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Application of systems analysis for monitoring of toxic substances in the ecosystem

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Застосування системного аналізу для моніторингу токсичних речовин в екосистемі

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Abstract

Each actual and virtual source of sewage discharges should be controlled by establishing a measuring or biomonitoring network (permanent or causal), and in the case of measuring monitoring, the types of detectors that measure the actual values of the parameters of the state should correspond to the nomenclature of the real possible contaminants and ranges, in which can be observed these contaminants, as well as the dynamics of their changes. In the case of biomonitoring, as indicators of pollution, it is necessary to use those living organisms that are most sensitive to the sources of contamination inherent to this source.

Keywords

biomonitoring, hexamethylenediamine, pollutant detectors, control system, legislative-administrative subsystem, ecological information system

1. Introduction

In the automated monitoring systems an important role is played by the choice of the number and location of pollution detectors. Increasing the accuracy and reliability of monitoring results is due to the economic difficulties due to the high cost of equipment [1]. In this regard, a number of methods have been developed to optimize the number and location of pollutant detectors. alarm system to exceed the maximum permissible value of pollution. Thus, there is chemical pollution substances of ponds, lakes, rivers and wells that are close to chemical industry enterprises. In rural areas where there is none centralized water supply, this contaminated water daily used for household needs and for eating. We will consider approaches to monitoring of harmful substances in the environment.

2. Networks around sources of discharges

An approach based on the analysis of the ratio of the probability of registration of the discharges *P (n)* and the cost of the control system *N (n)* is possible in order to assess the amount of detectors required for reliable control of the number of detectors [2]. This relation *F (n)* has a maximum corresponding to the optimal number of detectors. Usually the cost of a data center *Nц* depends little on the number of detectors and can be taken as a constant. Similarly, the cost of one detector *Nd* does not depend on the number of detectors in the system:

$$N(n) = N_{\text{Ц}} + n\,N_{\text{Д}} \quad (1)$$

At the same time, and the use of only mathematical models of pollution migration and situation assessment, that is, the use of so-called model monitoring, cannot provide reliable information support for making responsible decisions due to significant modeling errors and ambiguity of the results obtained. The system approach to the analysis of heavy technogenic accidents

and their ecological consequences is aimed at the coordination and integration of the use of scientific research, the holistic coverage of the phenomena of interest, the deepening of the study of the mechanism of accidents[3].

The purpose of this system of analysis is the formation of a set of alternatives to the emergence and development of accidents, risk assessment with the aid of a posterior distribution of accidents and the analysis of the reliability of cases with a given number of their occurrence and comparison with the a priori distribution. The methodology allows to analyze the sources, conditions and circumstances of accidents and their development processes, as well as to assess their environmental impact for management decisions in order to minimize environmental impacts.

3. Conclusion

The use of the method of obtaining temporary preparations for assessing the toxicity of the environment, including the collection of reproductive material of the bioindicator plant in environmentally friendly and technogenic zones. It is possible to detect the percentage of sterile pollen grains and thus determine the index of damage to the biosystem with the implementation of an integrated assessment of the state of the environment and the level of environmental hazard for humans and biota.

4. References

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