APPLIED MICROBIOLOGY AND BIOTECHNOLOGY

Supplementary Material

Selective elimination of bacterial faecal indicators in the *Schmutzdecke* of slow sand filtration columns

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Figure S1

Schematic drawing (**A**) and photograph (**B**) of the laboratory-scale slow sand filter columns. Dimensions are in cm; *a* = supernatant, *b* = sand bed, *c* and *d* = gravel beds.

Figure S2

Photograph of the *Schmutzdecke* of sand column C1 (**A**). CLSM micrographs of the top layer (**B**) and a representative section from about the middle (**C**) of the *Schmutzdecke*. Staining: bacterial biomass (Syto 9, green); EPS glycoconjugates (AAL-lectin, red); algae (autofluorescence of Chlorophyll a; blue); cyanobacteria (autofluorescence of phycobillins, pink); surface of mineral particles and silica skeletons of diatoms (reflection, white).

Figure S3

CLSM micrographs from the bottom zone of the *Schmutzdecke* (**A**), 5 cm sand (**B**), 10 cm sand (**C**), and 25 cm sand (**D**) of C1. Green: bacterial biomass (Syto 9); Red: EPS glycoconjugates (AAL-lectin); Blue: algae (autofluorescence of Chlorophyll, chlA); White: mineral surface (reflection); grid size = 50 µm for **A**-**C** and 42 µm for **D**.

Table S1. Diversity of bacterial 16S rRNA and microeukaryote 18S rRNA gene T-RFLP fingerprints over filter compartments in sand filter columns C1, C2, and C3.

Sample	Shannon index (*H*')					
	C1		C2		C3	
	Bacteria	Eukaryota	Bacteria	Eukaryota	Bacteria	Eukaryota
Feed-water	3.52	1.71	3.52	1.71	3.52	1.71
Supernatant	3.53	2.01	3.46	1.94	3.6	2.25
Schmutzdecke	3.82	2.98	3.68	2.81	3.76	2.58
Sand (5cm)	3.99	2.25	3.96	2.47	4.08	2.55
Sand (10cm)	3.95	1.92	3.95	1.51	4.1	2.72
Sand (25cm)	3.78	2.22	3.84	2.1	3.94	2.32
Water (5cm)	3.65	2.08	3.32	1.64	3.63	2.35
Water (10cm)	3.55	2.08	3.42	2.08	3.63	2.29
Water (25cm)	3.5	1.97	3.47	2.01	3.44	1.98
Effluent	3.8	2.1	3.59	1.8	3.6	1.25

Table S2 18S rRNA clone libraries of the inflow, *Schmutzdecke* , and effluent of sand filter column C1.

Sequence identifier	**Full name** **Taxonomic lineage (all Eukaryota)**
IN_euk__A01	Uncultured alveolate SAR*;Alveolata;*
IN_euk__A02	Uncultured alveolate *Eukaryota;* SAR*;Alveolata;*
IN_euk__A03	*Vorticellidae* SAR*;Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Peritrichia;*
IN_euk__A04	*Vorticellidae* SAR*;Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Peritrichia;*
IN_euk__B01	*Cercozoa* SAR*;Rhizaria;Cercozoa;Cercomonadidae;Cercomonas;*
IN_euk__B02	Uncultured alveolate SAR*;Alveolata;*
IN_euk__B03	Uncultured alveolate SAR*;Alveolata;*
IN_euk__B04	Uncultured alveolate SAR*;Alveolata;*
IN_euk__C02	Uncultured alveolate SAR*;Alveolata;*
IN_euk__C03	*Heteromita sp.* *Rhizaria; Cercozoa; Cercomonadida; Heteromitidae;*
IN_euk__C04	Uncultured alveolate SAR*;Alveolata;Protalveolata;Perkinsidae;* A31*;*
IN_euk__D01	Uncultured alveolate SAR*;Alveolata;*
IN_euk__D02	*Monas sp.* SAR*;Stramenopiles;Chrysophyceae;Ochromonadales;Paraphysomonas;*
IN_euk__D03	*Vorticellidae*

