

Usporedba AL i AA-EDTA metode ekstrakcije fosfora iz uzoraka tla

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Sažetak

Analiza biljkama prostupačnog fosfora obavezna je agrokemijska analiza tla za procjenu plodnosti tla, a u RH u upotrebi je najčešće AL metoda (ekstrakcija tla s amonij-laktat otopinom uz pH 3,75) koja se istovremeno koristi i za određivanje pristupačnog kalija. U pojedinim zemljama prisutna je AA-EDTA metoda (ekstrakcija tla s amonij-acetat-EDTA otopinom uz pH 4,6) koja se također istovremeno koristi za fosfor i kalij, ali i za ekstrakciju teških metala. S ciljem usporedbe ove dvije metode prikupljeno je ukupno 113 uzoraka tla s gnojidbenih i kalcizacijskih pokusa u RH, analizirani su pH, humus, AL-P₂O₅ i AA-EDTA-P₂O₅. Analizirana su tla podijeljena u dvije grupe prema kiselosti (78 kiselih i 35 karbonatnih uzoraka) i sadržaju humusa (59 uzoraka < 2% i 54 uzorka > 2% humusa). Prosječno je u svim uzorcima utvrđeno 166 mg kg⁻¹ AL-P₂O₅ i nešto manje (154) AA-EDTA-P₂O₅ uz vrlo značajnu korelaciju (r=0,85). Slična korelacija (r=0,84) utvrđena je analizom samo kiselih uzoraka, a u njima je utvrđena jednaka prosječna koncentracija P₂O₅ (150 mg kg⁻¹) ekstrakcijom s obje otopine (AL i AA-EDTA) uz značajnu varijabilnost rezultata. Međutim, analizom samo karbonatnih uzoraka tla, utvrđena je značajno veća korelacija (r=0,94) koncentracije fosfora ekstrahiranog s obje otopine, pri čemu je AL-ekstrakcija rezultirala značajno višim vrijednostima (202 mg kg⁻¹ P₂O₅) nego AA-EDTA-ekstrakcija (165 mg kg⁻¹ P₂O₅). Podjela uzoraka prema humoznosti također je rezultirala promjenama rezultata jer je u uzorcima manje humoznosti (<2% humusa) utvrđena podjednaka koncentracija P (129 i 131 mg kg⁻¹) uz niži koeficijent korelacije (r=0,69), a u uzorcima s više humusa (>2%) više je P ekstrahirano AL (207 mg kg⁻¹) nego AA-EDTA metodom (180 mg kg⁻¹) uz visok koeficijent korelacije (r=0,90).

Rezultati ukazuju na zaključak da se rezultati AA-EDTA metode mogu usporediti s rezultatima AL metode i stoga vrlo uspješno koristiti umjesto AL metode na svim tlima, a posebice na karbonatnim i humoznijim tlima.

Ključne riječi: fosfor, AL metoda, AA-EDTA metoda, pH tla, humoznost tla

Comparison of AL and AA-EDTA soil-P tests

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Abstract

Soil-P test is obligate chemical analyses for soil productivity estimation, and most frequent method in Croatia is AL method (soil extraction by ammonium-lactate solution at pH 3.75), simultaneously used as soil-K test. In some countries AA-EDTA method (soil extraction by ammonium-acetate-EDTA solution at pH 4.6) is used as soil-P and soil-K test, but simultaneously for heavy metals extractions too. With aim to compare these two soil tests, 113 soil samples were collected from field experiments focused in fertilization and liming. The soil pH, humus, AL-P₂O₅ and AA-EDTA-P₂O₅ were analyzed. All samples are grouped according to soil pH (78 acid and 35 calcareous samples) and humus content (59 samples < 2% and 54 samples > 2% humus).

Phosphorus content was in average 166 mg kg⁻¹ AL-P₂O₅ and lower (154) AA-EDTA-P₂O₅ with very significant correlation (r=0.85). Similar correlation (r=0.84) was estimated comparing results only in acid samples, and acid samples resulted in equal (150 mg kg⁻¹) P₂O₅ concentration by AL and AA-EDTA extraction. However, analyzing only calcareous samples, higher (r=0.94) correlation was achieved, and AL-extraction resulted in significantly higher results (202 mg kg⁻¹ P₂O₅) than AA-EDTA extraction (165 mg kg⁻¹ P₂O₅).

Samples grouped according to humus content also resulted in different average P concentrations, since in samples with lower (<2%) humus content equally P concentrations (129 i 131 mg kg⁻¹) were estimated with lower correlation (r=0.69) between two extraction methods, and in samples with higher (>2%) humus content more P were extracted by AL (207 mg kg⁻¹) than AA-EDTA method (180 mg kg⁻¹) with very high correlation coefficient (r=0.90).

The results lead to conclusion that AA-EDTA method is comparable to AL method and could be successfully used instead of AL method regardless to soil properties, but especially on calcareous soils and soils with higher humus content.

Key words: phosphorus, AL soil-P test, AA-EDTA soil-P test, soil pH, humus content