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***"Gheorghe Asachi" Technical University of Iasi, Romania***


# THE FUNCTIONAL RESPONSE OF IMMOBILIZED MICROBIAL COMMUNITIES TO INCREASE LOADING RATES OF THE PESTICIDES CHLORPYRIFOS AND BIFENTHRIN

**Alfredo Arias-Ruiz[1], Isabel Ambriz-Mexicano[1], Nora Ruiz-Ordaz[1]*, Juvencio Galíndez-Mayer[1]*, Héctor Poggi-Varaldo[2], Jaime García-Mena[3], Khemlal Nirmalkar[2], Ricardo Monterrubio-López[4]**

*[1]Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional (National Polytechnical Institute), Av. Wilfrido Massieu s/n, CP 07360, México City, Mexico*
*[2]Departamento de Biotecnología y Bioingeniería, Cinvestav-Unidad Zacatenco, Av. Instituto Politécnico Nacional 2579, Col Zacatenco CDMX 07360. Mexico*
*[3]Departamento de Genética y Biología Molecular, Cinvestav-Unidad Zacatenco, Av. Instituto Politécnico Nacional 2579, Col Zacatenco CDMX 07360. Mexico*
*[4]Unidad Politécnica para el Desarrollo y la Competitividad Empresarial, Instituto Politécnico Nacional, Av. Wilfrido Massieu s/n, CP 07360, México City, Mexico*

## Abstract

Several technologies have been developed to remediate contaminated terrestrial or aquatic environments; in contrast, few have been tested to prevent the pollution of aquatic ecosystems. Permeable reactive biobarriers (PRBs) are one of several emerging ecotechnologies that could prevent the contamination of surface waters by the arrival of agrochemical compounds carried by drainage and runoff from agricultural lands. A PRB functions as a biofilm reactor. Its usefulness depends on the capacity of the microbial communities (MC) immobilized in the biobarrier to resist and recover their degrading capacity after environmental disturbances, such as the presence of several types of pollutants and the increase of their loading rates to the biobarrier. This work evaluates the functional response of two taxonomically different MCs acclimated on diazinon to the increasing supply of two widely used pesticides, chlorpyrifos and bifenthrin. A D-Stat is an unsteady-state continuous culture technique used to provoke a continuous environmental disturbance in PRBs through the gradual increase in pesticide concentration. The results showed that regardless of the taxonomic structure of the immobilized MCs, a fast, functional adjustment occurred when continuously increasing loading rates ($B_V$) of pesticides were supplied to the biofilm reactor, observing synchrony between pesticide loading ($B_V$) and removal rates ($R_V$).

*Key words:* D-Stat, diazinon, ethyl chlorpyrifos, functional convergence, gradient feeding

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* Author to whom all correspondence should be addressed: e-mail: noraruizordaz@yahoo.com.mx; juvenciogm@yahoo.com; Phone (+52) 55 5729 6000 ext 57840; (+52) 55 5729 6000 ext 57839