

Chemical Pollution in Acid Sulfate Soils

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Soils containing pyrite (FeS_2) formed by natural processes under anaerobic conditions are widespread in Southeast Asian countries. It is possible that the pyrite contains As and Cd. These soils, classified as acid sulfate soils, are utilized for crop cultivation. Studies conducted in Malaysia indicate that toxic materials can be released into the soils and groundwater in the surrounding areas when the pyrite in the soils undergoes oxidation. This paper reports release of toxic materials into the soils and the surrounding environment when acid sulfate soils are drained to make way for development. Soil samples were selected from among the acid sulfate soils in the country. Some of the samples were maintained in unoxidized state, while others were exposed to the atmosphere. They were analyzed by various methods, including standard chemical methods, XRD and SEM-EDAX. Pyrite was found in the unoxidized state, while jarosite [$\text{KFe}_3(\text{SO}_4)_2(\text{OH})_6$] and natrojarosite [$\text{NaFe}_3(\text{SO}_4)_2(\text{OH})_6$] were present in oxidized samples. The Fe to S ratio of the pyrite structure was 1:2, indicating that accessory elements were absent within the pyrite structure. Oxidation of the pyrite would not lead to contamination of As and Cd in the soils. In the oxidized samples, some Mn were also detected. The metal along with Fe and Al were present in large amounts

in the water extract of the oxidized samples. This means that Al and Fe toxicity are a common problem in the areas covered by acid sulfate soils.