	SAR*;Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Peritrichia;*
IN_euk__D04	*Vorticellidae*
	SAR*;Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Peritrichia;*
IN_euk__E01	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__E02	*Stramenopiles*
	SAR*;Stramenopiles;Chrysophyceae;*
IN_euk__E03	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__E04	Uncultured fungus
	Opisthokonta;Nucletmycea;Fungi;Chytridiomycota;Chytridiomycetes;Rhizophydiales;
IN_euk__F01	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__F02	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__F03	Uncultured eukaryote
	Opisthokonta;Nucletmycea;Fungi;Chytridiomycota;Chytridiomycetes;Rhizophydiales;Rhizophydium;
IN_euk__F04	*Vorticellidae*
	SAR*;Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Peritrichia;*
IN_euk__G01	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__G02	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__G03	*Heteromita sp.*
	Rhizaria; Cercozoa; Cercomonadida; Heteromitidae;
IN_euk__G04	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__H01	Uncultured alveolate
	SAR*;Alveolata;*
IN_euk__H02	Uncultured alveolate
	SAR*;Alveolata;*

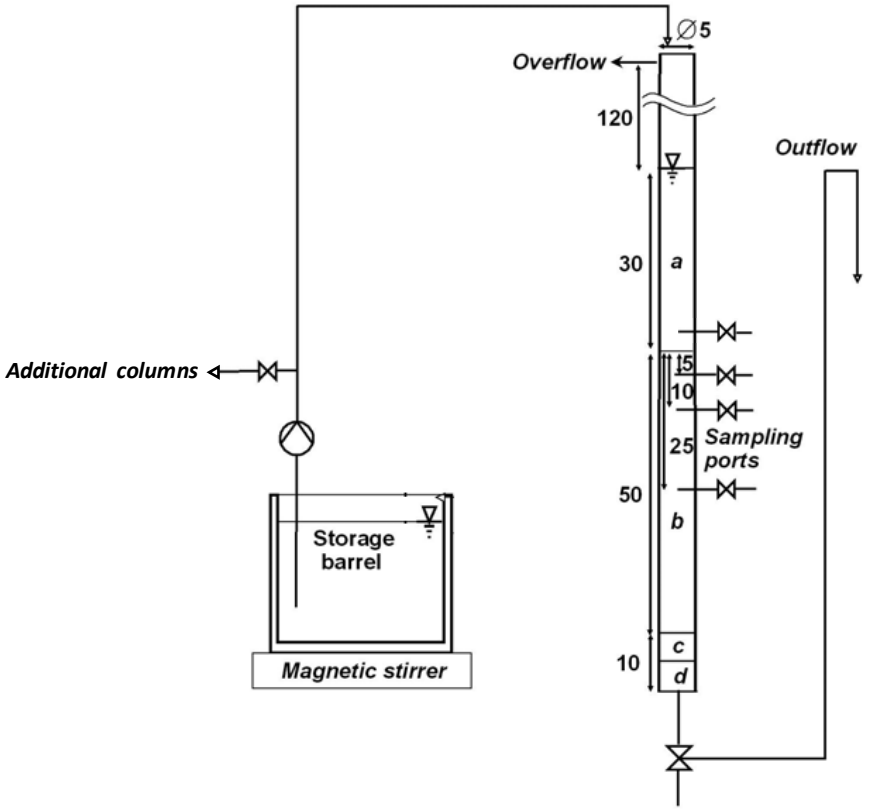
IN_euk__H03	Uncultured eukaryote
	Opisthokonta;Nucletmycea;Fungi;Chytridiomycota;Chytridiomycetes;Rhizophydiales;
IN_euk__H04	Uncultured eukaryote
	Opisthokonta;Nucletmycea;Fungi;Chytridiomycota;Chytridiomycetes;Chytridiales;
SD_euk__A05	*Oxytrichidae*
	SAR;Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;
SD_euk__A06	Uncultured eukaryote
	Opisthokonta;Nucletmycea; LKM11*;*
SD_euk__A07	Uncultured alveolate
	SAR;Alveolata;
SD_euk__A08	Uncultured eukaryote
	Opisthokonta;Nucletmycea; LKM11*;*
SD_euk__B05	Uncultured eukaryote
	Opisthokonta;Nucletmycea;LKM11;
SD_euk__B06	Uncultured eukaryote
	Opisthokonta;Nucletmycea;LKM11;
SD_euk__B07	Uncultured eukaryote
	Opisthokonta;Nucletmycea;LKM11;
SD_euk__B08	*Fragilariaceae*
	SAR;Stramenopiles;Diatomea;Coscinodiscophytina;Fragilariales;
SD_euk__C05	*Bacillariaceae*
	SAR;Stramenopiles;Diatomea;Bacillariophytina;Bacillariophyceae;Nitzschia;
SD_euk__C06	*Peritrichia*
	Alveolata; Ciliophora; Intramacronucleata; Oligohymenophorea;
SD_euk__C07	*Eurotiales*
	Opisthokonta;Nucletmycea;Fungi;Dikarya;Ascomycota;Pezizomycotina;Eurotiomycetes;Eurotiomycetidae;Eurotiales;Trichocomaceae;
SD_euk__C08	Uncultured eukaryote
	Opisthokonta;Nucletmycea;
SD_euk__D05	*Fragilariaceae*
	SAR;*Stramenopiles;Diatomea;Coscinodiscophytina;Fragilariales;*
SD_euk__D06	Nematode

