

Comparison of Soil Test Extractants for Determination of Available Soil Phosphorus

Authors : Violina Angelova, Stefan Krustev

Abstract : The aim of this work was to evaluate the effectiveness of different soil test extractants for the determination of available soil phosphorus in five internationally certified standard soils, sludge and clay (NCS DC 85104, NCS DC 85106, ISE 859, ISE 952, ISE 998). The certified samples were extracted with the following methods/extractants: CaCl₂, CaCl₂ and DTPA (CAT), double lactate (DL), ammonium lactate (AL), calcium acetate lactate (CAL), Olsen, Mehlich 3, Bray and Kurtz I, and Morgan, which are commonly used in soil testing laboratories. The phosphorus in soil extracts was measured colorimetrically using Spectroquant Pharo 100 spectrometer. The methods used in the study were evaluated according to the recovery of available phosphorus, facility of application and rapidity of performance. The relationships between methods are examined statistically. A good agreement of the results from different soil test was established for all certified samples. In general, the P values extracted by the nine extraction methods significantly correlated with each other. When grouping the soils according to pH, organic carbon content and clay content, weaker extraction methods showed analogous trends; also among the stronger extraction methods, common tendencies were found. Other factors influencing the extraction force of the different methods include soil: solution ratio, as well as the duration and power of shaking the samples. The mean extractable P in certified samples was found to be in the order of CaCl₂ < CAT < Morgan < Bray and Kurtz I < Olsen < CAL < DL < Mehlich 3 < AL. Although the nine methods extracted different amounts of P from the certified samples, values of P extracted by the different methods were strongly correlated among themselves. Acknowledgment: The financial support by the Bulgarian National Science Fund Projects DFNI H04/9 and DFNI H06/21 are greatly appreciated.

Keywords : available soil phosphorus, certified samples, determination, soil test extractants

Conference Title : ICAES 2019 : International Conference on Agriculture, Environment and Sustainability

Conference Location : Barcelona, Spain

Conference Dates : May 23-24, 2019