Supporting Information for

Influence of nitrogen limitation on the bioaccumulation kinetics of hematite nanoparticles in the freshwater alga *Euglena intermedia*

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8 pages, including 3 Tables and 4 Figures

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Table S1 Chemical components and their concentrations in HUT.

Components	Final concentration (mg L^{-1})	Components	Final concentration (mg L^{-1})
proteose peptone	600	CH_3COONa	400
yeast extract	400	potassium citrate	40
KH_2PO_4	20	Vitamin B_1	0.0004
$MgSO_4 \cdot 7H_2O$	25	Vitamin B_{12}	0.0005

Table S2 Chemical components and their concentrations in AF-6.

Components	Final concentration (mg L^{-1})	Components	Final concentration (mg L^{-1})
NH_4NO_3	198.1	Na_2EDTA	0.75
$CaCl_2 \cdot 2H_2O$	147	$FeCl_3 \cdot 6H_2O$	0.097
$MgSO_4 \cdot 7H_2O$	246.7	$MnCl_2 \cdot 4H_2O$	0.041
KH_2PO_4	34	$ZnCl_2 \cdot 7H_2O$	0.005
$CaCO_3$	10	$Na_2MoO_4 \cdot 2H_2O$	0.004
Citric acid	2	$CoCl_2 \cdot 6H_2O$	0.002
Fe-citrate	2		

Table S3 Full names of the abbreviations used throughout the text.

Abbreviation	Full name
HemNPs	polyacrylate-coated hematite (α-Fe_2O_3) nanoparticles
QDs	quantum dots
-N	nitrogen-depleted
NE	nutrient-enriched
TEM	transmission electron microscopy
DLS	dynamic light scattering particle sizer
RCF	relative centrifugal force
$[HemNPs]_{cell}$	HemNP concentration in the cells (pg-Fe μm^{-3})
$[HemNPs]_{med}$	HemNP concentration in the experimental medium (mg-Fe L^{-1})
$[HemNPs]_{ads}$	cell-surface-adsorbed concentration of HemNPs (pg-Fe μm^{-3})
$[HemNPs]_{intra}$	intracellular concentration of HemNPs (pg-Fe μm^{-3})
k_u	uptake rate constant of HemNPs (L μm^{-3} h^{-1})
k_e	efflux rate constant of HemNPs (h^{-1})
μ	cell-specific growth rate (h^{-1})
F_v/F_m	maximum photosynthetic system II quantum yield
Water-PAM	Water Pulse Amplitude Modulated Fluorometer
GF/F membrane	glass fiber/fine membrane
SSC	side scatter
$[PS]_{surf}$	amount of polysaccharide attached on the cell surface (fg-$Xanthan_{eq}$ μm^{-3})
$[CHO]_{cell}$	cellular carbohydrate concentration (μmol μm^{-3})
$[PS]_{dis}$	amount of polysaccharides released into the culture medium (μM)
ANOVA	analysis of variance
EDX	energy dispersive X-ray spectrometry

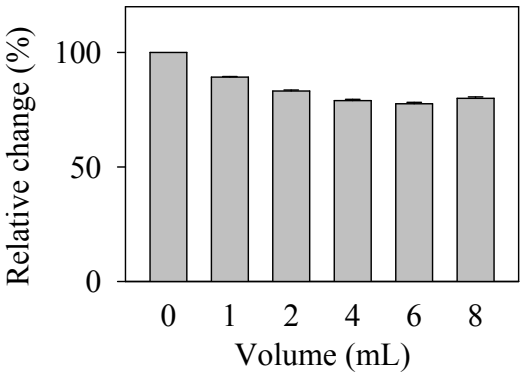

Fig. S1 Relative change of the cellular HemNP concentration ($[HemNPs]_{cell}$) with increasing volume of rinsing solution (i.e., AF-6).

