Biopurification system for a pesticides mixture degradation

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A biopurification system based on the adsorption and degradation capacity of a biomixture prepared with top soil, straw and peat (1:2:1) and covered with a vegetal cover is able to treat a complex mixture of pesticides. The degradation of atrazine (ATZ), chlorpyrifos (CHL) and iprodione (IPR) was studied in a biopurification system installed in containers of 1 m3 packed with 125 kg of biomass mixture (bulk density (ρ) 0.29 g mL⁻¹) with and without a vegetal cover (mixture of Festuca sp. and Lolium perenne) and operated at hydraulic load of 1.2 L of tap water per day. A water solution (484 mg L⁻¹) containing a mixture of formulated ATZ, CHL and IPR (35 mg of each active ingredient (a.i.) kg⁻¹ of biomixture) was sprayed over the surface of the containers. Besides, containers without pesticides were used as control. The concentration of the pesticides and their main metabolites and phenoloxidase and dehydrogenase activity were measured at three depth (15, 35 and 55 cm) in the biomixture during 60 days. Organic acid exudation from the vegetal cover were also analysed. The degradation of the pesticides was high (>95%) and was highest in containers with vegetal cover. Dehydrogenase activity was similar in all treatments except in container without pesticides and vegetal cover (low values). Contrarily, phenoloxide activity was highest in control container. Succinic, malic and oxalic acids were found in high concentration in contaminated container with vegetal cover, instead of citric acid was highest in uncontaminated container.

Biography

M Cristina Diez Jerez has completed her PhD at Universidad Estadual de Campinas SP, Brasil. She is a Full Professor at Chemical Engineering Department and the Director of Research & Development Center For Wastes Management (CIDGRO), La Frontera University, Chile. She has published more than 85 papers in ISI journals in the last 10 years.

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