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ГАЛАХИМ



Title: MEDICAL WASTE AS A SOURCE OF ANTIBIOTIC POLLUTION OF WATER BODIES

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Keywords:

Medicine, waste antibiotic ,pollution,
water

Research Objective:

In modern conditions, when the SARS-CoV-2 virus spreads on the planet and does not spare millions of people, the amount of medical waste is sharply increasing.

Medical waste is the main source of entry of harmful chemical, chemical-biological and biological elements into the environment. These are primarily drugs and chemicals - solid, liquid chemicals; disinfectants; toxic substances; expired or falsified medicines; cytotoxins. In most medical institutions there is no organized system for collecting, storing and transporting and disposing of drug residues; as a rule, they are drained into the city-wide drainage system. Waste products of patients and staff, disinfectants and other pharmaceuticals are also received there.

The purpose of this work was to collect and analyze information on medical waste in medical institutions of the Baikal region as a source of antibiotics entering water bodies.

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Objects and research methods:

The objects of the study were medical facilities in Irkutsk and reference information on the number of antibiotics passing through the pharmacy network in Irkutsk, the number of patients passing through medical facilities.

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Results

Wastewater from hospitals is not subjected to any treatment at local treatment facilities; traces of 14 antibiotics were found in them, including sulfonamides, tetracyclines, fluoroquinolones, macrolides, cephalosporins, cephalexin, lincomycin and trimethoprim. At the same time, antibiotics are not removed at the treatment facilities. They pass through and enter water bodies

Our research has established that at present, in a pandemic, on average, up to 1 kg of pharmaceuticals are circulated in health care facilities, when they are absorbed by 30-40%, up to 300-400 grams of pharmaceuticals will go directly to hospital wastewater with waste products to the city's treatment facilities.

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Results

According to the accepted classification, the risks according to the hazard index (HQ) are as follows: the level of risk is minimal, if $HQ < 0.1$; the risk level is low if $HQ = 0.1 - 1.0$; the level of risk is medium, if $HQ = 1.0 - 5.0$; the risk level is high if $HQ = 5.0 - 10.0$ and the risk level is extremely high if $HQ > 10.0$. Table 1 shows the values of hazard indices calculated for the standard consumption of drinking water products at minimum and maximum concentrations of antibiotics

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Results

Test sample	The predicted value of the hazard index for the minimum concentration	The predicted value of the hazard index for the maximum concentration
Drinking water from springs	0,9	5,2
Drinking water from the Angara below the wastewater discharge	0,1	1,5

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Conclusions

The predictive assessment of environmental risks for the population based on the calculation of the hazard index showed that the risks are classified as medium and low. The number of samples with the detected presence of antibiotics from the total amount of the investigated is 0.2-2.5%, which indicates the seriousness of the problem of environmental risks for the population of the Baikal region and it is necessary to continue research in the direction of pollution of water bodies with medical waste.

References

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Thank you for your attention!

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