CHEMICAL CHANGES IN A LIMED AND FLOODED ACID SULFATE FISHPOND

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ABSTRACT

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Field and laboratory studies were conducted on an acid sulfate soil in Carles, Iloilo with the following objectives: a) to characterize the soils in the pond bottom and along the dikes of an acid sulfate fishpond; b) to follow-up some chemical changes occurring in the flooded acid sulfate ponds, and c) to evaluate the effect of liming on these chemical changes.

The pH (1:1 soil-water) of the air-dried soil samples collected from the pond bottom and along the dikes of the nursery ponds ranged from 2.2 to 4.6. This was significantly correlated with the lime requirement, extractable Al, active Fe and Mn, acetate-soluble sulfate and total sulfur content of the soil.

In the field experiment, before lime treatment, the waters of the nursery ponds exhibited decreasing pH with time as well as increasing concentrations of dissolved Al and Fe.

The level of Mn in the water was low due to the small amount of active Mn present in the soil. Acidity in the pondwaters after a heavy rain was mainly due to the leaching of sulfuric acid from the dikes.

Three lime treatments were used in the study: I - 1 ton/ha of lime applied along the dikes and 3 tons/ha on the pond bottom, II - 3 tons/ha of lime on dikes and 1 ton/ha on the pond bottom, III - 4 tons/ha of lime on dikes and no lime on the pond bottom. Treatment II could be considered the most effective way of applying lime since the ponds in this treatment exhibited the highest mean water pH compared to the ponds of the other treatments.

Fish mortalities were observed in one of the ponds (NP10 in Treatment III) which may be traceable to the low pH and high Al concentration in the pondwater. The applied lime on the dike was not able to control the acidity because it was washed down by the rains and covered with eroded soil.

The SMP buffer method of determining lime requirement overestimated the lime required to control the acidity of the water in acid sulfate ponds.