Supplementary Information

Bioavailability of colloidal iron to heterotrophic bacteria in sediments, and effects on the mobility of colloid-associated metal(loid)s

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Supplementary Information (SI-1). Chemical characterization and grain size distribution of raw sediments before colloids extraction.

Table S1. Major and trace elements composition of Champsanglard (CHA) and L'Escourou (LSC) sediments.

	Al_2O_3	SiO_2	Fe_2O_3	CaO	K_2O	MgO	MnO	TiO_2	Zn	Cr	As	Pb	Ba	Cu	Ni	P	C	N
	%wt.	%wt.	%wt.	%wt.	%wt.	%wt.	%wt.	%wt.	ppm	ppm	ppm	ppm	ppm	ppm	ppm	wt.%	wt.%	wt.%
CHA	18.6	55.7	7.3	0.8	2.5	1.5	0.1	1.0	236	80	21	121	370	36	32	0.16	5.2	0.6
LSC	17.5	49.5	5.0	14.7	2.0	1.2	0.1	0.5	102	75	11	43	332	36	26	0.08	5.2	0.4

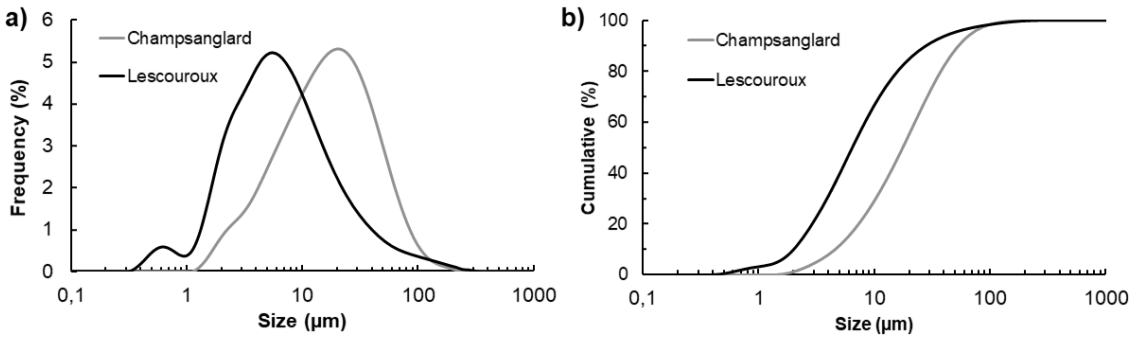

Figure S1: Grain size distribution of L'Escourou and Chamsanglard sediments. (**a**) Frequency/Size, (**b**) Cumulative/Size.

Table S2: Data for bulk sediments from Laser Diffraction measurements

Sample	D10 µm	D50 µm	D90 µm	Span	Clay %	Silt %	Sand %
Champsanglard	4.6	17.7	53.9	2.8	1.2	91.9	6.9
L'Escourou	2.0	6.5	28.3	4.0	9.8	86.7	3.5

L'Escourou sediment can be qualified as silt, while Champsanglard sediment is a sandy silt.

Supplementary Information (SI-2). Chemical "quality" of large colloids

Table S3: Chemical composition of the 0.2-1 µm size fraction of the colloids (*i.e.* large colloids) expressed in micrograms of metals by grams of dried (30°C) large colloids ($mg.g_{coll}^{-1}{}_{DW}$).

Large colloids	Al	Fe	Mn	Cr	As	Pb	C_{org}	N_{tot}	P_{tot}
	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$	$mg.g_{coll}^{-1}{}_{DW}$
CHA $_{0.2\text{-}1\ \mu m}$	69.4 ± 11.6	37.9 ± 3.5	-	0.046 ± 0.008	0.030 ± 0.001	0.114 ± 0.002	9.8 ± 6.5	3.82 ± 3.76	5.58 ± 1.24
LSC $_{0.2\text{-}1\ \mu m}$	64.1 ± 8.7	33.3 ± 4.4	0.22 ± 0.04	0.063 ± 0.008	0.018 ± 0.003	0.033 ± 0.005	20.2 ± 1.9	1.83 ± 0.64	12.23 ± 1.25

Supplementary Information (SI-3). Kinetics of carbohydrates consumption

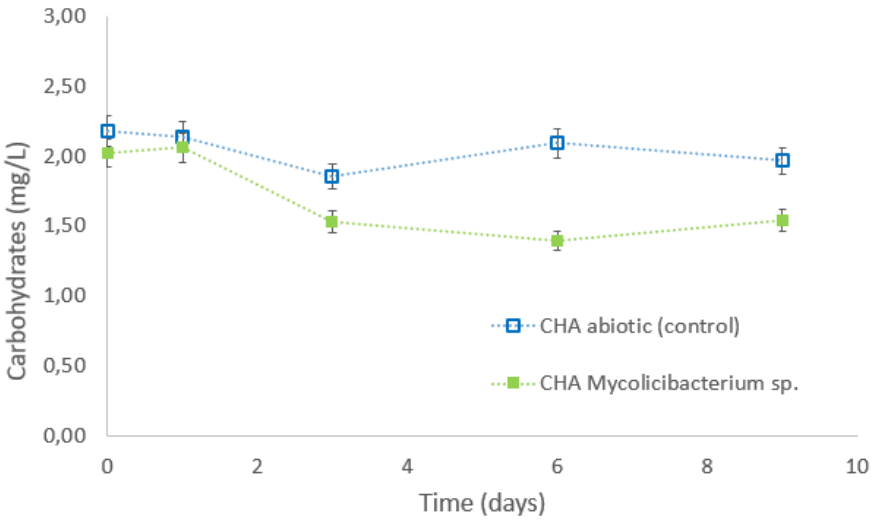

Figure S2: Evolution of carbohydrates concentration as a function of time for two conditions: bacteria with silica gel containing CHA-colloids in BHM (Test 3); and silica gel containing CHA-colloids under abiotic conditions in BHM* (Test 4, *i.e.* "control"). Results are reported here only for *Mycolicibacterium* sp. and Champsanglard colloids for clarity purpose. Error bars represent 1 SD. **BHM-modified Bushnell-Hass growth medium*, depleted with dissolved iron.