

Supplementary Information

Impact of CeO₂ nanoparticles on the functions of freshwater ecosystems: a microcosm study.

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Transmission Electron Microscopy observation of nanoparticles

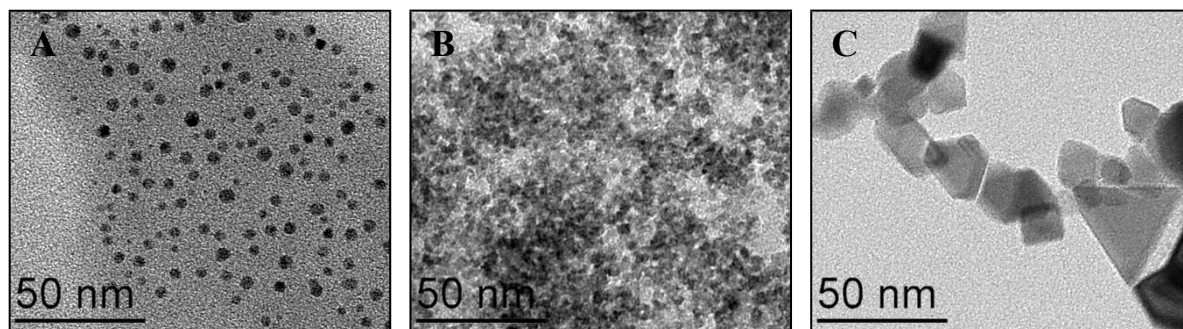


Figure S1: TEM observation in stock suspensions of (A) NP1, (B) NP2 and (C) NP3.

NP1 are small (2 – 5 nm), spherical, citrate-coated CeO₂ NPs.

NP2 are small (2 – 5 nm), spherical, non-coated CeO₂ NPs.

NP3 are large (20 – 60 nm), non-coated CeO₂ NPs plates.

