CHEMICAL IMPROVEMENT OF ACID SULFATE SOILS BY LEACHING WITH SALT OR BRACKISH WATER

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ABSTRACT

Leaching of surface soil material from two acid sulfate soils from the Mekong Delta, Vietnam, with salt water, followed by leaching with rain water to remove excess salt, leads to a reduction of the Al^{3+} at the exchange complex. The higher the salt concentration, the more Al^{3+} is removed. Treatment with salt water therefore reduces the risk of Aluminum toxicity in these soils.

The method in which the salt water leaching is applied plays an important role in the efficiency of the Al removal. Under strongly oxidative conditions (i.e. quick leaching with dry periods between leaching treatments), the quantity of Al^{3+} found in the leached water is bigger than the Al removed from the complex plus Al present as soluble salts in the original soil. It appears that such oxidative leaching partly dissolves other Al components in the soil. In strongly reduced conditions (leaching with salt water while keeping the soil permanently submerged) the quantity of Al^{3+} found in the leached water is less than the total of Al^{3+} removed from the complex and Al^{3+} from soluble salts. Leaching under reduced conditions removes Al^{3+} from the complex but it is immobilized in the soil. This Al will probably become present in toxic forms again upon oxidation. It is therefore, recommended to execute salt water leaching under oxidative conditions.

Treatment with salt water cannot eliminate other chemical problems of acid sulfate soils such as Phosphorus deficiency, low pH and the danger of Ferrous Iron toxicity upon prolonged submergence. Fertilization remains imperative.