Effect of dolomitic limestone and gypsum applications on soil solution properties and yield of corn and groundnut grown on Ultisols.

ABSTRACT

A study was conducted to determine soil solution properties and relative tolerance of corn and groundnut plants to soil acidity. Corn followed by groundnut was planted on Ultisols one month after lime or gypsum was incorporated into the topsoil. Soil samples were collected after corn and groundnut harvest. Soil solutions were extracted by the immiscible replacement method of soil water with fluorocarbon trichlorofluoroethane. Results showed that total Al, inorganic Al, Ca, and Mg concentrations were erratically affected by the treatments. However, total Al values were indicated to be high when solution pHs were low, especially at treatments with low amounts of lime or high amounts of gypsum. It appeared that Ca released from the dissolution of gypsum had replaced Al in the exchange complex, causing the high concentrations of Al in the solution. Solution pH, corresponding to 90 % relative yields of corn and groundnut, were 4.7 and 4.3, respectively. This means that groundnut is more tolerant to soil acidity than corn. Liming Ultisols at low rates may be necessary for groundnut cultivation. For corn cultivation, the liming rate is 2 t ha-1, which supplies adequate amounts of Ca and Mg for the growth of corn plants.

Keyword: Aluminium corn; Dolomitic limestone; Groundnut; Gypsum; Peanut; Ultisol.