Abstract

Soil activity is a term generally applied to the ability of a soil to take in and dispose water under changing moisture conditions. It is due to presence of clay minerals with a net negative charge to neutralise which, water is attracted to the mineral surface. The water molecules are incorporated in the clay structure in between the clay plates and with increased water; both the exchangeable cations and the c lay surfaces are hydrated resulting in further separation of the clay plates and swelling of the soils. This has come to be referred to as soil activity. Swelling soils are a major engineering problem and have been estimated to rank first of all the natural hazards in terms of damage to structures, and more so light buildings and pavements making their detection to be one of the most important site investigations in the construction industry. Methods of determining the soil activity have been developed over the years most of which utilise the soil physical properties as indices. Among these are Atterberg limits and cation exchange capacity (CEC) tests. These methods are time consuming and at times expensive. While this might not be a big problem in the industrialised world it is a great challenge in the developing world and at times lead to construction without proper site investigations more so if such construction is of light structures. In this paper we report on the findings of an approach in which spectroscopy was used to address the soil activity in a set of samples collected from areas of known soil activity in Kenya. The Methylene blue absorption (MBA) and the Atterberg limits were used to determine the soil activity, results of which were correlated with identifying parameters from laboratory spectral analysis. The outcomes are relationships between the soil activity and their spectral indicators and lay the foundation for a rapid method of estimating soil activity based on their optical properties.