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Data Article

Metagenomic data of free cyanide and thiocyanate degrading bacterial communities

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ABSTRACT

The data presented in this article contains the bacterial community structure of the free cyanide (CN^-) and thiocyanate (SCN^-) degrading organisms that were isolated from electroplating wastewater and synthetic SCN^- containing wastewater. PCR amplification of the 16S rRNA V1-V3 regions was undertaken using the 27F and 518R oligonucleotide primers following the metacommunity DNA extraction procedure. The PCR amplicons were processed using the illumina® reaction kits as per manufacturer's instruction and sequenced using the illumina® MiSeq-2000, using the MiSeq V3 kit. The data was processed using bioinformatics tools such as QIIME and the raw sequence files are available via NCBI's Sequence Read Archive (SRA) database.

Specifications Table

Subject area	Biology, Microbial ecology, Biodiversity
More specific subject area	Metagenomics
Type of data	Table

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How data was acquired	Sequencing was conducted on an Illumina® MiSeq-2000, using a MiSeq V3 (600 cycle) kit following the procedures developed at Inqaba Biotech (Pretoria, South Africa) (www.inqababiotec.co.za).
Data format	Raw data
Experimental factors	The flanking regions of the 16S rRNA gene (V1-V3) were PCR amplified using the 27F and 518R oligonucleotide primers.
Experimental features	Cyanide degrading organisms (CDOs) were isolated in electroplating wastewater. Since the CDOs were unable to degrade SCN^-, a gravimetric technique was employed in synthetic wastewater containing SCN^- outside the BioERG laboratory. Metacommunity DNA was extracted from both the CDOs and TDOs for sequencing.
Data source location	BioERG laboratory, Cape Town, South Africa (33.9324°S, 18.6406°E) Electroplating facility, Cape Town, South Africa (33.9708°S, 18.5780°E)
Data accessibility	The accession numbers of the sequence data are publicly available on a public repository (http://hdl.handle.net/11189/5110) and are also embedded within Supplementary Table 1 and 2.

Value of the data

- This research data provides crucial information on the bacterial community structure and differences between the CDOs and TDOs post-CN^- and SCN^- exposure, respectively.
- The presented data can be utilized by researchers for comparative studies related to CN^- and SCN^- biodegradation.
- The bacterial organisms detected in both the CDOs and TDOs were mainly dominated by bacteria which have never been reported to possess CN^- and SCN^- degradation capabilities, and future research necessitates for the determination of the role that these organisms play in CN^- and SCN^- biodegradation processes.

1. Data

The presented dataset contains the bacterial composition of free cyanide (CDO) and thiocyanate degrading (TDO) organisms from electroplating and synthetic SCN^- containing wastewater, respectively. Table 1 shows the comparative analysis of the bacterial compositions between the CDOs and TDOs.

2. Experimental design, materials and methods

2.1. Sample collection and isolation procedure

The CDOs were isolated from an electroplating facility wastewater. The wastewater was collected in sterile non-transparent 20 L polypropylene containers and the cyanide concentration was immediately quantified to be above 150 mg CN^-/L, using the detection technique developed by [1]. The TDOs were isolated from synthetic SCN^--containing wastewater solution (500 mL) containing (g/L); K_2HPO_4 (3.4), KH_2PO_4 (4.3), Glucose (0.01), SCN^- (0.2) and CN^- (0.2), at a pH of 10 ($\pm$0.05), using the gravimetric technique. Briefly, the solution was exposed for two months to allow airborne microorganisms to settle on the media outside the laboratory. A fraction (100 mL) of both the synthetic and electroplating wastewater solutions was filtered sterilized in a 0.22 μm Millipore membrane and the microbial cells were re-suspended in 5 mL of sterile Millipore water in preparation of DNA extraction procedures.