

MEDICINAL PRODUCTS IN THE ENVIRONMENT

In recent years, our special attention has been paid to the emerging issues in the field of environmental safety, to which we have not given a serious thought as yet.

One of such issues is that of entry and migration in the environment of pharmaceuticals, food additives, and personal care products. They are manufactured and consumed in large quantities and discharged into the sewerage system with human wastes.

Until the 1980s, it was commonly believed that these items are treated at wastewater treatment plants and do not pose an environmental risk, even if released into the environment.

Among the first of those who changed the attitude towards the occurrence of medicinal products in the environment were environmental chemists Thomas Heberer and Hans-Jürgen Stan of the Technical University of Berlin.

In the 1980s they revealed the occurrence in rivers, lakes, and deep aquifers of medicinal products, in particular, analgesics, as well as ibuprofen, diclofenac, antibiotics, and other medications that are extensively used in Europe.

Those studies showed that, e.g., many antibiotics, as they leave human body, remain virtually unchanged and preserve their activity. They enter water basins and eventually get into butcher's meat, as well as into vegetables, fruit, and drinking water.

By contrast to pharmaceuticals waste subjected to fairly stringent environmental regulations, acceptable methods for controlling the release into the environment of such **nonspecific contaminants** still remain to be developed.

It should be noted, however, that the environmental risk posed by these contaminants goes beyond their toxicity: Under natural conditions, antibiotics permanently coexist with microbes and make them immune and thereby totally invulnerable to medicines.

American researchers studied the migration of medicines over the Great Lakes and demonstrated that they may adversely affect the reproductive and hormone systems in fish and exhibit mutagenic activity.

In Russia, the issue of nonspecific contamination of the environment also receives much attention. For example, since 1996 the St. Petersburg Scientific Research Center for Ecological Safety, Russian Academy of Sciences, has been conducting studies on migration of nonspecific contaminants in the Neva Bay and the Gulf of Finland. At the initiative of Academician N.P. Laverov, President of Russian UNEPCOM, an environmental safety observatory was established on the base of the Center, which is equipped with unique high-resolution instrumentation for chromatographic-mass spectrometric examinations.

By now, proposals have been prepared concerning a collaborative research with Nordic scientists, aimed to study the migration of nonspecific contaminants over the Baltic Sea.

At the same time, relevant studies already conducted in a number of countries identified nonspecific contamination as a new factor adversely affecting the environment and human health.

It is global in nature and poses a worldwide threat to environmental safety.

An objective assessment of the new risk to environmental safety calls for coordinated actions at the UN level.

In this context, it is a matter of particular urgency to develop a special scientific program under the auspices of UNEP and WHO, aimed at studying the entry and migration of nonspecific contaminants in the environment, at disclosing the mechanisms of their action on the biosphere as well as establishment of special International Fund on developing technologies and equipment for sewage treatment plants to treat municipal wastewater from wastes still retaining the activity of medical products.