A study on Al toxicity level and properties of highland soils in Khun Wang and Inthanon areas, Chiang Mai province was conducted in 31 pedons, aiming at assessing the relationship between level of Al toxicity and soil properties in order to provide equations suitable for predicting Al saturation of highland soils. Soil pits were used for this research, which included the investigation of general environments of the areas selected. Soil samples were collected with respect to soil genetic horizon and analysed using standard procedures.

Soils in both areas were formed from gneiss, granite and diorite and well developed. These highland soils had well drained feature. They had low to moderate fertility level, mostly having organic matter accumulated to great depths. The soils under native forest contained extractable Al and Al saturation percentage higher than did the soils used for agricultural production, particularly those under greenhouse cover where farmers commonly used lime to raise soil pH and, in turn, diminished the release of Al to the soil system, and bases further accumulated within the soils. Humults were found in the highest numbers, accouting for 24 pedons of which they can be classified into Typic Palehumults and Typic Haplohumults. They were composed of 52.7 and 51.6% Al saturation, respectively and these values were clearly higher than those obtained from other soils. The values were indicative of toxicity to growing plants, especially the ones that were not native tropical of which they were generally rater tolerant to Al toxicity.

The equation suitable for predicting Al saturation percentage in soils under native forest condition with the highest accuracy was "%Al saturation = 239.5-0.63(Extr.Ca)-0.32(Extr.Na)-0.35(pH_{KCl})-0.20(pH_w), R^2 = 0.88", under cultivation, with lower predictability was "%Al saturation = 150.7-0.51(Extr.Ca)-0.32(Extr.Na)-0.33(Silt)-0.20(pH_w)-0.27(Extr. Mg), R^2 = 0.77", and under both types of land use was "%Al saturation = 173.8-0.57(Extr.Ca)-0.34(Extr.Na)-0.30(Silt)+0.15(CEC, NH_4OAc)-0.17(pH_{KCl})-0.14(Extr.Mg)-0.15(pH_w), R^2 = 0.75" was recommended. According to these equations, predicted Al saturation percentage had, in order from the highest to the lowest, negative correlation with extractable Ca, extractable Na, pH_w and pH_{KCl} in the case of forest soils, with silt content additionally involved for cultivated soils whereas CEC by NH_4OAc having positive correlation when all samples were taken into account.

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