

Chemical characteristics of representative high aluminium saturation soil as affected by addition of soil amendments in a closed incubation system.

ABSTRACT

Soil acidity is one of the main factors that limits profitable and sustained agricultural production. This study examined the performance of selected amendments in improving soil fertility of acidic tropical soils. The best two acidic tropical soils from Malaysia, Batu Anam and Durian, were selected to represent acid soils from Colombia while the five soil amendments selected were ground magnesium limestone (GML), magnesium carbonate (MgCO_3), gafsa phosphate rock (GPR), gypsum, and kieserite. They were incubated in a closed incubation system for two months. The measured parameters were soil pH, exchangeable aluminium (Al), exchangeable cations, and available P. The treatments were organised in a factorial completely randomised design (CRD) with three replications. There was a significant difference in response among soils, amendments, rates and their interaction effects for the different soil parameters evaluated, with GML giving a high soil pH (0.339) effect and amelioration of the exchangeable Al (-0.838 cmolc/kg) per ton applied. MgCO_3 and GPR gave similar effects in neutralising exchangeable Al (~ -0.6 cmolc/kg) per ton ha⁻¹ with a slight increase in soil pH (0.1 unit). Kieserite and Gypsum had a significant effect on amelioration of aluminum ((~ -0.16 cmolc/kg) in Batu Anam soil. GML was the most cost-effective amendment in increasing soil pH and neutralising Al at USD\$ 118.5 per cmolc/kg of Al.

Keyword: Acidic soils; Soil amendments; Exchangeable aluminum; Incubation system; Ground magnesium limestone; Gafsa phosphate rock.