

Improving the productivity of acid sulfate soils for cultivation using limestone, basalt, organic fertilizer and/or their combinations

ABSTRACT

Acid sulfate soils are generally not suitable for the crop production unless they are efficiently improved. A study was conducted to improve the productivity of acid sulfate soils for rice cultivation using ground magnesium limestone (GML), basalt and organic fertilizer. The study was conducted on rice in laboratory, glasshouse and field. The pH of acid sulfate soils was low and exchangeable Al was very high which affected rice growth. The application of GML and basalt increased soil pH and reduced Al toxicity. GML required to ameliorate the soils for rice cultivation was 4 t ha^{-1} . Basalt in combination with organic fertilizer was a good soil amendment, but required to be applied a few months ahead of rice cultivation. Due to GML or basalt application, rice plants grew well even though water pH was below 5. The highest rice yield obtained was $4.0 \text{ t ha}^{-1} \text{ season}^{-1}$ for Sulfaquepts and it was $7.5 \text{ t ha}^{-1} \text{ season}^{-1}$ for Sulfosaprists. In general, the application of GML or basalt in combination with organic fertilizer improved the productivity of acid sulfate soils and consequently enhanced rice yield.

Keyword: Acid sulfate soil; Aluminum toxicity; Iron toxicity; Rice production; Soil amendments