

## Supporting information

# Transfer of cobalt nanoparticles in simplified food web: from algae to zooplankton to fish

Nanxuan Mei,<sup>a</sup> Jonas Hedberg,<sup>a</sup> Mikael Ekvall,<sup>b,c</sup> Egle Kelpsiene,<sup>c</sup> Lars-Anders Hansson,<sup>b</sup> Tommy Cedervall,<sup>c</sup> Eva Blomberg,<sup>a,d,\*</sup> Inger Odnevall <sup>a,e,f,\*</sup>

<sup>a</sup> KTH Royal Institute of Technology, School of Engineering Sciences in Chemistry, Biotechnology and Health, Department of Chemistry, Div. Surface and Corrosion Science, Drottning Kristinas väg 51, SE-100 44 Stockholm, Sweden.

<sup>b</sup> Aquatic Ecology, Department of Biology, Ecology Building, Lund University, SE-223 62 Lund, Sweden

<sup>c</sup> Center for Molecular Protein Science, Department of Biochemistry and Structural Biology, Lund University, P.O. Box 118, SE-221 00 Lund, Sweden

<sup>d</sup> RISE Research Institutes of Sweden, Division Bioeconomy and Health, Material and Surface Design, Stockholm, Sweden

<sup>e</sup> AIMES - Center for the Advancement of Integrated Medical and Engineering Sciences at Karolinska Institutet and KTH Royal Institute of Technology, Stockholm, Sweden

<sup>f</sup> Karolinska Institutet, Department of Neuroscience, SE-171 77, Stockholm, Sweden

\* Corresponding author, email: EB ([blev@kth.se](mailto:blev@kth.se)), IO ([ingero@kth.se](mailto:ingero@kth.se))

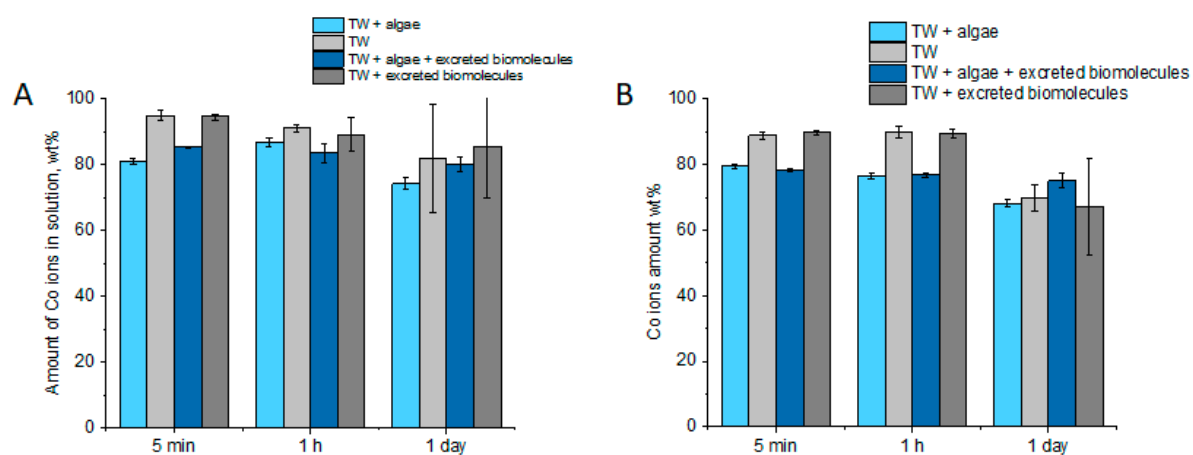
**Table S1.** Composition of tap water (TW) used in this study [1].

	Unit	Mean value
Conductivity	mS/m	19
Alkalinity, $\text{HCO}_3^-$	mg/L	50*
Ammonium, $\text{NH}_4^+$	mg/L	<0.01
Nitrite, $\text{NO}_2^-$	mg/L	<0.004
Nitrate, $\text{NO}_3^-$	mg/L	0.5
Fluoride, $\text{F}^-$	mg/L	0.11*
Chloride, $\text{Cl}^-$	mg/L	26*
Sulphate, $\text{SO}_4^{2+}$	mg/L	5.4
Phosphor as phosphate, $\text{P-PO}_4^{2-}$	mg/L	<0.005
Total organic carbon	mg/L	2.3*
Iron, Fe	mg/L	0.02
Manganese, Mn	mg/L	<0.01
Calcium, Ca	mg/L	24
Magnesium, Mg	mg/L	1.5
Copper, Cu	mg/L	0.02
Sodium, Na	mg/L	11
Potassium, K	mg/L	1.1

