

Utilization of silicon for sustainable rice cultivation in acid sulfate soil

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Abstract

Utilization of silicon for sustainable rice cultivation in acid sulfate soils were studied for 2 years during 2010-2012. The study site was studied on Rungsit soils in Amphoe Tanyaburi, Pathumtani Province. The objectives of this study were to study the effect of high quality organic fertilizer combination silicon and chemical fertilizer on rice yield, to assess chemical soil properties after using soil amendments, and also to assess the economic return. A Randomized Complete Block Design (RCBD) with 10 treatments and 3 replications were employed. Treatment 1 was on the control; treatment 2 was using chemical fertilizer rate which recommended by LDD²; treatment 3 was using silicon 50 kg/rai; treatment 4 was using high quality organic fertilizer at 300 kg/rai (the recommendation rate by LDD); treatment 5 was using silicon 25 kg/rai combination with high quality organic fertilizer 300 kg/rai; treatment 6 was using silicon at the 50 kg/rai combination with high quality organic fertilizer 300 kg/rai; treatment 7 was using silicon 25 kg/rai combination with chemical fertilizer; treatment 8 was using silicon at the 50 kg/rai combination with chemical fertilizer; treatment 9 was using silicon 25 kg/rai combination with ½ chemical fertilizer; treatment 10 was using silicon 50 kg/rai combination with ½ chemical fertilizer. After 2 years, the results showed that pH decreased, and the percentage of organic matter, avail. P, ext. K, ext Ca increased. The highest yield was using silicon 25 kg/rai combination with high quality organic fertilizer 300 kg/rai, and the second was treatment 6 was using silicon at the 50 kg/rai combination with high quality organic fertilizer 300 kg/rai. However it was found that the economic return was highest with using high quality organic fertilizer 300 kg/rai (3,907.5 Baht/rai). Using silicon at the 50 kg/rai combination with high quality organic fertilizer 300 kg/rai gave the economic return 3,075.65 Baht/rai.

Keywords: silicon, high quality organic fertilizer, acid sulfate soils