

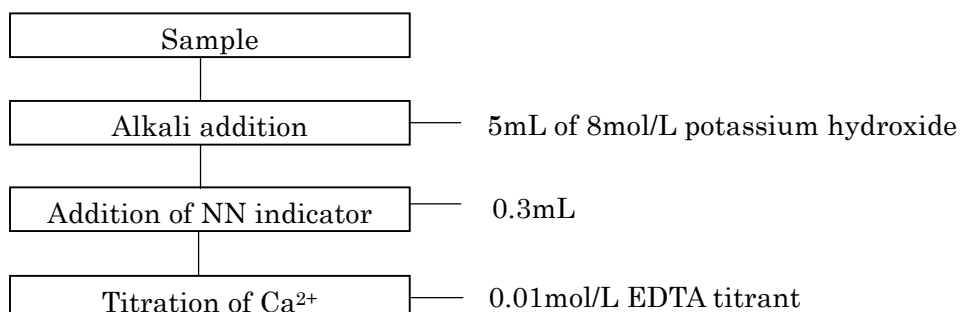
AQUACOUNTER Application Sheet	COM series	DATA No. B13	1st edition
Pharmaceuticals	Quantification of calcium and magnesium in dialytic fluid and transfusion		

1. Measurement outline

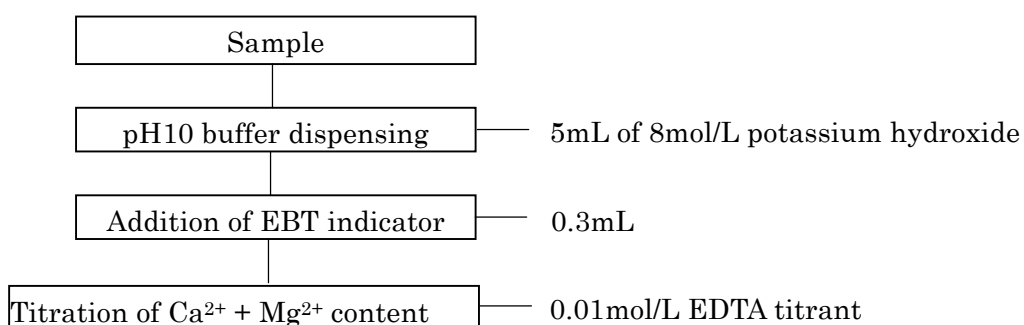
This section introduces an example of measurement in which calcium and magnesium in dialytic fluid and transfusion containing minerals, organic acids and saccharides were quantified by chelatometric titration.

An outline of measurement procedure is provided below:

Quantification of calcium



Quantification of calcium + magnesium



Magnesium concentration is calculated by subtracting the calcium concentration from the above two measurement results.

2. Reagents and Electrodes

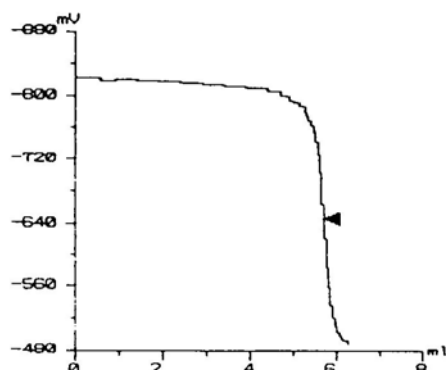
(1) Reagents	Titrant	0.01mol/L EDTA titrant
	Buffer	8mol/L Potassium hydroxide solution pH 10 Ammonia/ammonium chloride buffer
	Indicator	[EBT indicator] 0.3g EBT powder and 2g hydroxylamine hydrochloride are dissolved in 50mL methanol. [NN indicator] 0.5g NN powder is dissolved in 100mL 50% methanol solution.
(2) Electrodes	Photometric probe with 650nm filter	

3.Measurement conditions example (for COM-1600M w/Photometric unit)

Master File 1							
Condition 1 (for Ca ²⁺)				Condition 2 (Ca ²⁺ + Mg ²⁺)			
Method	AUTO			Method	AUTO		
Amp. No.	2			Amp. No.	2		
Buret No.	1	Mode No.	5	Buret No.	1	Mode No.	21
Meas Unit	mV	Pre Int	0 sec	Meas Unit	mV	Pre Int	1 sec
S-Timer	10 sec	Del K	5	S-Timer	10 sec	Del K	9
CP mL	0 mL	Del Sens	0 mV	CP mL	0 mL	Del Sens	0 mV
Direction	N/A	Int Time	3 sec	Direction	N/A	Int Time	1 sec
DP mL	0 mL	Int Sens	3 mV	DP mL	0 mL	Int Sens	5 mV
End Sens	300	Brt Speed	2	End Sens	300	Brt Speed	2
Over mL	0.5 mL	Pulse	40	Over mL	0.5 mL	Pulse	40
Max volume	20 mL			Max Volume	20 mL		
Unit	meq/L			Unit	meq/L		
Size	10.0g			Sixr	10.0g		
Blank	0 mL			Blank	BLANK result value		
Factor	Titer of the titrant			Factor	Titer of the titrant		
Molarity	0.01			Molarity	0.01 mol/L		
K	0			K	0		
L	0			L	0		
Formula	D×F×M×2/S×1000)			Formula	D×F×M×2/S×100·B		