	Opisthokonta;Holozoa;Metazoa;Animalia;Nematoda;Chromadorea;Monhysteridae;
SD_euk__D07	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__D08	*Bacillariaceae*
	SAR;*Stramenopiles;Diatomea;Bacillariophytina;Bacillariophyceae;Nitzschia* ;
SD_euk__E06	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__E07	*Cercozoa*
	SAR;*Rhizaria;Cercozoa;Thecofilosea* ;
SD_euk__E08	*Bacillariaceae*
	SAR;*Stramenopiles;Diatomea;Bacillariophytina;Bacillariophyceae;Nitzschia;*
SD_euk__F05	*Fragilariaceae*
	SAR;*Stramenopiles;Diatomea;Coscinodiscophytina;Fragilariales* ;
SD_euk__F06	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__F07	Uncultured eukaryote
	Opisthokonta;Nucletmycea;Fungi ;
SD_euk__F08	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__G05	Uncultured eukaryote
SD_euk__G06	*Fragilariaceae*
	SAR;*Stramenopiles;Diatomea;Coscinodiscophytina;Fragilariales* ;
SD_euk__G07	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__G08	*Parachela*
	Opisthokonta;Holozoa;Metazoa;Animalia;Tardigrada;Hypsibiidae;
SD_euk__H05	Uncultured eukaryote
	Opisthokonta;Nucletmycea ;LKM11;
SD_euk__H06	Uncultured eukaryote
	Opisthokonta;Nucletmycea;
SD_euk__H07	Uncultured eukaryote

	Opisthokonta;Nucletmycea;
SD_euk__H08	*Cercozoa*
	SAR*;Rhizaria;Cercozoa;Thecofilosea;*
EF_euk_A09	subclass *Stichotrichia*
	SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_A10	Uncultured fungus
	Opisthokonta;Nucletmycea ;LKM11;
EF_euk_A11	*Viridiraptor sp.*
	Rhizaria; Cercozoa; Glissomonadida; Viridiraptoridae;
EF_euk_A12	*Colpodella sp.*
	SAR;*Alveolata;Protalveolata;Colpodellida;Colpodella;*
EF_euk_B09	Uncultured fungus
	Opisthokonta;Nucletmycea;Fungi;Chytridiomycota;Chytridiomycetes;Chytridiales;
EF_euk_B10	*Ciliophora*
	SAR;Alveolata;Ciliophora;Intramacronucleata;Conthreep;
EF_euk_B11	Uncultured fungus
	Opisthokonta;Nucletmycea ;LKM11;
EF_euk_B12	*Ciliophora*
	SAR;*Alveolata;Ciliophora;Intramacronucleata;Conthreep;Prostomatea;Prorodon;*
EF_euk_C09	*Cercomonadidae*
	SAR;*Rhizaria;Cercozoa;Cercomonadidae;Cercomonas;*
EF_euk_C11	*Viridiraptor sp.*
	Rhizaria; Cercozoa; Glissomonadida; Viridiraptoridae;
EF_euk_C12	*Viridiraptor sp.*
	Rhizaria; Cercozoa; Glissomonadida; Viridiraptoridae;
EF_euk_D09	Uncultured eukaryote
	SAR;*Alveolata;Ciliophora;Intramacronucleata;Conthreep;*
EF_euk_D10	*Diplolaimelloides sp.*
	Opisthokonta;Holozoa;Metazoa;Animalia;Nematoda;Chromadorea;
EF_euk_D11	*Oxytrichidae*
	SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*

