

# Determination of Exchangeable Cations in Soils with Different Physical-Chemical Properties

Mrs Moloud Rahman<sup>1</sup>, Dr Alla Marchuk<sup>1</sup>, Mrs Ying Can Zhu<sup>1</sup>, Dr John McLean Bennett<sup>1</sup>

<sup>1</sup>*National Centre For Engineering In Agriculture, The University Of Southern Queensland*

Accurate measurements of exchangeable cations are paramount in the assessment of soil cation exchange capacity (CEC), structural instability and nutrient exchange prediction. However, there is a long-standing concern about significant variations in the results obtained from different Australian soil testing laboratories for the same soil sample, with variations of up to 164% between measurements for Ca and Mg, 183% for Na, 65% for K and 62% for CEC, depending on the method used as Rengasamy and Churchman (1999) reported. This leads to errors in providing accurate information for management decisions.

Exchangeable cations and CEC were determined for seven soils with different pH, electrolyte concentrations, clay content and dispersibility and compared using eight different methods for cations exchange. Four of the analysed soils were supplied as a reference material by the Australasian Soil and Plant Analysis Council (ASPAC).

Our study shows significant differences in the results for CEC obtained for soils with 1) high ionic strength, with standard deviations of 16.69; 2) high pH and dispersibility, with standard deviations of 5.58; and, 3) high clay content, with standard deviations of 2.21, respectively.

Therefore, our conclusion is that the methods for exchangeable cation measurements need to be soil specific, and parameters such as soil pH, EC, clay content, dispersibility and soil type need to be considered before choosing the exchange method.