



Influence of metalaxyl- and mefenoxam-based fungicides on chemical and biochemical attributes of soil quality under field conditions in a southern humid forest zone of Cameroon

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Fungicides applied to soils have the potential to affect soil microbial activity. The quantity and frequency of metalaxyl application have escalated with the advent of metalaxyl-tolerant crops and is likely to remain so with regard to projections of higher cocoa production rates by 2010 in the main farming regions in Africa. The objective of this study was to investigate changes in the chemical and biochemical attributes of soil quality resulting from a single application of metalaxyl- and mefenoxam-based fungicides applied as formulated materials at the commercially recommended application rate under tropical rainforest field conditions. Selected chemical properties (pH, electrical conductivity and OC) were generally affected by the fungicide application. Significant effects ($P < 0.05$) were observed with wettable powder combined with copper (WPC) formulated mefenoxam (for all three parameters) and emulsifiable concentrate (EC) formulated metalaxyl (for pH and OC). Significant changes in pH and electrical conductivity values were also effected by WPC metalaxyl and EC mefenoxam application, respectively. Microbial activity indices (available P, available N and specific enzymatic systems) were more sensitive indicators of change. All products decreased available P levels in plots, with significant effects occurring after sixty days after application. Incorporation of the fungicides increased NH_4^+ -N levels in plots after seven days of application, with significant effects observed with metalaxyl-based fungicides.

These changes affected soil microbial activity as evidenced by significant effects on hydrolase activities. Of the enzyme activities studied, acid phosphatase and alkaline phosphatase activities were the most sensitive to all products. This sensitivity was more pronounced with regard to available P and the acid phosphatase activity. With the exception of the contents of available N and available P, all other parameters measured were sensitive to the type of formulation.

Key words: Formulations, metalaxyl, mefenoxam, enzyme activities, attributes of soil quality, humid tropical field conditions.