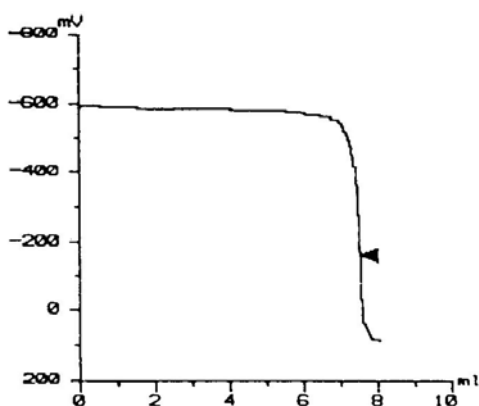
4. Measurement example

(1) Dialytic fluid



Measurement results on Ca^{2+} in dialytic fluid

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (mEq/L)
1	25	5.716	4.663
2	25	5.679	4.625
3	25	5.678	4.632
4	25	5.670	4.626
5	25	5.677	4.632
Avg.			4.636 mEq/L
Std. Dev.			0.016 mEq/L
C.V.			0.338 %

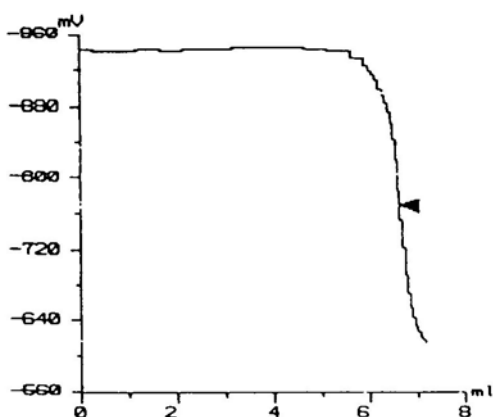


Measurement results on Mg^{2+} in dialytic fluid

Sample No.	Sample volume (mL)	Titration value (mL)*	Concentration (mEq/L)
1	25	7.508	1.462
2	25	7.502	1.488
3	25	7.500	1.487
4	25	7.499	1.492
5	25	7.503	1.490
Avg.			1.484 mEq/L
Std. Dev.			0.012 mEq/L
C.V.			0.831 %

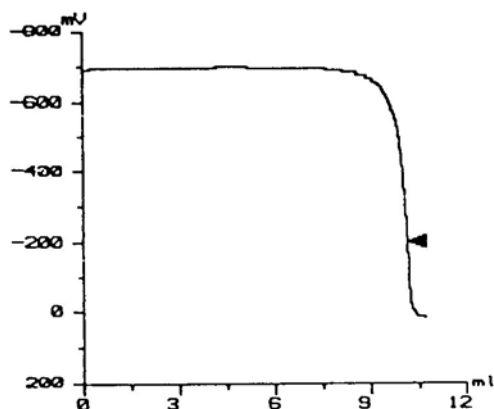
* Indicates the titration value for the total of $\text{Ca}^{2+} + \text{Mg}^{2+}$

(2) Transfusion



Measurement results on Ca^{2+} in transfusion

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (mEq/L)
1	10	6.627	13.52
2	10	6.625	13.51
3	10	6.629	13.52
4	10	6.628	13.52
5	10	6.627	13.52
Avg.			13.52 mEq/L
Std. Dev.			0.005 mEq/L
C.V.			0.03 %



Measurement results on Mg^{2+} in transfusion

Sample No.	Sample volume (mL)	Titration value (mL)*	Concentration (mEq/L)
1	10	10.133	7.114
2	10	10.132	7.116
3	10	10.136	7.116
4	10	10.141	7.128
5	10	10.138	7.124
Avg.			7.120 mEq/L
Std. Dev.			0.006 mEq/L
C.V.			0.085 %

* Indicates the titration value for the total of $Ca^{2+} + Mg^{2+}$

5. Outline

- (1) Calcium and magnesium in dialytic fluid and transfusion were quantified by chelatometric titration using the measurement unit for photometric titration and favorable measurement results were obtained with good precision.

Though inflection point detection (Auto) was used as the titration method in this experiment, it is measured using B intersection point detection (B Cros) in general.

- (2) It is possible to conduct all operations from sample dispensing to titration and electrode washing automatically using the fully automatic titration system ALT-200 when measuring multiple samples and to save the energy in quality-controlled analysis.

Key words

Medical product, chelatometric titration, dialytic fluid, transfusion, calcium, magnesium

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