ASSESSMENT OF THE SELF-PURIFICATION CAPACITY OF FOLIC ACID-CONTAMINATED WATERS: FROM MODEL SYSTEMS TO MICROCOSMS

Elena Bunduchi [a,b], Angela Lis [a,b*], Viorica Gladchi [a,b], Vladislav Blonschi [a,b], Ruslan Borodaev [a,b]

[a]*Department of Industrial and Ecological Chemistry „Acad. Gh. Duca", Faculty of Chemistry and Chemical Technology, Moldova State University, 60, A. Mateevici str., Chisinau MD-2009, Republic of Moldova*
[b]*Institute of Chemistry of Moldova State University, 3, Academiei str., Chisinau MD-2028, Republic of Moldova*
** e-mail: angela.lis@usm.md, +37369737563*

Abstract. This study evaluates the impact of folic acid (FA) on water self-purification processes by comparing pollution and depollution indicators in model systems (distilled water) and laboratory microcosms (natural water from the Dănceni reservoir, Republic of Moldova). In non-catalytic and Cu(II)-catalyzed model systems, increasing FA concentration enhanced the inhibition capacity ($\sum k_{iOH}[S_{iOH}]$) and decreased the steady-state hydroxyl radical concentration ($[\bullet OH]_{ss}$), demonstrating that FA acts as a hydroxyl radical scavenger. Extending the investigation from model systems to laboratory microcosms using FA concentrations simulating a pollution scenario showed that the contaminant increased the organic load (COD_{Mn}) of natural water and significantly inhibited hydroxyl-radical-mediated self-purification processes. Meanwhile, dissolved oxygen saturation and pH remained within optimal ranges, maintaining aerobic conditions and supporting contaminant biodegradation. Nevertheless, the overall results demonstrated that elevated FA inputs reduce the oxidative self-purification capacity of natural waters.

Keywords: folic acid (FA), hydroxyl radical scavenging, inhibition capacity, self-purification, microcosm.