Abstract

The role of nitrogen forms on solubilisation and utilisation of rock phosphate was investigated on tomato (*Lycopersicon esculentum*) crops grown in minirhizotrons to assess root-induced chemical changes in the rhizosphere. Two tomato cultivars Cal-J and Moneymaker were supplied with rock phosphate as P source, ammonium (plus DIDIN-nitrification inhibitor) and nitrate as Nforms.NH4+ treatment significantly reduced rhizosphere pH while nitrate led to alkanization. Shoot P content increased with declining rhizosphere pH due to rock phosphate solubilisation. P nutrition was sufficient for NH4-N (intense rhizosphere acidification)
but critical under NO3- supply. Shoot Ca contents were in the deficiency range under NH4+ supply, despite increased Ca availability due to rock phosphate solubilisation. Also Mg2+ and K+ uptake declined with decreasing rhizosphere pH. These findings suggest NH4
+ and H+ competition with cation uptake, limiting shoot growth. Acid soils low in Ca and Mg, NH4 + in combination with NO3- may improve rock phosphate utilisation