EF_euk_D12	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_E10	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_E11	Uncultured Euamoebida *Amoebozoa;Discosea;Flabellinia;Dactylopodida;*
EF_euk_E12	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_F10	*Viridiraptor sp.* *Rhizaria; Cercozoa; Glissomonadida; Viridiraptoridae;*
EF_euk_F11	*Cercomonadida* SAR*;Rhizaria;Cercozoa;Cercomonadidae;Cercomonas;*
EF_euk_F12	*Tetrahymena sp.* SAR;*Alveolata;Ciliophora;Intramacronucleata;Conthreep;Oligohymenophorea;Hymenostomatia;Tetrahymena;*
EF_euk_G09	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_G10	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_G11	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_G12	*Diplolaimelloides sp.* *Opisthokonta;Holozoa;Metazoa;Animalia;Nematoda;Chromadorea;*
EF_euk_H11	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*
EF_euk_H12	*Oxytrichidae* SAR;*Alveolata;Ciliophora;Intramacronucleata;Spirotrichea;*

A


∅5
Overflow
120
Outflow
30
a
Additional columns
15
10
25
Sampling ports
50
b
Storage barrel
c
10
d
Magnetic stirrer

B

Figure S1

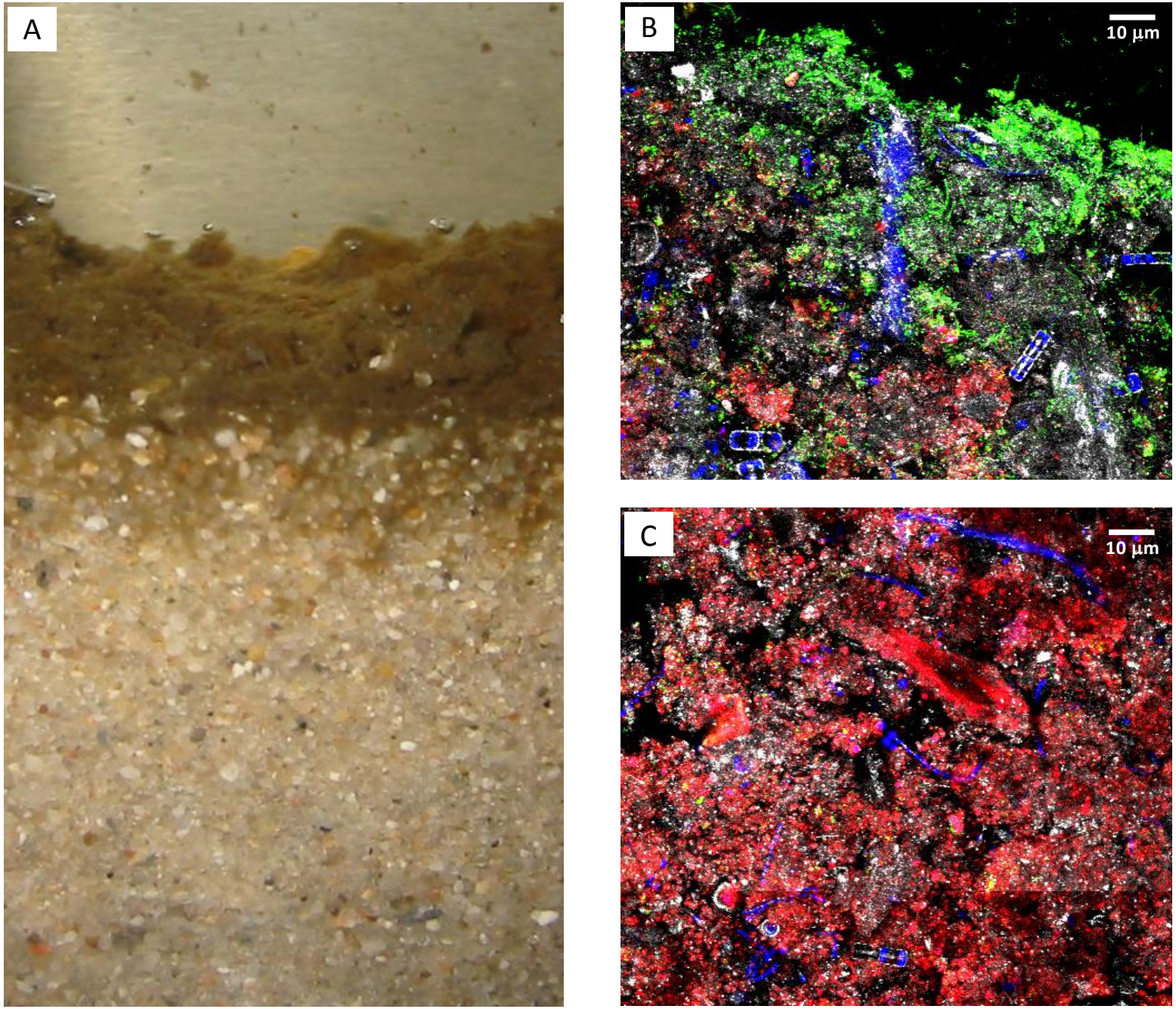


Figure S2

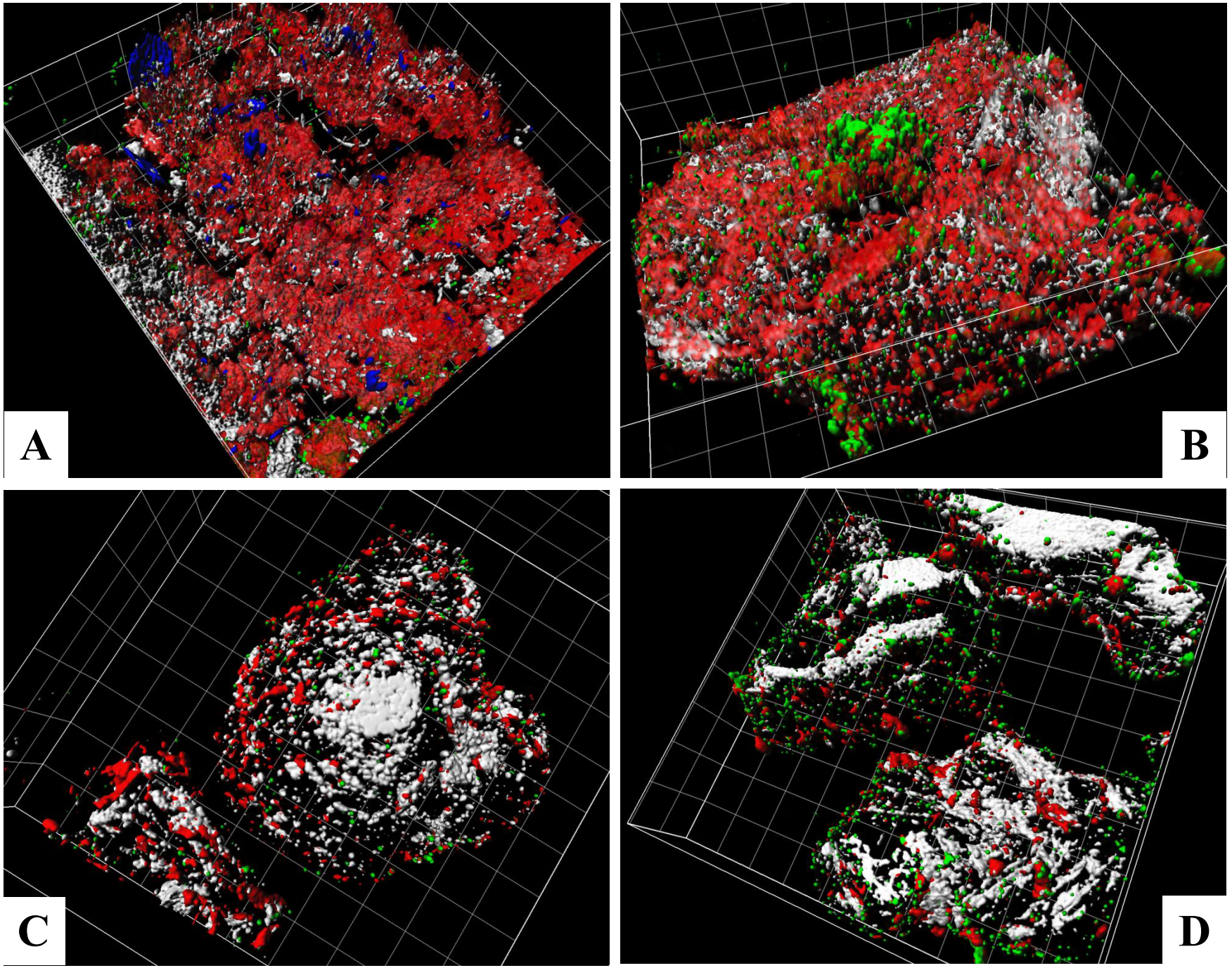


Figure S3