

Public Abstract

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Title:EFFECTS OF SELECTED SURFACTANTS ON NUTRIENT UPTAKE AND SOIL MICROBIAL COMMUNITY

Surfactants with solvent and wetting abilities are used in the formulation of herbicides to enhance spraying capabilities. These chemicals eventually enter into the soil and may disrupt different chemical, physical and biological processes. The aim of this study was to examine the effects on nutrient uptake in corn and soil microbial community due to application of surfactants at different rates, herbicides, and surfactant-herbicide combinations in silt loam and silty clay loam soils. Surfactants used were Activator 90, Agri-Dex and Thrust. Herbicides used were glyphosate, atrazine, and bentazon. Corn was planted in fertilized soils and moisture levels maintained. After seven weeks, plant foliage were ground and stored for elemental analyses with Inductively Coupled Plasma Emission Spectrophotometer (ICP). Soil samples were analyzed with Polymerase Chain Reaction (PCR-DGGE) and Phospholipid Fatty Acids analyses (PLFA) to assess microbial diversity.

The treatments did not greatly affect nutrient uptake by corn. Visual differences between both soils and among treatments were observed with DNA band expression, although few significant differences due to treatments were found. PLFA biomarkers were variably affected by soils and different treatments relative to control. In general treatments did not significantly affect plant nutrient uptake or microbial community, perhaps as a result of the onetime application of small quantities of chemicals. Differences between both soils reflected the overall contribution of soil texture, chemical and physical characteristics. Formulation additives should be considered when evaluating effects of pesticide applications on plant quality and soil biology.