

PROBLEMS OF ENVIRONMENTAL POLLUTION BY DRUGS

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Introduction. Messages about the presence medicines in the surface waters began to arrive since 1990. The following research confirmed presence of drugs in the environment around the world. Water pollution by drugs has become a serious environmental problem for the world .

Last years around the world thousands of water samples have been taken in order to study the presence of residues of drugs in the environment. Currently there were confirmed the presence of more than 150 drugs and their metabolites in the water.

The main sources of pollution are waste and sewage of pharmaceutical companies, livestock farms, domestic waste. A huge amount of drugs coming into the environment through the sewage system. Drugs withdrawal from the human body get into the sewage being in biologically active form or in the form of metabolites.

Sewage treatment plants usually are not suitable for decontamination and disposing of drugs. A large number of substances are poorly biodegraded in the treatment facilities system and get into surface water in the unchanged form.

These factors lead to the fact that uncontrolled pharmaceutical environmental pollution takes place.

Trace amounts of chemicals that are part of the analgesics, tranquilizers, antibiotics, hormones (including oral contraceptives), anti-inflammatory drugs are detecting not only in natural waters but also in drinking water. Currently their concentration is low (at 1 - 100 g/L), but long-term actions on the living organisms may have unexpected harmful consequences, both individual and species levels.

Aim. To analyze published data of environmental pollution cases by drugs and their metabolic products in order to further development identification methods of medicines various groups in the objects of biosphere.

Materials and methods. We proposed advanced approaches in order to study the environmental toxicology of drugs, including:

study of international experience in assessing the toxicity, hazards and assess risks of pharmaceutical substances as pollutants in biological systems;

study of international experience in assessing biodegradation of medicinal substances;

the drugs development responsibility extension in order to assess their potential effects on the environment at all stages of the life cycle of a medicinal product: from raw materials to products utilization;

development of new modern methods for determining drugs in different natural matrices that can affect on vital functions of alive organisms.

Results and discussion. The availability and potential hazards of pharmaceutical products in the environment and potential environmental impacts of increasingly attracts the attention of scientific and international organizations. In 2012 WHO published a report "Drugs in drinking water" as an overview of many articles and studies. In a report states that there is need for research on pharmaceutical pollution monitoring and assessment of the risks associated with long-term effects of low concentrations of drugs on alive organisms.

In Ukraine, the problem has not been studied, but a significant amount of the pharmaceutical market and the uncontrolled sale and consumption of drugs allows the design problem in the Ukraine also.

We conducted the collection and structuring the availability of pharmaceutical pollutants in different matrices (water, aquatic organisms, etc.) for the prediction of the pollution in Ukraine.

Determination of the main sources and ways of appearing drugs into the environment, forecasting the main polluting substances which may be relevant for Ukraine, it is necessary to develop analytical methods for determination of these substances in the biosphere objects.

Low concentrations of pharmaceutical pollution require the most modern analytical equipment: liquid chromatography with mass spectrometry detectors.

Conclusion. The analysis of published data on cases of environmental pollution drugs and their metabolic products was conducted.

Perspective of development methods for determining drugs in the biosphere sites to assess their risk to the environment and human health was proved.