Oxygen rate, pH and conductivity in microcosms

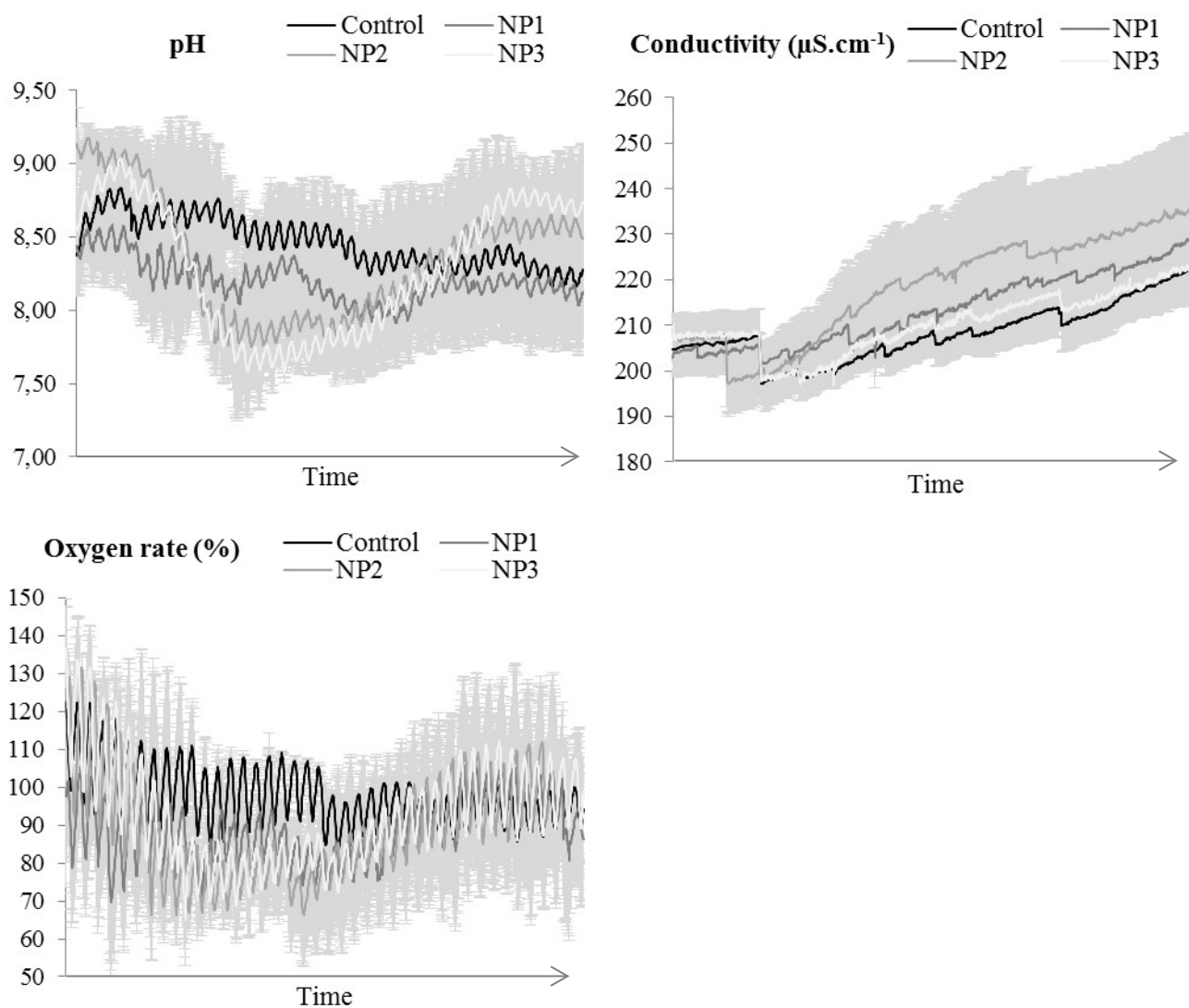


Figure S2: Variation curves of pH, oxygen rate and conductivity during microcosm experiment (mean values). Light gray zones show the standard error values.

Chironomid larvae growth

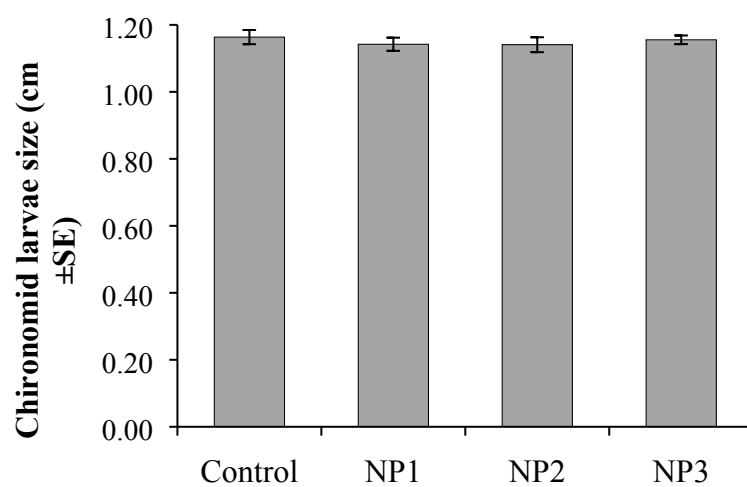


Figure S3: Chironomid larvae size at the end of the experiment.

