
Interaction of Rimsulfuron with Smectites

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Abstract: The adsorption of the sulfonylurea herbicide rimsulfuron, [N-((4,6-dimethoxypyrimidin-2-yl)aminocarbonyl)-3-(ethylsulfonyl)-2-pyridinesulfonamide], on clay minerals with different saturating cations was studied. Three smectites with different lattice charge distribution (hectorite, montmorillonite and nontronite) were selected and made homoionic to Ca²⁺, Cu²⁺ and Al³⁺. Because of the instability of rimsulfuron in water, the experiments were carried out in chloroform solution. The interaction mechanism depends on the nature of the saturating cation and the tetrahedral layer charge of the silicate. Among the exchangeable ions studied, only Al³⁺ is able to produce degradation of the herbicide to N-(4,6-dimethoxypyrimidin-2-yl)-N-[(3-(ethylsulfonyl)-2-pyridinyl)urea. In this case, the lower the tetrahedral charge, the more active the degradation. The Ca²⁺-saturated clays are ineffective in the degradation. In contrast, the formation of a stable chelate complex with the saturating ion permits rimsulfuron to be adsorbed to a rather high extent into Cu(II)-clays and to be stable against degradation.

Key Words: Adsorption • Infrared Spectroscopy • Pesticides • Rimsulfuron • Smectites

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