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Mg-rich Synthetic Gypsum or Basalt as an Alternative Source of Ameliorant to Manage Soil Acidity for Plantation Tree Crops

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The rubber and oil palm in Malaysia are mainly cultivated on acidic Ultisols and Oxisols, which occupy about 70 per cent of the country's land surface. The pH of the soils varies from 4 to 5; however, the crops can withstand this level of soil acidity. This is not the case for cocoa, which grows best if the pH is greater than 5, at which Al^{3+} , Fe^{2+} and Mn^{2+} toxic to its roots are mostly precipitated as inert hydroxides; the respective pKa of the ions are 5, 4.58 and 6. Long-term application of ammonium sulphate on soils in Malaysian plantations can result in increased soil acidity due to nitrification of NH_4^+ released by the N-fertiliser. Thus, in the long run, soil pH can be lowered to the level that affects the growth and production of the crops. For oil palm, soil pH should be maintained at the level greater than 4.3. Treating Ultisols and Oxisols cropped to cocoa, rubber or even oil palm with ground magnesium limestone (GML), Mg-rich synthetic gypsum (MRSg) and ground basalt increases their pH, with the level dependent on the amount applied. Besides increasing soil pH, application of the ameliorants (MRSg or basalt) increases Ca, Mg and even S in the soils that translate into enhanced crop growth and eventually their production is sustained.

Keywords: *Acidic soils, cocoa, oil palm, rubber, soil ameliorant.*