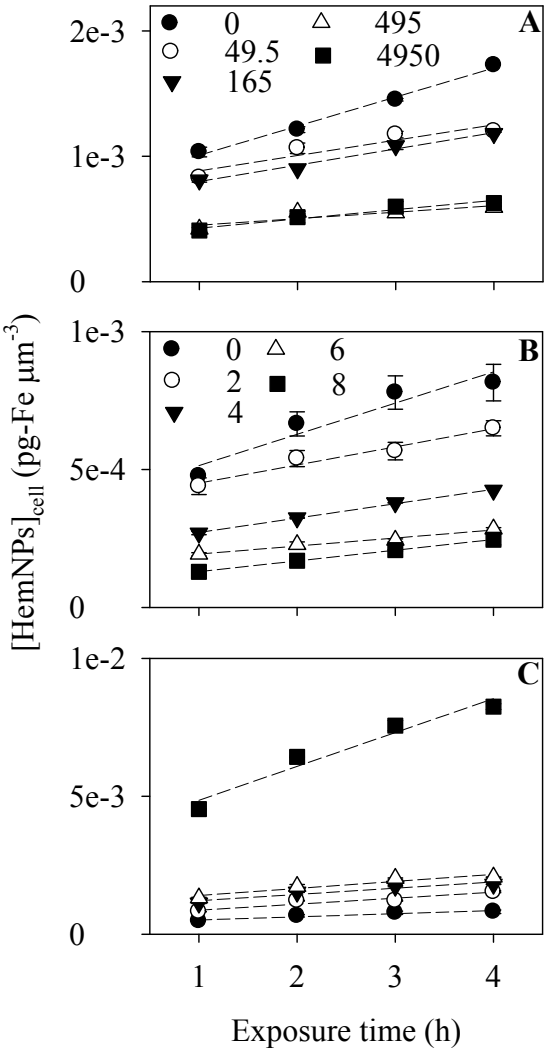

Fig. S2 The increase in the cellular HemNP concentration ($[HemNPs]_{cell}$) with increasing exposure time in *Euglena intermedia* pre-cultured (A) in the experimental medium with different concentrations of nitrogen (0, 49.5, 165, 495, and 4950 μM) for 2 days as well as in (B) the nutrient-enriched and (C) nitrogen-depleted media for 0, 2, 4, 6, and 8 days before the 4-h uptake experiment. Dashed lines are the linear regression between $[HemNPs]_{cell}$ and exposure time. The data are reported as the mean ± standard deviation (n = 3).

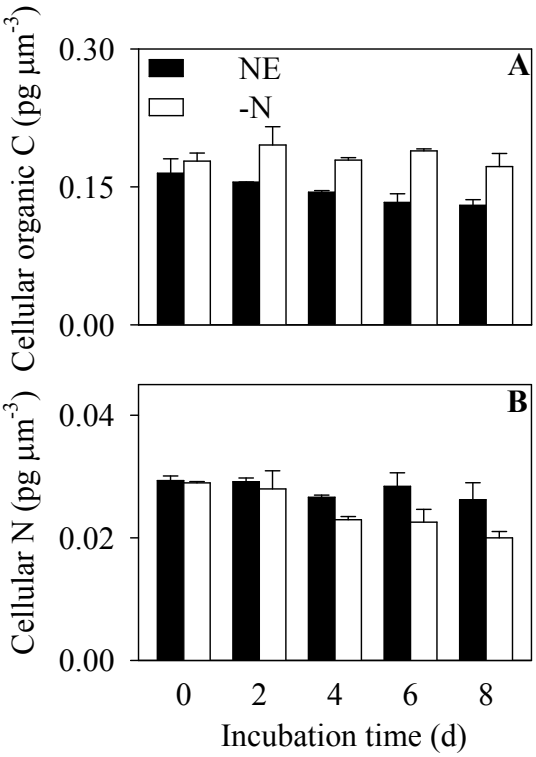

Fig. S3 The cellular (A) organic carbon and (B) nitrogen concentrations in *Euglena intermedia* pre-cultured in the nutrient-enriched (NE) and nitrogen-depleted (-N) media for 0, 2, 4, 6, and 8 days. The data are reported as the mean ± standard deviation (n = 3).

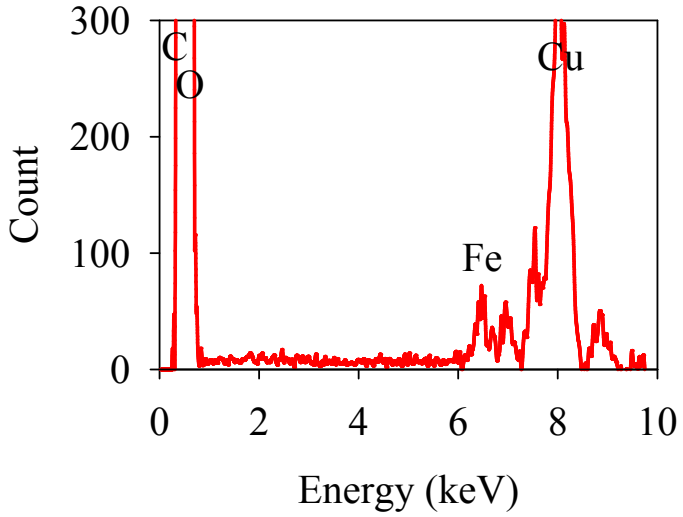

Fig. S4 Representative elemental composition of the arrowed spots in the TEM images of Fig. 2B and C, as investigated by energy dispersive X-ray (EDX) spectrometry.