

**Comparison of extraction techniques for measuring
exchangeable cations in calcareous soils – accessory
publication containing the method conversion equations**

C. G. Pierce^A and S. Morris^B

A. Corresponding author; Department of Environment and Conservation (NSW), Analytical and Environmental Chemistry Section, PO Box 29, Lidcombe NSW 1825; Email:

piercec@epa.nsw.gov.au

B. Wollongbar Agricultural Institute, Bruxner Highway, Wollongbar NSW 2477, Australia.

Table 1. Factors for conversion between all pairs of methods for sodium. Values in parentheses are the mean absolute error in cmol(+)/kg.

A=	B=	C=	D=	E=	F=	G=	H=
-0.065+0.453B (0.076)							
-0.16+0.726C (0.067)	-0.211+1.603C (0.095)						
0.033+1.012D (0.092)	0.216+2.232D (0.131)	0.266+1.392D (0.078)					
-0.147+0.646E (0.083)	-0.181+1.426E (0.139)	0.019+0.889E (0.082)	-0.178+0.639E (0.077)				
0.017+0.796F (0.076)	0.181+1.756F (0.103)	0.244+1.095F (0.066)	-0.016+0.787F (0.058)	0.252+1.232F (0.105)			
-0.037+0.814G (0.087)	0.059+1.798G (0.219)	0.169+1.121G (0.101)	-0.071+0.806G (0.106)	0.167+1.262G (0.166)	-0.07+1.024G (0.124)		
-0.042+0.714H (0.064)	0.049+1.576H (0.161)	0.162+0.983H (0.063)	-0.076+0.706H (0.083)	0.16+1.106H (0.114)	-0.075+0.898H (0.087)	-0.006+0.877H (0.047)	
-0.064+0.526I (0.069)	B=0.001+1.161I (0.07)	0.132+0.724I (0.07)	-0.097+0.52I (0.066)	0.126+0.815I (0.104)	-0.102+0.661I (0.068)	-0.035+0.647I (0.13)	-0.031+0.737I (0.11)

Table 2. Factors for conversion between all pairs of methods for potassium. Values in parentheses are the mean absolute error in cmol(+)/kg.

A=	B=	C=	D=	E=	F=	G=	H=
-0.123+0.942B (0.054)							
-0.113+1.167C (0.058)	0.021+1.229C (0.042)						
-0.203+1.437D (0.086)	0.005+1.415D (0.075)	-0.007+1.145D (0.047)					
-0.042+0.962E (0.073)	0.108+1.001E (0.049)	0.07+0.816E (0.045)	0.06+0.719E (0.051)				
-0.274+1.434F	-0.14+1.5F	-0.142+1.234F	-0.126+1.086F	-0.286+1.543F			

(0.08)	(0.063)	(0.064)	(0.059)	(0.079)	(0.115+0.659G (0.043)		
-0.084+0.924G (0.056)	0.048+0.975G (0.043)	0.02+0.795G (0.043)	0.016+0.702G (0.038)	-0.076+0.988G (0.056)	0.115+0.659G (0.043)		
-0.128+0.92H (0.059)	-0.004+0.976H (0.049)	-0.022+0.796H (0.042)	-0.024+0.705H (0.046)	-0.127+0.988H (0.062)	0.084+0.657H (0.036)	-0.054+1.001H (0.042)	
-0.149+1.009I (0.054)	-0.022+1.066I (0.05)	-0.035+0.868I (0.028)	-0.035+0.768I (0.043)	-0.148+1.082I (0.063)	0.066+0.722I (0.046)	-0.073+1.094I (0.039)	0.02+1.094I (0.036)

Table 3. Factors for conversion between all pairs of methods for magnesium. Values in parentheses are the mean absolute error in cmol(+)/kg.

