



Evaluation of the acute toxicity on *Daphnia magna* throughout the catalytic wet peroxide oxidation of dissolved natural organic matter

Camilo L. Guerrero-Romero^a, Dolly Revelo^b, Alejandra Caicedo^a, Marcela Botina^a, Ana M. García-Mora^{c,d}, Ricardo A. Torres-Palma^d, Luis-Alejandro Galeano^c, Iván A. Sánchez-Ortiz^{a,c,*}

^aDepartamento de Recursos Hidrobiológicos, Universidad de Nariño, 520002 Pasto, Colombia, Tel. (+57) 3016436357; emails: ivansaor@hotmail.com/iaso@udenar.edu.co (I.A. Sánchez-Ortiz), camiloguerrero.romero@gmail.com (C.L. Guerrero-Romero), alejandra61033@hotmail.com (A. Caicedo), marcela_9410_@hotmail.com (M. Botina)

^bGrupo de Investigación en Bioelectroquímica (BEQ), Departamento de Biología, Universidad de Nariño, 520002 Pasto, Colombia, email: margo.revelo@gmail.com (D. Revelo)

^cGrupo de Investigación en Materiales Funcionales y Catálisis (GIMFC), Departamento de Química, Universidad de Nariño, 520002 Pasto, Colombia, emails: anamariagarcia@udenar.edu.co (A.M. García-Mora), alejandrogaleano@udenar.edu.co (L.-A. Galeano)

^dGrupo de Investigación en Remediación Ambiental y Biocatálisis (GIRAB), Universidad de Antioquia UdeA, 050010 Medellín, Colombia, email: ricardo.torres@udea.edu.co (R.A. Torres-Palma)

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ABSTRACT

This research was aimed at evaluating the evolution of the acute toxicity (effective concentration measured in terms of immobilization, EC_{50}) on *Daphnia magna* neonates at 48 h of exposure during the catalytic wet peroxide oxidation (CWPO) of dissolved natural organic matter (NOM), activated by an Al/Fe-pillared clay catalyst. The CWPO-degradation of NOM was assessed throughout 240 min (180 min of peroxide addition) as a function of time on samples of either raw surface water (supplies of rural aqueducts) or effluents of conventional physicochemical treatment units at drinking water treatment plants (DWTPs). Total organic carbon (TOC), non-reacted H_2O_2 concentration, and decolorization were the measured response variables as a function of the reaction time. Starting TOC concentrations in the targeted water supplies varied between 1.54 and 4.65 mg/L. The CWPO treatment achieved depletions of the initial immobility ranging between 97.5% and 100% showing this technology as a very promising alternative assisting DWTPs to improve the overall safety of drinking water. The immobilization of the *D. magna* neonates showed to be also affected by the conductivity, whose Spearman correlations varied between 0.69 and 0.96, and then this parameter must be carefully taken into account in measurements of toxicity based on this bio-indicator.

Keywords: Advanced oxidation processes; Drinking water treatment; Catalytic wet peroxide oxidation; Mineralization; Pollution removal; Toxicity test

* Corresponding author.