a. Asociación del ligando auxiliar

Amoniaco $\log \beta = 9,37$

b. Disociación de los quelones

EDTA $pQ_{a1} = 1,99$; $pQ_{a2} = 2,68$; $pQ_{a3} = 6,11$; $pQ_{a4} = 10,17$

Calmagita $pQ_{Ind1} = 8,10$; $pQ_{Ind2} = 12,4$

Calcón $pQ_{Ind1} = 7,00$; $pQ_{Ind2} = 13,5$

c. Constantes de estabilidad de los diferentes complejos

Calcio	EDTA	$\log Q_{CaY} = 10,7$
	Amoniaco	$\log \beta_1 = -0,2$; $\log \beta_2 = -0,8$; $\log \beta_3 = -1,6$; $\log \beta_4 = -2,7$
	Calcón	$\log C_{aInd} = 5,3$
	Calmagita	$\log C_{aInd} = 6,1$
Magnesio	EDTA	$\log Q_{MgY} = 8,70$
	Amoniaco	$\log \beta_1 = 0,23$; $\log \beta_2 = 0,08$; $\log \beta_3 = -0,36$; $\log \beta_4 = -1,1$
	Calcón	$\log MgInd = 7,6$
	Calmagita	$\log MgInd = 8,10$

d. Constantes de estabilidad de los quelatos protonados

Calcio $Q_{CaHY} = 10^{3,1}$

Magnesio $Q_{MgHY} = 10^{3,9}$

Factores

FHY = 2,47

FLM Calcio = 1,41

Magnesio = 2,63

FMHY Calcio = 1,00

Magnesio = 1,00

FHInd Calcio = $10^{2,45}$

Magnesio = $10^{1,32}$

Constantes condicionales

$Q'_{CaY} = 10^{10,49}$; $Q_{MgY} = 10^{8,49}$

Cálculos dependientes del P.E

$[Ca^{2+}]_{P.E} = 2,96 \times 10^{-7} M \therefore pCa_{P.E} = 6,52$

$[Mg^{2+}]_{P.E} = 2,16 \times 10^{-6} M \therefore pMg_{P.E} = 5,66$

Cálculo de porcentaje de error

Magnesio

$$[Mg^{2+}]_{P.F} = \frac{F_{HInd}}{10^{Q_{MgInd}}} = \frac{10^{2,46}}{10^{8,7}} = 2,24 \times 10^{-6} M \therefore pMg_{P.F} = 5,65$$

$$\Delta pM = pMg_{P.F} - pMg_{P.E} = 5,65 - 5,66 = -0,01$$

$$\% Error = \frac{10^{\Delta pM} - 10^{-\Delta pM}}{\sqrt{Q'_{MY} \cdot C_{MY}}} \cdot 100 = \frac{10^{-0,01} - 10^{0,01}}{\sqrt{10^{8,69} \cdot 2,5 \times 10^{-3} M}} \cdot 100 = +0,22$$

Calcio

$$Q'_{MgY} = \frac{[MgY^{2-}] F_{MHY}}{[Mg^{2+}]_{P.F} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} \therefore [Y^{4-}] = \frac{[MgY^{2-}] F_{MHY}}{[Mg^{2+}]_{P.F} \cdot Q'_{MgY} \cdot F_{LM} \cdot F_{HY}} = 3,42 \times 10^{-7} M$$

$$Q'_{CaY} = \frac{[CaY^{2-}] F_{MHY}}{[Ca^{2+}]_{P.F} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} \therefore [Ca^{2+}]_{P.F} = \frac{[CaY^{2-}] F_{MHY}}{Q'_{CaY} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} = 4,17 \times 10^{-8} M$$

$$pCa_{PF} = \log\left(\frac{1}{[Ca^{2+}]_{P.F}}\right) = 7,34$$

$$\Delta pM = pCa_{P.F} - pCa_{P.E} = 7,34 - 6,52 = 0,82$$

$$\% Error = \frac{10^{\Delta pM} - 10^{-\Delta pM}}{\sqrt{Q'_{MY} \cdot C_{MY}}} \cdot 100 = \frac{10^{0,82} - 10^{-0,82}}{\sqrt{10^{10,69} \cdot 2,5 \times 10^{-3} M}} \cdot 100 = +0,07$$

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Amoniaco $\log \beta = 9,37$

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Magnesio = $10^{1,32}$

Constantes condicionales

$Q'_{CaY} = 10^{10,49}$; $Q_{MgY} = 10^{8,49}$

Cálculos dependientes del P.E

$[Ca^{2+}]_{PE} = 2,96 \times 10^{-7} M \therefore pCa_{PE} = 6,52$

$[Mg^{2+}]_{PE} = 2,16 \times 10^{-6} M \therefore pMg_{PE} = 5,66$

Cálculo de porcentaje de error

Magnesio

$$[Mg^{2+}]_{PF} = \frac{F_{HInd}}{10^{pMg_{Ind}}} = \frac{10^{2,45}}{10^{8,7}} = 2,24 \times 10^{-6} M \therefore pMg_{PF} = 5,65$$

$$\Delta pM = pMg_{PF} - pMg_{PE} = 5,65 - 5,66 = -0,01$$

$$\therefore Error = \frac{10^{\Delta pM} - 10^{-\Delta pM}}{\sqrt{Q'_{MY} \cdot C_{MY}}} \cdot 100 = \frac{10^{-0,01} - 10^{0,01}}{\sqrt{10^{8,49} \cdot 2,5 \times 10^{-3} M}} \cdot 100 = +0,22$$

Calcio

$$Q'_{MgY} = \frac{[MgY^{2-}]\, F_{MHY}}{[Mg^{2+}]_{PF} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} \quad \therefore [Y^{4-}] = \frac{[MgY^{2-}]\, F_{MHY}}{[Mg^{2+}]_{PF} \cdot Q'_{MgY} \cdot F_{LM} \cdot F_{HY}} = 3,42 \times 10^{-7} M$$

$$Q'_{CaY} = \frac{[CaY^{2-}]\, F_{MHY}}{[Ca^{2+}]_{PF} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} \quad \therefore [Ca^{2+}]_{PF} = \frac{[CaY^{2-}] F_{MHY}}{Q'_{CaY} \cdot [Y^{4-}] \cdot F_{LM} \cdot F_{HY}} = 4,17 \times 10^{-8} M$$

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