

Supplementary materials

Supporting analytical methods

The odorous organic matters in porewater were extracted by the solid-phase micro-extraction (SPME) method and then analyzed using a gas chromatography-mass spectrometry system (GC-MS, SHIMADZU TQ8040, Japan) (Guo et al., 2016). In detail, 12.5 mL of filtered porewater was injected into the sample vial and 4 g NaCl was added, and then the solid-phase extractor (SAAB-57335U-85UM CAR/PDMS, SUPELCO, USA) was inserted into the headspace above the vial. The analyses of porewater samples were performed on a gas chromatography-mass spectrometry (GC-MS, SHIMADZU TQ8040, Japan), equipped with a VF-624 ms column (length, 60 m; diameter, 0.32 mm; thickness, 1.8 μ m; Agilent Technologies, USA). Helium (99.999%) was used as the carrier gas, and argon (99.9999%) was used as collision-induced dissociation gas. The gas chromatographic conditions taken splitless injection modes, the injection temperature was 250°C and the injection volume was 1 μ L. The GC oven temperature program was: 40°C for 2 min, and continuous heating to 110°C at a rate of 8°C/min, then holding for 1 min and reheating to 260°C at a rate of 10°C/min, and finally holding for 20 min. The tandem MS/MS was operated as follows: the electron ionization source (EI) was 70 eV and ion source temperature was 230°C; the solvent delay was 1 min, and the multiple ion reaction monitoring modes (MRM) was selected.

Additional figures

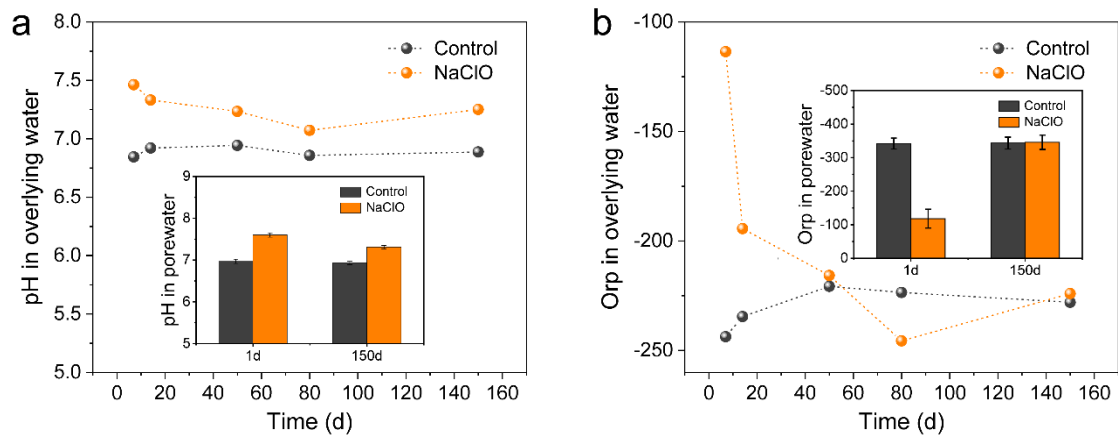


Fig. S1 The pH in the overlying water and porewater (a) and the ORP in the overlying water and porewater (b)

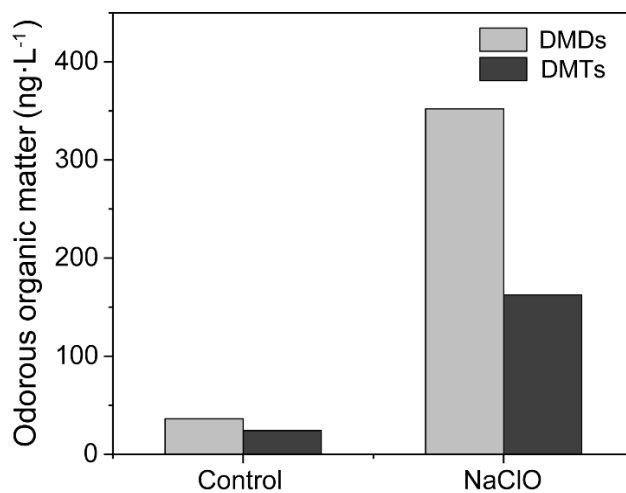


Fig. S2 The concentration of odorous substances in the pore water on Day 150

Additional tables

Table S1 The characteristic and function of 20 genera with the relative abundance increased after chlorination

