

ENVIRONMENTAL RISK ASSESSMENT OF SELECTED PHARMACEUTICALS
PRESENT IN SURFACE WATERS IN RELATION TO ANIMALS

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Abstract: This paper addresses the issue of antibacterial drugs, estrogens and cytostatic drugs' presence in surface waters and their influence on animals. The ecotoxicity and the impact of three active compounds: ciprofloxacin, 17 α -ethinylestradiol and 5-fluorouracil on protozoa, crustaceans and fish were examined. Acute tests (crustaceans' immobilization test, fish survival test, enzymatic test on *Daphnia magna*) and chronic tests (growth test on protozoa, reproduction test on crustaceans and juvenile growth test on two species of fish) were performed. Acute toxicity studies revealed diversified species – sensitivity to the tested compounds. Crustaceans *Artemia salina* were the most resistant to all three pharmaceuticals. Fish also demonstrated low sensitivity to ciprofloxacin and 5-fluorouracil (LC(EC)_{50-96h} > 100 mg/l). In the survival tests, the greatest harm in respect to fish and crustaceans was demonstrated by 17 α -ethinylestradiol, and in the enzymatic tests – by ciprofloxacin. In all chronic tests, the toxic effects of drugs were proven. Tested compounds limited reproduction of crustaceans and growth of protozoa and fry. The risk assessment, conducted on the basis of the PEC/PNEC quotient, showed a significant risk in relation to aquatic animals caused by the presence of 17 α -ethinylestradiol and 5-fluorouracil in concentrations detected in surface waters.