

HOMOGENEOUS CATALYTIC OXIDATION OF AMOXICILLIN AND DICLOFENAC SODIUM. KINETIC AND APPLIED STUDY

Larisa Mocanu*, Maria Gonta, Gheorghe Duca

Laboratory of Physical and Quantum Chemistry, Institute of Chemistry, Moldova State University, 3, Academiei str., MD-2028, Chisinau, Republic of Moldova

**e-mail: larisa.mocanu@usm.md*

Abstract. This study investigates and compares the efficiency of Fenton and photo-Fenton homogeneous catalytic oxidation processes for the degradation and mineralization of amoxicillin and diclofenac sodium. For amoxicillin, the optimal Fenton process parameters were established at a Fe^{2+} : H_2O_2 : substrate molar ratio of 1:10:2 (pH 2.2; 30 min), while UV-A integration reduced treatment time by 4-5-fold (6-8 min, degradation > 85%, COD > 85%). Conversely, the classical Fenton process eliminated diclofenac sodium at a higher rate, achieving 81.6% degradation in just 180 s, and a molar ratio of 1:0.6:9 (pH 2.5), though maximum mineralization (84%) required UV-C photo-Fenton treatment. Both reactions followed pseudo-first-order kinetics ($R^2 \geq 0.95$ -0.97). Granular activated carbon adsorption is recommended as a post-treatment step. These results highlight the viability of these advanced oxidation processes for the treatment of pharmaceutical wastewater and provide fundamental kinetic and design parameters for their pilot-scale implementation in the Republic of Moldova

Keywords: Advanced Oxidation Processes (AOPs), emerging pollutants, amoxicillin, diclofenac sodium, pharmaceutical wastewater.