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 N forms. 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.