ABSTRACT

The reactivity of chemicals is appraised by considering their functional groups. This is difficult work, since two or more nearby groups can conspire to generate unique reactivity. Raising or lowering electron density near functional groups may push reactivity over a threshold. Hydroxy acids, keto acids, and phosphorus(III)-containing oxyanions are often considered benign, but is this wise? Hydroxy acids and keto acids find their way onto lists of disinfection byproduct precursors believed to exist within natural organic matter. "Phosphite" is used in a wide range of agronomic settings from potato fields to almond orchards, and is even sprayed postharvest on lettuce, kale, and other perishable fruits and vegetables. Aquatic chemistry and insights into speciation that it provides offer important clues into reactivity relevant to environmental behavior and toxicity.

 Beyond the usual suspects: why we should care about hydroxy acids and keto acids within natural organic matter, and phosphorus (III)-containing oxyanions used in agriculture

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BIO: Alan Stone completed his bachelor's degree in Chemistry from the University of Maryland, College Park in 1978, and his master's and Ph.D. degrees in Environmental Engineering Science at Caltech under the direction of James J. Morgan in 1983. Since then, he has been a member of the faculty of the Whiting School of Engineering, Johns Hopkins University. His work deals with the effects of speciation on reaction pathways and rates, with a special emphasis on metal-organic complex formation and adsorption at mineral/water interfaces. Biogeochemical investigations include chemical reactions important in early diagenesis in sediments, subsurface migration of contaminants, acquisition of iron and other elements by plants, and abiotic sinks for biologically active compounds. Environmental chemistry investigations include the surface-catalyzed hydrolysis, oxidation, and reduction of pesticides, properties and chemical transformations of synthetic chelating agents, and chemistry relevant to water treatment. Recently he has begun exploring speciation and reaction pathways and rates taking place in biofluids and in media used for culturing cells. Seventeen students have completed their Ph.D. degrees under his direction.

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