A=	B=	C=	D=	E=	F=	G=	H=
0.567+1.018B (0.664)							
-2.341+1.217C (0.601)	-2.873+1.197C (0.465)						
1.168+0.951D (0.641)	0.572+0.936D (0.536)	2.869+0.783D (0.497)					
-0.774+1.208E (0.737)	-1.312+1.187E (0.543)	1.294+0.992E (0.394)	-2.023+1.269E (0.601)				
-1.185+1.181F (0.705)	-1.775+1.165F (0.786)	0.885+0.976F (0.755)	-2.483+1.243F (0.636)	-0.402+0.983F (0.643)			
-1.054+1.045G (0.503)	-1.63+1.029G (0.495)	1.031+0.86G (0.407)	-2.357+1.1G (0.363)	-0.299+0.869G (0.516)	0.066+0.888G (0.546)		
-0.192+1.007H (0.391)	-0.773+0.991H (0.322)	1.745+0.829H (0.413)	-1.449+1.06H (0.527)	0.438+0.836H (0.39)	0.788+0.856H (0.613)	0.824+0.964H (0.414)	
-0.872+1.138I (0.55)	-1.437+1.12I (0.43)	1.19+0.937I (0.479)	-2.155+1.198I (0.432)	-0.124+0.945I (0.406)	0.195+0.969I (0.632)	0.179+1.089I (0.454)	-0.668+1.13I (0.321)

Table 4. Factors for conversion between all pairs of methods for calcium. Values in parentheses are the mean absolute error in cmol(+)/kg.

A=	B=	C=	D=	E=	F=	G=	H=
1.048+1.074B (0.73)							
-3.351+1.168C (0.694)	-4.192+1.092C (0.665)						

0.935+1.132D (0.927)	-0.091+1.053D (0.714)	3.687+0.969D (0.686)							
1.303+1.121E (0.953)	0.245+1.043E (0.647)	4.02+0.958E (0.715)	0.162+1E (0.845)						
-12.882+1.667F (1.59)	-14.227+1.616F (1.501)	-9.4+1.491F (1.438)	-12.448+1.485F (1.361)	-15.582+1.636F (1.718)					
-2.719+1.15G (0.551)	-3.655+1.078G (0.664)	0.468+0.988G (0.544)	-3.432+1.026G (0.519)	-3.944+1.044G (0.851)	4.547+0.768G (0.885)				
-1.461+1.097H (0.558)	-2.49+1.029H (0.664)	1.512+0.945H (0.677)	-2.333+0.98H (0.615)	-2.778+0.995H (0.844)	5.527+0.726H (0.852)	1.081+0.955H (0.365)			
-2.758+1.234I (0.749)	-3.567+1.15I (0.489)	0.516+1.057I (0.536)	-3.41+1.098I (0.69)	-3.815+1.111I (0.666)	4.295+0.837I (0.914)	0.013+1.071I (0.558)	-1.139+1.122I (0.617)		

Table 5. Factors for conversion between all pairs of methods for ECEC. Values in parentheses are the mean absolute error in cmol(+)/kg.

A=	B=	C=	D=	E=	F=	G=	H=
2.222+0.986B (1.007)							
-6.364+1.179C (1.237)	-8.731+1.197C (0.896)						
2.885+1.031D (1.497)	0.709+1.045D (1.089)	7.851+0.874D (1.052)					
0.087+1.133E (1.526)	-2.109+1.147E (1.004)	5.506+0.96E (0.949)	-2.745+1.1E (1.132)				
-14.164+1.449F (1.759)	-16.783+1.475F (1.823)	-7.005+1.24F (1.806)	-16.564+1.406F (1.79)	-12.987+1.291F (1.74)			
-2.842+1.062G (0.909)	-5.191+1.079G (0.786)	2.935+0.902G (0.79)	-5.681+1.033G (0.909)	-2.772+0.942G (1.129)	7.488+0.742G (1.047)		
-1.31+1.028H (0.802)	-3.634+1.044H (0.743)	4.225+0.874H (0.933)	-4.194+1.001H (0.956)	-1.378+0.912H (0.955)	8.547+0.718H (1.096)	1.438+0.968H (0.528)	
-3.041+1.13I (1.091)	-5.36+1.147I (0.707)	2.792+0.959I (0.778)	-5.841+1.098I (0.832)	-2.891+1.001I (0.901)	7.276+0.791I (1.228)	-0.165+1.063I (0.589)	-1.66+1.098I (0.695)