Use of ion chromatography for analysis of macro-nutrients in Mehlich 1 extracts of unfertilized forest soils

Joseph B. Fischer and James H. Miller. George W. Andrews Forestry Sciences Laboratory, USDA Forest Service, Southern Research Station, 520 DeVall Drive, Auburn, AL 36849-5418

Ion chromatography (IC) is evaluated as an alternative to atomic absorption (AA) and inductively-coupled plasma spectrometry (ICP) for analysis of potassium (K), magnesium (Mg) and calcium (Ca), and as an alternative to antimonyl molybdate colorimetry and ICP for analysis of phosphorous (P) macro-nutrients in Mehlich 1 extracts. Soils typical of pine forests in the southeastern United States were tested. IC correlates well with AA and ICP for K and Ca, but not for Mg, unless conditions are chosen that resolve Mg from manganese (Mn). IC does not correlate very well with colorimetry for P at extract levels below 2 mgKg⁻¹ or in extracts with high levels of dissolved organic matter complexes of aluminum (Al) and iron (Fe). ICP results for P exceed both IC and colorimetry by 3-5 mgKg-1 for all soils tested. The merits of IC relative to AA, ICP, and colorimetry for forest soil testing are discussed.

General Papers

Division of Agrochemicals
The 226th ACS National Meeting, New York, NY, September 7-11, 2003