



Can corn plants inoculated with arbuscular mycorrhiza fungi affect soil clay assemblage?

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Plants can extract K from exchangeable and non-exchangeable sites in the soil clay mineral structures. The latter, known as fixed K, is usually seen as an illite layer, i.e. an anhydrous K layer that forms a 1.0 nm structural layer unit as seen by X-ray diffraction. Nutrient availability can be enhanced in the root zone by arbuscular mycorrhiza fungi. In this study, the effects of non-inoculated and *Glomus intraradices* inoculated corn plant growth under different experimental conditions on soil K-bearing clay minerals were identified. The soil, a Vertic Xerothalic, was planted in corn in a 2008-2010 randomized field experiment. Bulk and rhizosphere soil sampling was carried out from May to September 2010 from fertilized plots (N200P90K160 and N200P0K160) with and without plants. According to XRD analysis, three major K-bearing minerals were present in soil: smectite-rich mixed layer mineral, illite-rich mixed layer mineral and illite. Results at 40DAS indicate extraction of K from clay minerals by plant uptake, whereas at 130DAS much of the nutrient seems to be returned to the soil. There is an apparent difference between bulk and rhizosphere clays. The XRD patterns are not unequivocally affected by *Glomus* inoculation. There are observable changes in clay mineralogy in fallow unfertilized compared with fertilized soil. In the studied soil, the illite rich mixed-layer minerals seem to be the source of K absorbed by plants, while illite acts as sink of K released from the plant-microorganisms system at the end of the growing season and as source for the following crop.