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Fixation Coefficient and Soil Residual Effect of Cadmium Application on Three Biannual Crop Rotations at Four Locations in Chile

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Abstract

Cadmium (Cd) is a metalloid present in agricultural soils and harmful for human health. A large part of the Cd entering into the soil can be fixed, while another portion can contribute to increasing availability indices of this element (residual effect). The present study evaluated Cd residual effect and Cd fixation derived from anthropic applications at four locations in Chile during two seasons. Three crop rotations were used, which included white lupine (*Lupinus albus* L.), narrow-leafed lupine (*Lupinus angustifolius* L.), and durum wheat (*Triticum turgidum* L. var. *durum*) as the first crop and durum wheat as the second crop. Results indicated that the anthropic application of Cd to the soil, in the three crop rotations and at the four locations under study, exhibited a low residual effect in the next season and null effect two seasons after its application. Among the three preceding crops of each rotation, the highest effect on Cd residuality in both seasons was achieved using both lupines, especially narrow-leafed lupine. The Cd fixation coefficient in the upper 0.2 m of soil in the three crop rotations and at the four locations was very high, and it was greater than 99.9% in all cases.

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