

Effect of organic based N fertilizer on dry matter (*Zea mays* L.), Ammonium and nitrate recovery in an acid soil of Sarawak, Malaysia

Abstract

Problem statement: Exchangeable ammonium (NH_4^+) could be recovered by humic and fulvic acids from humic substances. The ability of these acids in fixing or retaining NH_4^+ has been demonstrated in many findings and reports. Both acids could affect the plant growth, nutrients uptake by enhancing photosynthesis rate and root growth among others. Thus, in this study, the effect of both acids (in liquid form) on soil exchangeable NH_4^+ , dry matter production and available nitrate (NO_3^-) was investigated. Approach: Humic molecules were isolated using standard procedures, followed by liquid organic N fertilizers formulation. Organic based N fertilizers were applied to soil in pots at 10 Days After Planting (DAP) and 28 DAP. Treated soils and plant parts were sampled at 54 DAP or at tasselling stage. Soil samples were analyzed for pH, ammonium and nitrate content. The plant samples were weighed to assess dry matter production. Results: Under acid condition, organic based liquid N fertilizers (fulvic acid or both, humic and fulvic acids) increased accumulation of NH_4^+ in soil. The presence of carboxylic groups in humic molecules increased NH_4^+ retention with increasing soil's stock labile carbon. However, low percentage of these acids reduced their full effect on dry matter production. The availability of nitrate was not statistically different for all treatments. Low soil pH could have reduced nitrification processes and simultaneously soil NO_3^- content. Conclusion: Liquid form of humic and/or fulvic acids could play an important role in enhancing urea efficiency. However, their contribution needs to be studied in detail in relation to humic molecules characteristics. This study had a potential in the development of liquid and foliar organic fertilizers. © 2009 Science Publications.