Duangporn Vithoonjit 2006: Chemical and Mineralogical Properties of Some Laterites and Plinthites in Thailand. Master of Science (Agriculture), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Associate Professor Anchalee Suddhiprakarn, Ph.D. 127 pages.
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The study on chemical and mineralogical properties of Some laterites and plinthites in Thailand was conducted by comparing types and quantities of iron oxides in different types of laterite and plinthite in representative soils. These included five soils from the North, five soils from the Northeast, one soil from Southeast Coast and four soils from Southern Thailand. Analyses carried out for different forms of iron, aluminum and manganese were by dithionite citrate bicarbonate (DCB) extraction for their free forms, ammonium oxalate (pH 3.0) extraction for their amorphous forms and 0.1 M sodium pyrophosphate (pH 10.0) extraction for their organic forms. Total elemental analysis for Si, Al, Fe, Ti, Na, Mg, K, Ca, P and Mn in laterite and plinthite was by X-ray fluorescence spectrometry. The results revealed that most of the laterite and plinthite bearing soils are highly developed, well drained, deep soils formed on residuum derived from metasedimentary rocks. The laterite and plinthite layers have been formed by the changes of water table indicated by their grayish and brownish colors induced by water stagnancy. Their chemical properties indicate that major iron oxides are present in crystalline forms and chemically active. These laterites and plinthites have low content of plant nutrients including calcium, magnesium, sodium, manganese, phosphorus and sulphur which would affect their availability for plants. These laterites and plinthites have quartz as the most abundant mineral whereas iron minerals consistently found are goethite and hematite. Gibbsite exists in some areas only. Besides, 0.7 and 1.0 clay mineral groups are also present. The results on fertility assessment of these soils reveal that they have relatively poor fertility status and they are slightly acid to very strongly acid (pH 4.5-6.5). Their agricultural uses need careful selection of crop types and suitable soil management practices such as irrigation and proper fertilizer uses to attain the highest availability for the crop. Permanent livestock pasture may be the most suitable use for the upland laterite and plinthite bearing soils. Their uses for economic tree crops always need to consider soil moisture status, soil depth and hardness of the laterite and plinthite layers as the main cropping factors.

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