

CHEMICAL CHARACTERISTICS OF ACID SULFATE SOILS AS AFFECTED BY ADDITION OF CALCIUM SILICATE IN-COMBINATION WITH AND/OR WITHOUT GROUND MAGNESIUM LIMESTONE (GML)

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Abstract

This study was conducted to evaluate the integral effect of ground magnesium limestone (GML) and calcium silicate on acid sulfate soils in Malaysia and to determine the optimal combination of GML and calcium silicate, with consideration on the cost incurred by the farmers and the positive soil chemical characteristics improvement on acid sulfate soil. The acid sulfate soils were incubated under the submerged condition for 120 days with GML (0, 2, 4, 6 t ha⁻¹) in combination with calcium silicate (0, 1, 2, 3 t ha⁻¹). A total of 9 out of 16 combination rates met the desired requirement of chemical soil characteristics. The chemical soil characteristics are soil pH > 4, exchangeable Al < 2 cmolc kg⁻¹, exchangeable Ca > 2 cmolc kg⁻¹, exchangeable Mg > 1 cmolc kg⁻¹ and Si content > 43 mg kg⁻¹. Furthermore, 2 out of 9 combination rates (i. 2 t ha⁻¹ calcium silicate + 2 t ha⁻¹ GML, and ii. 3 t ha⁻¹ calcium silicate + 2 t ha⁻¹ GML) cost were below the cost of 4 t ha⁻¹ GML value of USD 668, which is a common rate used by the farmers in Malaysia. Thus, possible recommendation are, i) 2 t ha⁻¹ calcium silicate + 2 t ha⁻¹ GML cost USD 484 and, ii) 3 t ha⁻¹ calcium silicate + 2 t ha⁻¹ GML cost USD 559. These combination rates met the desired requirement of soil chemical characteristics and could reduce the liming cost of rice-farmers in Malaysia under acid sulfate soil.

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