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Supplementary material

Copper and lead internalisation by freshwater microalgae at different carbonate concentrations

Paula Sánchez-Marín,[A] *Claude Fortin* [A] *and Peter G. C. Campbell*[A,B]

[A]Institut National de la Recherche Scientifique, Centre Eau Terre Environnement, 490 de la Couronne, Québec, QC, G1K 9A9, Canada.

[B]Corresponding author. Email: peter.campbell@ete.inrs.ca

Table S1. Measured total Pb (Pb_T) and dissolved inorganic carbon (DIC) concentrations in the exposure solutions with added DIC used in the algae uptake experiments and calculated $Pb^{2+}$and Pb-carbonate species concentrations (mol L^{-1}) (pH 7; I = 7 mM)

Given that the formation of $PbHCO_3^+$ complexes was not considered in our calculations, it is possible that the log K values used for the Pb-CO_3 complexes are overestimates of the true values. Therefore, although we cannot conclude that the constants given by Bayen et al.[1] and used in the present paper to calculate Pb speciation are the 'correct' ones, we can conclude that they are valid for the calculation of Pb^{2+} concentrations under our conditions (based on the agreement with the ISE measurements). 'n.c.', not considered

Pb_T	DIC	Pb^{2+}	$PbCO_3$	$Pb(CO_3)_2^{2-}$	$PbHCO_3^+$
7.10×10^{-8}	1.1×10^{-4}	4.73×10^{-8}	1.18×10^{-8}	1.03×10^{-13}	n.c.
1.01×10^{-7}	3.1×10^{-4}	4.78×10^{-8}	4.01×10^{-8}	1.17×10^{-12}	n.c.
1.03×10^{-7}	5.2×10^{-4}	3.72×10^{-8}	5.53×10^{-8}	2.87×10^{-12}	n.c.
1.04×10^{-7}	1.0×10^{-3}	2.21×10^{-8}	7.53×10^{-8}	8.97×10^{-12}	n.c.
1.03×10^{-7}	2.1×10^{-3}	1.18×10^{-8}	8.76×10^{-8}	2.28×10^{-11}	n.c.
1.07×10^{-7}	3.2×10^{-3}	9.13×10^{-9}	9.53×10^{-8}	3.49×10^{-11}	n.c.
4.84×10^{-7}	2.8×10^{-4}	2.43×10^{-7}	1.76×10^{-7}	4.46×10^{-12}	n.c.
4.71×10^{-7}	4.8×10^{-4}	1.61×10^{-7}	2.60×10^{-7}	1.46×10^{-11}	n.c.
4.86×10^{-7}	9.8×10^{-4}	1.04×10^{-7}	3.60×10^{-7}	4.37×10^{-11}	n.c.
4.89×10^{-7}	2.0×10^{-3}	5.60×10^{-8}	4.15×10^{-7}	1.07×10^{-10}	n.c.
4.77×10^{-7}	3.0×10^{-3}	3.51×10^{-8}	4.30×10^{-7}	1.84×10^{-10}	n.c.
4.66×10^{-7}	3.9×10^{-3}	4.94×10^{-8}	4.04×10^{-7}	1.16×10^{-10}	n.c.

Table S2. Measured total Cu (Cu_T) and dissolved inorganic carbon (DIC) concentrations in the exposure solutions with added DIC used in the algae uptake experiments and calculated $Cu^{2+}$and Cu-carbonate species concentrations (mol L^{-1}) (pH 7; I = 7 mM)

Cu_T	DIC	Cu^{2+}	$CuCO_3$	$Cu(CO_3)_2^{2-}$	$CuHCO_3^+$
7.05×10^{-8}	4.71×10^{-4}	3.17×10^{-8}	2.56×10^{-8}	1.85×10^{-11}	5.68×10^{-10}
7.69×10^{-8}	1.02×10^{-3}	2.25×10^{-8}	4.37×10^{-8}	7.60×10^{-11}	8.84×10^{-10}
4.53×10^{-7}	1.03×10^{-3}	1.44×10^{-7}	2.47×10^{-7}	3.64×10^{-10}	5.72×10^{-9}
5.17×10^{-7}	3.16×10^{-3}	6.83×10^{-8}	4.09×10^{-7}	2.21×10^{-9}	8.29×10^{-9}

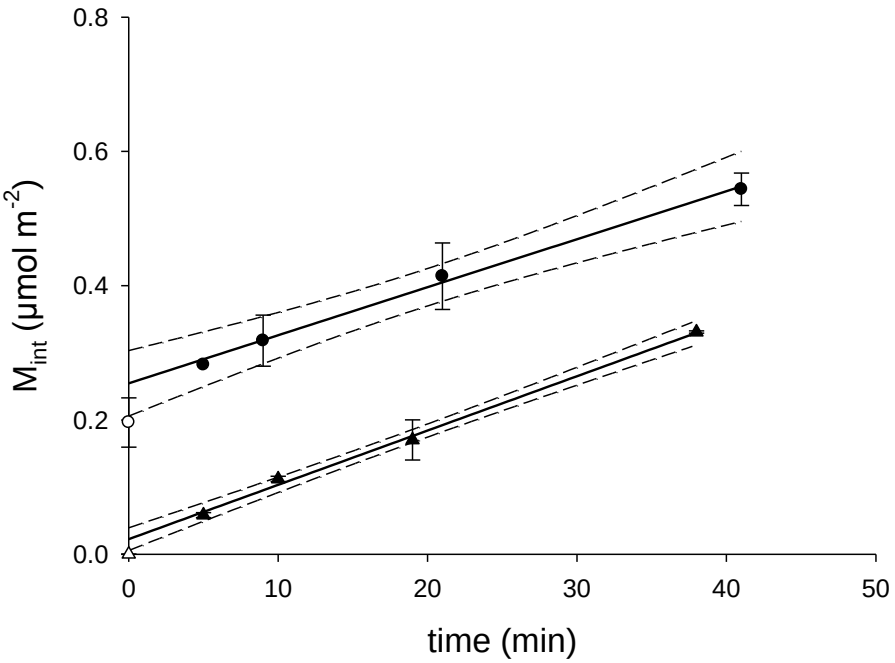

Fig. S1. Time-course of Cu (black circles) and Pb (black triangles) internalization by *Chlamydomonas reinhardtii* exposed to 77 nM Cu^{2+} or 60 nM Pb^{2+} in simplified MHSM (pH 7; I = 7 mM). Means ± s.d. (*n* = 3) are represented. White symbols represent the initial Cu or Pb present in the cells before exposure (*n* = 6). Linear regressions fitted to the metal exposed-cells data with their ± 95% CI are represented.

References

[1] S. Bayen, P. Gunkel-Grillon, I. Worms, M. Martin, J. Buffle, Influence of inorganic complexes on the transport of trace metals through permeation liquid membrane. *Anal. Chim. Acta* **2009**, *646*, 104. [Erratum in *Anal. Chim. Acta.* **2012**, *713*, 145]. doi:10.1016/j.aca.2009.04.040