

Exploratory investigation about the behavior of the atrazine herbicide in an Entic Haplustoll soil of the State of Córdoba.

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In Argentina, due to the intensification of agriculture and the replacement of conventional tillage (CT) by direct seeding tillage (DST), weed control is purely chemical, which promotes more frequent herbicide applications and, usually, with doses higher than for CT. Atrazine is a herbicide that has been and is widely used in the world for different crops, and is frequently found in groundwater. The objectives of this study were to contribute knowledge about the behavior of atrazine in soil with extensive crops in the Province of Córdoba and to analyze the regulatory framework on the use of herbicides in Argentina, specifically in the Province of Córdoba. The work was implemented on a lot sown with corn and treated with atrazine. Soil samplings were done at different depths and at different times after application. Quantitative assessment of atrazine was carried out using a Liquid Chromatograph of Ultra High Resolution, in tandem with a Mass Spectrometer Triple-Quadrupole. Besides, the physical and chemical properties of the soil of each sample were determined. The data obtained was analyzed using Principal Component Analysis (PCA). It resulted in that atrazine persisted for over 260 days in the soil after the first application. Water ingress in the soil profile collaborated to herbicide particles transport into deeper horizons. The graphs obtained with PCA analysis showed that the variables N-NO₃, % CO, % MO, % Nt and are positively correlated with the concentration of atrazine, while pH is negatively correlated with the herbicide being studied. Moreover, the herbicide has a different behavior depending on the location in the profile or depth level studied due to the different physical and chemical composition of the soil and in relation to the time after application under analysis. The legislation in Argentina concerning the application of weed control products at a national level and particularly in the province of Cordoba considers and regulates the most important aspects of the activity but does not take into account reference values on the concentration of atrazine in different soil types and uses.

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