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USING ARBUSCULAR MYCORRHIZAL FUNGI TO ENHANCE PLANT GROWTH IN MAIZE (*ZEA MAYS*) IN SOILS WITH HIGH CONCENTRATIONS OF ALUMINUM

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Abstract

Approximately 30% of the world's total land area consists of acid soils, and as much as 50% of the world's potentially arable lands are acidic. It is known that generally plants grown in acid soils due to Al solubility at low pH, have reduced root systems and exhibit a variety of nutrient-deficiency symptoms, with a consequent decrease in yield.

Among the mechanisms employed by crop plants that enable them to tolerate toxic levels of Al are those that exclude Al from the root apex and those that allow the plant to tolerate Al accumulation in the root and shoot. Maize is the main crop cultivated in Mexico, including the tropical areas, where the toxicity by aluminum reduces its yield. Although Al-tolerant genotypes from maize have been reported, this alternative does not work for all regions

Under natural conditions, 80% of plants are colonized as symbiotic associations with arbuscular mycorrhizal fungi (AMF), which are found in most plant systems and climates. In addition to improving the nutrition of plants, it has been observed that there are variable effects of AMF in the interaction of plants with metals. A range of factors including the inherent properties of the fungus, the ability to capture the heavy metal by plants are characteristics that may influence the uptake of metal in the soil by mycorrhizal plants. This paper evaluates the effect of three types of AMF inocula to confer tolerance to maize plants grown in soil supplemented with aluminum.

We used three different mycorrhizal inocula: 1) Native population (obtained of soils with high concentrations of soluble aluminum, 2) *Acaulospora delicata*, 3) *Gigaspora gigantea*. The aluminum concentrations used were 0, 50 and 100 ppm. The seeds of the variety NB9, were germinated and grown in special pots of PVC under greenhouse conditions.

It was observed that only the native inoculum provided a significant increase in dry weight of root and stem, increasing the plant biomass by 20% compared to the control without AMF. Although the native micelia growth was only 50-90% compared to the *A. delicata* and *G. gigantea*, the effect on the plant growth was higher. The results show that the AMF can serve to increase the tolerance of maize plants to aluminum, when adequate inocula are used, particularly by fungal populations derived from acid soils.