

ABSTRACT

The soils of the tropics have long been considered problem soils compared to their counterparts in temperate areas. Malaysia has a hot humid climate which these high temperatures and heavy rainfall acting over a wide variety of parent materials, have produced a wide range of soils. Problem soils are defined as those which require special management practices for their economic use in agricultural production. In general, problem soils are of the lowest priority for agricultural use. However, when population pressure demands it, such soils have to be utilised. There are four groups of problem soils found in Malaysia which are Oxisols, acid sulphate soils, sandy soils and organic soils. Unfortunately, In Malaysia, most of these types of soils are prone to erosion and landslides. Slope stability has always been the interest of civil engineers, geotechnique experts, soil mechanists and therefore the principles of soil physics, soil mechanics, and geotechnique, have been applied to explain slope failures and to find ways of improving slope strength. The chemistry of slope instability and landslides has not been the main concern of many landslide researchers. The aim of this research is to bring forward a study on the problem of slope stability from the physico-chemical point of view, such as to explore the capabilities of heavy metal (micronutrients) concentration in soil as shallow slope failure indicator. The second objective of this study is to determine the concentration of heavy metals namely Aluminium (Al) lead (Pb), Ferum (Fe), Zinc (Zn) Chromium (Cr) in highly weathered soil that significantly relevant to stable slope. The third objective is to determine the concentration of heavy metals in highly weathered soil that significantly relevant to unstable slope and to identify key factors to predict shallow slope failure using chemical properties. In order to achieve this goal, in chapter 3, 21 sampling points of stable and unstable slope in Selangor and Perak were chosen and 21 soils samples were collected for labatory test. Analysis on each of 93 samples data confirmed the findings by exhibiting highly significant differences between heavy metal (micronutrients) content, slope stability, and the location .This clearly demonstrates that concentration of heavy metal in different slope condition can have an important influence on the shallow slope failure. The results of the study from soil samplings both in Perak and Selangor sites show that a higher content of heavy metal (micronutrients) is an indication that the soil has higher content of organic carbon and higher content of CEC activities which result in the stability of the soil while a lower content of heavy metal (micronutrients) is an indication that the soil has lower content of organic carbon and lower content of CEC activities which result in the instability of the soil.

Keywords: Oxisols, Stable slope, Unstable slope, Heavy Metal (micronutrients)