even with sufficient uniformity of the material, the degree of variability can be different. Nevertheless, taking into account the whole complex of biometric indicators, it is possible not only to conduct a study more fully and reliably but also to evaluate the data in environmental terms: determine the type of habitat (forest-growing association).

In general, it should be noted that the analysis of the obtained data confirmed the validity of the change in the biometric parameters of pine needles in various habitat conditions (forest types). The results obtained can be used in determining the conditions for pine growth.

BIBLIOGRAPHY

1. *Видякин, А. Н.* Изменчивость анатомо-морфологического строения хвои сосны в географических культурах Кировской области / А. Н. Видякин // Лесоведение. – 1981. – № 5. – С. 18–25.

IMPLEMENTATION OF BIOTEST ORGANISMS OF DIFFERENT TROPHIC LEVELS IN SAFETY OF WASTEWATER BAKERY

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Safety study of wastewater samples for bakeries was undertaken. The study of the safety of wastewater fito-testirovaniem was determined by methods of morphological changes during seed germination redisaprovodili. Sewage security phytotesting was carried out based on the study of the morphological changes in the germination of radish seeds. The results determine the patterns of toxicity of the samples using different classes bioassay sys-tems confirm. Possibility of use as a bioassay-organisms in determining sewage plant safety is confirmed.

Keywords: security, bioassay, toxicity, phytotesting, ciliates, sewage.

Severity toxins contained in food raw materials and food, can be established only direct methods of evaluat-ing their impact on living organisms [1, 2]. Chemico-analytical methods can not fully evaluate the real danger of toxic substances present in food, as the simultaneous presence of several substances even at concentrations that do not exceed their MACs can manifest biological effects that can not be predicted based on the chemical composi-tion.

Safety was determined by means of wastewater bioassay test organisms of different taxonomic groups:

– Higher plants;

– Micro-organisms;

– Celled.

Wastewater phytotesting safety studies carried out on the basis of a study of morphological changes during seed germination of radish according to SanPiN 2.1.7.573-96. The aqueous extract of the samples of waste water

was filtered and reacted with red radish seeds for 96 hours at a liquor ratio of 1:5 and 20 °C temperature .The control sample contained distilled water.

At the second stage of the research as a bioassay system used is simple – ciliates Colpoda steinii .The method is based on the extraction of the studied products of different fractions of toxic substances polar and nonpolar nature with subsequent exposure to the culture extracts ciliates Colpoda steinii according to GOST 13496.7-97.

For the third phase of the experiment as a bioassay-organisms used animal cells.

The method is based on the ability of methylene blue to attach the hydrogen that is separated from sub-strate oxidation (animal cell) during respiration and is recovered in a colorless leuco form in accordance with MR 2.1.7.2279-07 1.1.037-95 MU. The experiment included the exposure of methylene blue solution in svezhevzyatyh cell of sodium chloride with a drop of animal origin in 37 °C environment.

At the end of the experiment, we can conclude that the degree of toxicity of wastewater samples of bakery companies after purification by anaerobic digestion varies within 2–10 %, which indicates that their safety. The most toxic is the sample of wastewater prior to purification.

A comparative study of the toxicity of wastewater samples bakeries before and after purification by anaer-obic digestion using the bioassay systems belonging to different taxonomic groups. These results confirm the pat-tern of toxicity of the samples with different classes bioassay systems, and, consequently, the ability to use the lat-ter as a bioassay-organisms in determining security wastewater bakeries.

BIBLIOGRAPHY

1. *Savvova, K.* Safety Study of Wastewaters from Bakery Enterprises Using Biotest Organisms of Different Trophic Levels / K. Savvova, I. Kondratenko, L. Lobotskaya, S. Bondar, // Monograph "Water Security". – Mykolaiv: PMBSNU – Bristol: UWE, 2016. – P. 308–314.

2. *Krusir, G.* Concerning the assessment of the ecological hazard index of the bakery enterprise, taking into account the possibility of an industrial accident / G. Krusir, I. Kondratenko // Ecological safety. – 2016. – № 22 (2). – P. 89–97.

3. *Krusir, G. V.* Concerning the assessment of the ecological hazard index of a bakery with regard to the possibility of a man-made accident / G. V. Krusir, I.P. Kondratenko // Ecol. Bezpeka. – 2016. – Vol. 22, № 2. – P. 89–97.

ANALYSIS OF ANTHROPOGENIC INFLUENCE ON THE ENVIRONMENTAL COMPONENTS DURING THE DEVELOPMENT OF CONIFEROUS OIL DEPOSIT IN THE TOMSK REGION

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In connection with the planned expansion of the cluster site at the Khvoynoye oil field in the Tomsk Re-gion of the Aleksandrovsky District, a short-term local environmental forecast was compiled. Due to negative anthropogenic impacts on environmental components during construction, a list of environmental measures has been compiled, and proposals have been developed for an environmental monitoring program.

Keywords: oil field, environmental forecast, environmental monitoring.

Large-scale anthropogenic environmental quality changes in Western Siberia are inextricably linked with the development of the oil and gas industry. In the north of the Tomsk region, in the Aleksandrovsky district, the Coniferous oil and gas field is located, the development of which began in 2005 [1].

Analysis of gross emissions of pollutants into the atmosphere on the territory of the Tomsk region according to the State report «On the State and Environmental Protection of the Tomsk Region in 2017» showed that the Ale-ksandrovsky district takes the leading place among all regions of the region and its share is 12.7 % of total emissions [2].

During the expansion of the cluster site, the maximum anthropogenic impact will be directed to vegetation and soils, namely to the destruction of the integrity of the soil and vegetation cover, which entails a detrimental ef-fect on the hydrosphere of the region, namely, a change in the volume of wastewater and the chemical composition of water.

For environmental control, it is necessary to draw up a program for environmental monitoring of atmospher-ic air, surface and groundwater, soil, flora and fauna.