Dissolved organic matter composition regulates microbial degradation and carbon dioxide production in pristine subarctic rivers

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Table S1. Initial chemical characteristics of river water samples used in the incubation

	June 2018		**October 2018**	
	Brown-water river	**Clearwater river**	**Brown-water river**	**Clearwater river**
pH	6.9 ± 0.3	6.8 ± 0.4	7.5 ± 0.1	7.4 ± 0.1
$SUVA_{254}$ (l mg C^{-1} m^{-1})	5.5 ± 0.9	3.4 ± 1.6	2.6 ± 0.7	1.1 ± 0.7
DOC (µmol l^{-1})	375 ± 83	271 ± 105	486 ± 165	419 ± 188
TN (µmol l^{-1})	8.8 ± 4.1	5.4 ± 1.3	9.8 ± 1.6	7.9 ± 2.6
NO_3^- + NO_2^- (µmol l^{-1})	0.54 ± 0.84	0.36 ± 0.50	0.44 ± 0.73	0.31 ± 0.46
NH_4^+ (µmol l^{-1})	1.5 ± 0.8	1.0 ± 0.3	1.3 ± 0.4	1.2 ± 0.7

Table S2. 16S qPCR Mastermix

Mastermix	**x1**
Maxima SYBR-Green	12,50 µl
Forward primer (F338)	1,25 µl
Reverse primer (R518)	1,25 µl
NF H_2O	9 µl
Sample DNA	1 µl
Total	25 µl

Table S3. 16S qPCR protocol

Step	**T (°C)**	**time (min)**
1.	95	3
2.	95	0:35
3.	53	0:35
4.	72	0:25 + plate read
5.	Go to step 2.	x45
6.	72	1:00
7.	Melt curve 65-95	1:00 + plate read
8.	4	∞

Table S4. Spearman's rank correlations for the cumulative CO_2 production and the cumulative CO_2 production per DOC (CO_2/DOC ratio) with DOC and TN concentrations, $SUVA_{254}$, BDOC (%) and the number of m/z peaks in each compound group (FT-ICR MS data)

	Cumulative CO_2	Cumulative CO_2/DOC ratio
DOC concentration day 0	n.s	-0.47, p = 0.04
TN concentration day 0	n.s.	-0.47, p = 0.03
$SUVA_{254}$ day 0	0.56, p = 0.01	n.s.
BDOC (%)	n.s.	0.52, p = 0.02
Aliphatics day 0	n.s.	n.s.
HUPs day 0	n.s.	n.s.
Sugar-like day 0	n.s.	n.s.
Peptide-like day 0	0.42, p = 0.03	0.55, p = 0.01
Condensed aromatics day 0	n.s.	n.s.
Polyphenolics day 0	n.s.	n.s.
DOC concentration day 21	n.s.	n.s.
TN concentration day 21	0.58, p = 0.006	n.s.
$SUVA_{254}$ day 21	0.52, p = 0.02	n.s.
Aliphatics day 21	n.s.	n.s.
HUPs day 21	n.s.	n.s.
Sugar-like day 21	n.s.	n.s.
Peptide-like day 21	0.49, p = 0.02	0.69, p < 0.001
Condensed aromatics day 21	0.49, p = 0.02	n.s.
Polyphenolics day 21	n.s.	n.s.

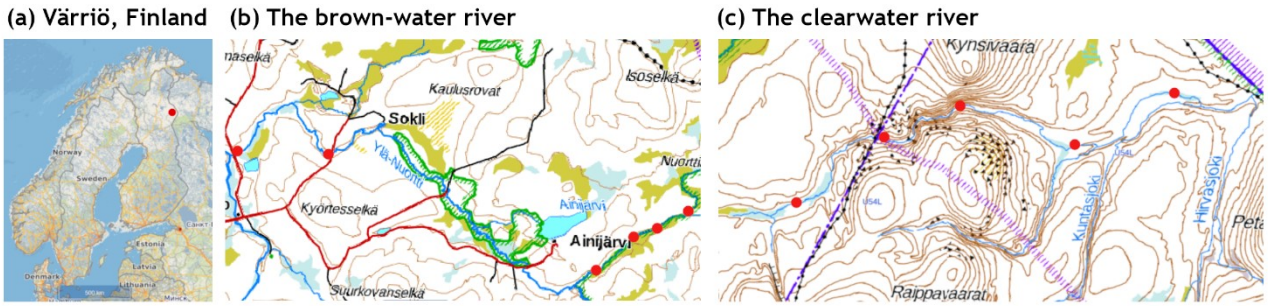

Fig. S1 (a) The study area in Värriö Strict Nature Reserve (67°44′16″N, 29°38′58″E) in Finnish Lapland, (b) Brown-water river (river Yli-Nuortti) and (c) Clearwater river (river Kotkakurunoja). Red dots represent the sampling locations. Map from National Land Survey of Finland, Paituli open access data base, open data CC-BY-4.0 license, available online: http://www.csc.fi/paituli.

