

Improving lowland rice (*O. sativa* L. cv. MR219) plant growth variables, nutrients uptake, and nutrients recovery using crude humic substances

Abstract

High cation exchange capacity and organic matter content of crude humic substances from compost could be exploited to reduce ammonia loss from urea and to as well improve rice growth and soil chemical properties for efficient nutrients utilization in lowland rice cultivation. Close-dynamic air flow system was used to determine the effects of crude humic substances on ammonia volatilization. A pot experiment was conducted to determine the effects of crude humic substances on rice plant growth, nutrients uptake, nutrients recovery, and soil chemical properties using an acid soil mixed with three rates of crude humic substances (20, 40, and 60 g pot⁻¹). Standard procedures were used to evaluate rice plant dry matter production, nutrients uptake, nutrients recovery, and soil chemical properties. Application of crude humic substances increased ammonia volatilization. However, the lowest rate of crude humic substances (20 g pot⁻¹) significantly improved total dry matter, nutrients uptake, nutrients recovery, and soil nutrients availability compared with crude humic substances (40 and 60 g pot⁻¹) and the normal fertilization. Apart from improving growth of rice plants, crude humic substances can be used to ameliorate acid soils in rice cultivation. The findings of this study are being validated in our ongoing field trials. © 2015 Perumal Palanivell et al.