\* Indicates annual average value

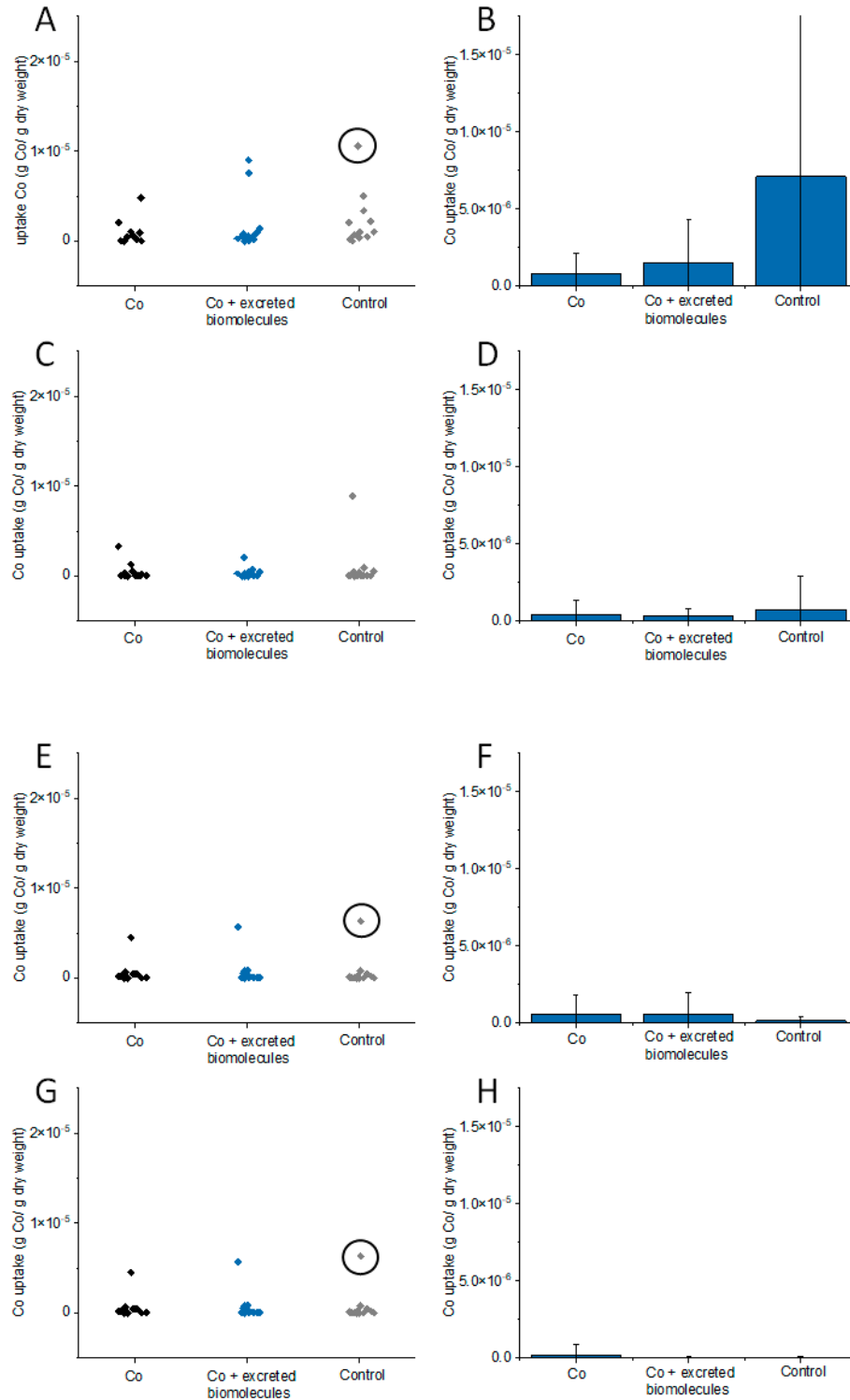
**Table S2.** Changes in scattered light intensity (kcounts/s) with time for Co NP TW suspensions containing algae and algae + excreted biomolecules.

	Co NPs in TW + algae	Co NPs in TW + algae + excreted biomolecules
5 min	110.3 ± 62.1	281.6 ± 123.0
1 h	1.3 ± 0.12	1.1 ± 0.15
+24 h	3.0 ± 2.0	4.2 ± 4.0



**Figure S1** A: Amount of Co ions (wt%) remaining in solution after 5 min, 1 h, and 1 day after removing algae from the solution (via centrifugation) for two different Co-ion loadings:

**A:** 44; and **B:** 440 µg/L Co. The error bars represent the standard deviation of three individual replicates.



**Figure S2.** Co uptake in fish organs, calculated as g Co per g dry body organ weight. A: Co uptake in fish blood serum for all samples; B: mean values of the Co uptake in fish blood serum; C: Co uptake in fish blood cells for all samples; D: mean values of the Co uptake in fish blood cells; E: Co uptake in the fish brain for all samples; F: mean values of the Co uptake in the fish brain; G: Co uptake in fish muscle for all samples; and H: mean values of the Co uptake in fish muscle. The error bars reflect the value of one standard deviation. The point marked with a circle is the outlier checked by the Grubbs test [2]. This value was removed when calculating the mean values.

## References

1. [https://www.vasyd.se/-/media/Documents/Vattenrapporter/juli2017-juni2018/Lund-Bolmen-juli17-juni18\\_hemsidan.pdf](https://www.vasyd.se/-/media/Documents/Vattenrapporter/juli2017-juni2018/Lund-Bolmen-juli17-juni18_hemsidan.pdf).
2. Miller, J. and J.C. Miller, *Statistics and chemometrics for analytical chemistry*. 2018: Pearson education.