Genus	Characteristic and function
Chlorobium	Anaerobic, chemoautotrophic, and might be involved with sulfur metabolism and the response to oxidative stress (Hanson and Tabita, 2001).
Soehngenia	Gram-positive, anaerobic but aerotolerant, chemo-organotrophic. Growth substrates are a wide range of carbohydrates and some other carbon sources, it can fix nitrogen (Parshina, 2003).
norank_f__Steroidobacteraceae	Gram-negative, strictly aerobic. This bacteria can degrade steroids, it can grow under NaCl 0.5%, and it has the ability of denitrification (Huang et al., 2019b)
Thermomonas	Gram-negative bacteria, aerobic. Chemoorganotrophy, urea can be hydrolyzed and usually without the use of carbohydrates. It is a denitrifying agent (Wang et al., 2020). This bacterium may cause potential chlorine resistance risk (Song et al., 2019).
Petrimonas	Gram-negative, strictly anaerobic. Chemoorganotrophy, with fermentative metabolism, and can ferment glucose into acetic acid (Kim et al., 2018). Petrimonas sulfuriphila, one of the Petrimonas genus, can use elemental sulfur and nitrate as electron acceptors and reduce them to sulfide and ammonium, respectively (Grabowski, 2005).
Comamonas	Gram-negative, strictly aerobic. Occasionally causes human diseases (Steinberg and Burd, 2015). Genes for deamination and ammoniation are abundant in Comamonas, indicating that Comamonas plays an important role in nitrogen biogeochemical cycle (Wu et al., 2018)
Roseomonas	Gram-negative. It may cause infection in immunocompromised individuals (Romano-Bertrand et al., 2016).
unclassified_f__Rhodobacteraceae	Gram-negative. It contains two types of bacteria: Chemoorganotrophy and photoheterotrophic. They are deeply involved in the biogeochemical cycle of sulfur and carbon (Smith et al., 2019). The strain can grow in 1.0%–6.0% NaCl (w/v) (the best was 2.5%) (Yang et al., 2017).
Luteimonas	Gram-negative, aerobic. It can grow well in 0.5% NaCl (w/v) (Wang et al., 2015). Luteimonas capable of degrading petroleum hydrocarbon, and it is involved in C degradation during composting (Zhu et al., 2020). It has nirK gene and can participate in C metabolism (Zhong et al., 2020).
Blastomonas	Gram-negative, strictly aerobic, photoheterotrophic.

Desulfobulbus	Gram-negative, anaerobic. It can reduce sulfate, sulfite, and thiosulfate to hydrogen sulfide (H ₂ S) (Widdel and Pfennig, 1981). Desulfobulbus was the key genus for propionate degradation through the pyruvate and propanoate metabolism pathway (Zeng et al., 2019).
Sphingopyxis	Gram-negative, strictly aerobic. It is good at degrading complex organic compounds (Kim et al., 2014; Xu et al., 2018; Yang et al., 2020).
Limnobacter	Gram-negative, strictly aerobic, chemoheterotrophs. It is related to sulfur metabolism (Fan et al., 2016; Da et al., 2018).
Sphingomonas	Gram-negative, strictly aerobic, chemoheterotrophs. It's an opportunistic pathogen (Wasiura et al., 2019).
norank_f__Nannocystaceae	Most members of this family are considered to be salt-tolerant and halophiles, and they can degrade complex macromolecules (Garcia and Müller, 2014).
Nannocystis	Strictly anaerobic, chemolithoautotrophy. It may be involved in the synthesis of 2-MIB (Dickschat et al., 2007).
unclassified_f__Sphingomonadaceae	Gram-negative, aerobic, or facultatively anaerobic. It is highly tolerant of temperature, salt, and pH (Hendrik et al., 2019). It is a carbon degrading bacteria with denitrification characteristics (Shi et al., 2020).
Reyranella	Gram-negative, aerobic. It may degrade protein (Tomohiro et al., 2018). This is a denitrifying bacterium (Chen et al., 2020a).
Anaerofustis	Gram-positive, strictly anaerobic. It is involved in the acidification of glucose, and the products are acetic acid and butyric acid (Finegold et al., 2004).
Azospirillum	Gram-negative, microaerobic. This organism involves in carbon and nitrogen metabolism (Okon and Itzigsohn, 1995).