Leaf litter decomposition

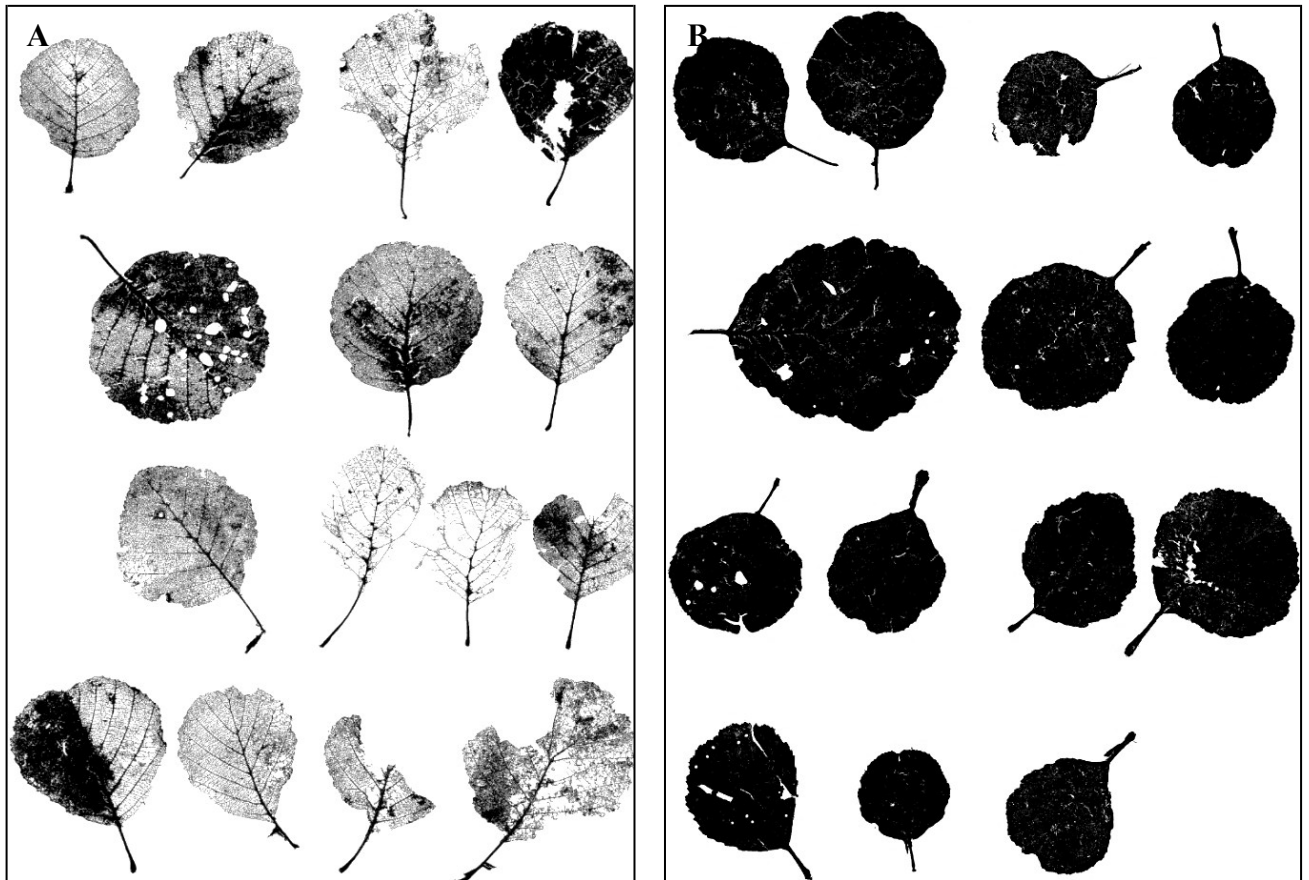


Figure S4: Alder leaves collected after six weeks of incubation in mesocosm, in presence (A) or absence (B) of chironomid larvae.

Microbial community diversity assessment

DNA extraction: DNA was extracted from filters with PowerSoil DNA isolation kit (MOBIO Laboratories, Carlsbad, CA), following producer's instructions. Universal primers 341F-GC and 907R^{1,2} were used for the partial amplification of rDNA 16S. PCR mix (100 µl) contained 6U of TaqPolymerase (5 PRIME, Hambourg, Germany), 10 µL of Taq 10x buffer, 200 µM of dNTP, 0.5 µM of primers and 50 ng of extracted DNA. PCR protocol consisted in 5 minutes of denaturation at 95°C; 20 cycles of 30s at 95°C, 30s at 65-55°C (touchdown -0,5°C per cycle), 35s at 72°C ; followed by 10 cycles of 30s at 95°C, 30s at 55°C and 35s at 72°C and final elongation of 7 minutes at 72°C.

DGGE analysis: PCR products were verified on agarose gel (1% w/v) and separated with the DCODE Mutation Detection System (Bio-Rad, Hercules, CA). PCR products migration was then realized on polyacrylamide gel (7% w/v) with TAE 1x buffer at 65V and 60°C for 16h. Gel was stained then marked with SYBR Green I and visualized with STARION FLA-9000 scanner (Fujifilm Life Sciences FSVT, Courbevoie, France). GelCompar II software was used to normalize and compare DGGE profiles. Bray-Curtis distance matrices were generated³. Data were analyzed and illustrated by non-metric multidimensional scaling (NMDS)^{4,5} and analyses of similarity (ANOSIM) were performed using PAST software⁶ to characterize differences between samples.

References

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