



“Gh. Asachi” Technical University of Iasi, Romania

**ICEEM/02 – ENVIRONMENTAL ENGINEERING
SECTION**

“Water and Wastewater Treatment Technologies”

**COMPLEX APPROACH TO THE PROBLEM OF
PERSISTENT ORGANIC POLLUTANTS
DEGRADATION IN WATER ENVIRONMENT**

**Victor Covaliov¹, Olga Covaliova^{1*}, Angela Cincilei², Gilles Mailhot³,
Pascale Besse³, Anne-Marie Delort³, Michele Bolte³, Ion Dragalin⁴**

¹*State University of Moldova, Chisinau,*

²*Institute of Microbiology, Academy of Science of Moldova, Chisinau,*

³*University Blaise Pascal, Clermont-Ferrand, France,* ⁴*Institute of Chemistry, Academy of
Science of Moldova, Chisinau*

Abstract

This paper deals with the physical-chemical and microbiologic treatment of persistent organic pollutants POPs (namely, benzothiazoles), and the limits of these methods applicability are considered. The new technical solutions improving their degradation efficiency were proposed, by using microbiological treatment and photo-catalytic one, with the UV-irradiation having the wavelength 180-320 nm in oxidative environment, containing hydrogen peroxide and iron (III) ions as catalysts. The kinetics and mechanism of benzothiazole (BT) molecules degradation was studied by gas-liquid and thin-layer chromatography, and intermediate products were identified. The role of redox processes, running under the influence of active radicals, is discussed.

The screening of bacterial and fungal cultures made it possible to select certain strains, possessing different capacity of BTs utilization as the single source of nitrogen, carbon and energy. The study of the products of BTs microbial transformation products was carried out. The biodegradation of BT and OBT (hydroxybenzothiazole) by a few stems of fungi g. *Penicillium* was monitored by reverse phase HPLC–method performed directly on culture media without purification. The most active biodestructors turned out to be *Penicillium sp.24*, *Penicillium sp.77*. The xenobiotics were biotransformed into hydroxylated derivatives.

Keywords: waste water, microbiologic treatment, biodegradation, organic pollutant, benzothiazole

* Author to whom all the correspondence should be addressed: e-mail: olgacov@water.md