Table S2 The characteristic and function of 20 genera with the relative abundance decreased after chlorination

Genus	Characteristic and function
norank_f__Eubacteriaceae	Gram-positive, chemoorganotrophy. Some members of Eubacteriaceae use carbohydrates for fermentation. And some members are opportunistic pathogens of vertebrates.
Defluviicoccus	Gram-negative, facultatively anaerobic. It can utilize organic acids and glucose as carbon sources and it also participates in the denitrification process (Dai et al., 2007).
Lactivibrio	Anaerobic. It can ferment carbohydrates and amino acids. Nitrate, sulfate, thiosulfate, elemental sulfur, sulfite, and Fe (III) cannot be used as terminal electron acceptors (Qiu et al., 2014).
Allochromatium	It can oxidize sulfide or thiosulfate, and it is considered to be able to fix carbon.
Macellibacteroides	Gram-positive, obligate anaerobic. This organism cannot use sulfate, thiosulfate, elemental sulfur, sulfite, nitrate, and nitrite as terminal electron acceptors. Cellobiose, glucose, lactose, mannose, maltose, peptone, rhamnose, raffinose, sucrose, and xylose can be used as electron donors. The main glucose metabolites are lactic acid, acetic acid, butyric acid, and isobutyric acid. The bacteria can ferment a variety of carbohydrates and produce volatile fatty acids (Chen and Chang, 2017).
Desulfovibrio	Gram-negative, obligate anaerobe. This is a sulfate-reducing bacteria (An et al., 2019).
norank_f__Syntrophaceae	Gram-negative, strictly anaerobic. Syntrophaceae can involve in propionic acid degradation (Jannat et al., 2020), isovaleric acid degradation (Chen et al., 2020b), and methanogenesis process (Meng et al., 2020).
Microbacterium	Gram-positive. It participates in pyruvate metabolism (Yu et al., 2020), and it was reported to degrade naphthalene (Cáceres et al., 2009). It can convert ammonium to nitrogen under aerobic conditions (Zhang et al., 2013).
norank_f__Propionibacteriaceae	Gram-positive, aerobic, or facultatively anaerobic. It can use ammonia for nitrification (Huang et al., 2019a).
norank_f__Pirellulaceae	Anaerobic. It can utilize ammonia for nitrification (Mohamed et al., 2010).
norank_o__Gaiellales	Strictly aerobic. It can use a variety of organic compounds as carbon sources.
norank_o__Aminicenantales	Some of the members may be involved in the methanogenesis process (Hua et al., 2020).
Clostridium_sensu_stricto_1	Gram-negative, anaerobic.
Aminomonas	Gram-negative, obligate anaerobic. It can degrade amino acids, and the main product is acetic acid.
Paludibacter	Gram-negative, strictly anaerobic. It can ferment with a variety of sugars, and the products are propionate and acetate (Ueki, 2006).
Gordonia	Gram-positive, aerobic, chemoorganotrophy. This is a pathogen.

Brooklawnia	Gram-positive, facultatively anaerobic. It can ferment organic matter into propionate (Bae et al., 2006).
Rhodococcus	Gram-positive, aerobic. A few of them are pathogenic. And it can degrade lignin (Chatterjee et al., 2020).
Syntrophus	Gram-negative, anaerobic. It can degrade fatty and aromatic acids.
Desulfomonile	Gram-negative, strictly anaerobic. This is a sulfate-reducing bacterium.

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