The Effects of Soil Components and Processes on the Toxicity of Pesticides to Mammalian Cells. (S11sorensen140623-Poster)

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Abstract:

The fate and toxicologic risk of agricultural chemicals is of tremendous importance to both human health and natural ecosystems. Alterations in the oxidation state of iron (Fe) in clay minerals has been shown to affect the degradation of pesticides. Yet, what does degradation mean when attempting to assess toxicologic risk? This study objective was to measure the influence of Fe oxidation state, on the toxicity of agricultural chemicals to mammalian cells. Four pesticides (alachlor, oxamyl, dicamba, and 2,4-D) were reacted with both oxidized and reduced SWa-1 clay. Supernatant from each pesticide/clay mixture were separated by centrifugation, filter sterilized, and used in a chronic mammalian cell cytotoxicity assay. The results of this study were as follows: (1) oxamyl and alachlor reacted with reduced SWa-1 clay, showed a reduction in their overall cytotoxic potential; (2) dicamba reacted with the reduced-clay treatment was more cytotoxic then the other treatments; and (3) no differences were observed between samples for 2,4-D. These results indicate that Fe oxidation state plays a definite role in altering the cytotoxic potential of some agricultural pesticides which suggests this factor should be taken into account in pesticide management programs.

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