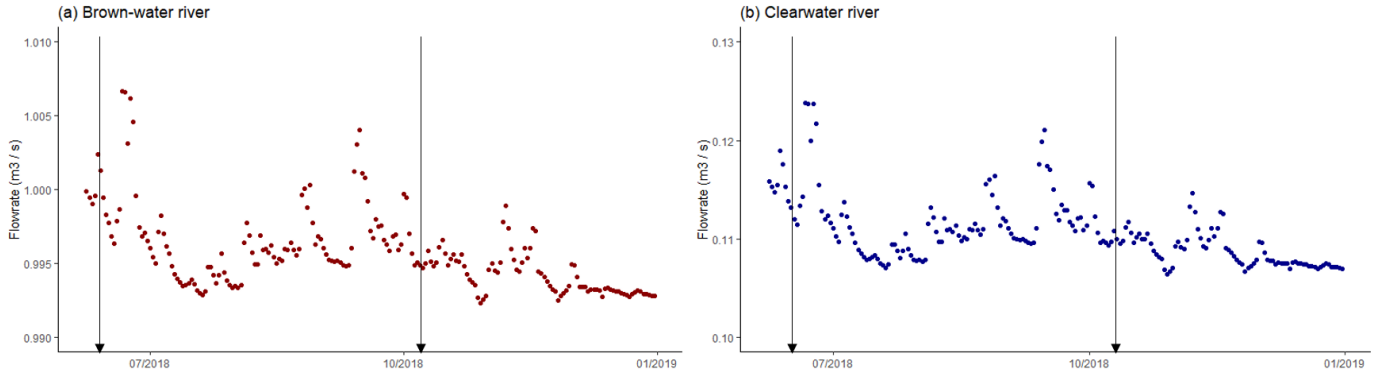

Fig. S2 Estimated water discharge in (a) brown-water and (b) clearwater river determined based on the continuous pressure sensor data and measurements of the flow rate, cross section and water depth in June and October 2018. Arrows represent the sampling occasions.

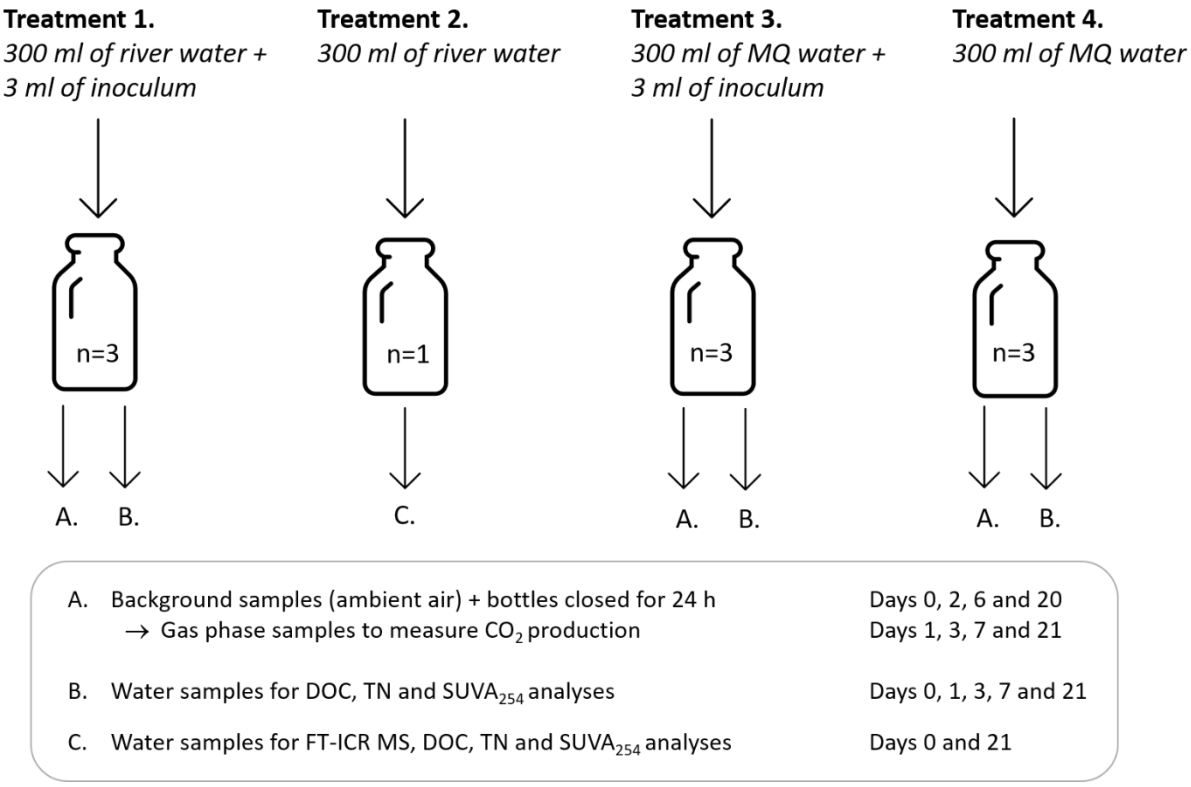

Fig. S3 Incubation set-up