Sarisa Sirichomjan 2009: Revising Methods of Estimating K Fertilizer Requirements on Smectitic Maize Soils. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Professor Tasnee Attanandana, D.Agr. 120 pages.

Potassium fertilizer recommendation revision for smectitic maize soils using potassium requirement equation was studied. The important factors in the equations are buffer coefficient for potassium (BC_K), K critical level, initial soil K, plant uptake K and management factors. The investigation comprised three studies. 1) Study of potassium release and fixation of some smectitic and kaolinitic maize soils. The results showed that the cumulative potassium release by Ca resin at 150 days of the smectitic soils was higher than the kaolinitic soils. The Elovich equation described the potassium release kinetics the best among the four equations studied. The different rates of K application on kaolinitic and smectitic soils showed lower K fixation and higher K release on kaolinitic soils. The higher K release of kaolinitic soils compared to smectitic soils with higher K application was obviously seen. 2) Study of soil properties affecting buffer coefficient of potassium of some maize soils by NH_4OAc, Mehlich 1, mixed nitric perchloric acid and Ca resin. The results revealed low BC_K Mehlich 1 and Ca resin in smectitic soils while they were high values in kaolinitic soils. The BC_K NH_4OAc was correlated with exchangeable Mg ($AdjR^2$ =0.546**) whereas BC_K Mehlich 1, BC_K mixed acid and BC_K Ca resin were correlated with soil pH ($AdjR^2$=0.864** , 0.731** and 0.812** respectively). 3) Study four methods of potassium extractions for revision of potassium requirement on smectitic soils. The results showed that Ca resin extraction was the promising method for potassium fertilizer requirement prediction in smectitic soils. However, field tests are needed before disseminating the recommendation to the users.

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