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Data Article

Process performance determination data in thiocyanate biodegradation system s: Use of sulphate production

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ABSTRACT

This data article presents the utilization of sulphates as an indirect technique for the assessment of microbial growth, activity and SCN^- biodegradation efficiency since the TDO were observed to be unable to utilise the produced sulphates as a source of sulphur (Mekuto et al., 2017) [1]. The TDO demonstrated complete SCN^- biodegradation while also utilizing the produced ammonium. The production of SO_4^{2-} from SCN^- biodegradation had a good correlation in comparison to the traditional methods of assessing microbial growth and activity i.e. direct cell counts (DCC), heterotrophic counts (CFU) and fluorescein production from fluorescein diacetate (FDA). The concentration of the produced SO_4^{2-} demonstrated a similar logarithmic trend with the FDA, DCC and CFU techniques, thus confirming that the production of SO_4^{2-} from SCN^- biodegradation systems can be utilised as an indirect technique for the assessment of microbial growth, activity and SCN^- biodegradation performance.

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Specifications Table

Subject area	Environmental Biotechnology
More specific subject area	Bioremediation
Type of data	Table and Figures
How data was acquired	Spectrophotometric determinations were conducted in a Jenway 6715 UV/Vis spectrophotometer while for the Thoma counting chamber (Hawksley, UK) was used for direct cell counts.
Data format	Analyzed
Experimental factors	Sulphate production from biodegradation of wastewater containing thiocyanate in comparison to traditional microbial growth/activity techniques i.e. Fluorescein diacetate (FDA), Heterotrophic cell counts (CFU), Direct cell counts (DCC).
Experimental features	Thiocyanate degrading organisms (TDO) were isolated and identified as described in [2]. TDO's were grown for 98 h in SCN ⁻ containing solution where the SO ₄ ²⁻ production was compared to traditional microbial growth/activity techniques such that SO ₄ ²⁻ can be utilized as an indirect assessment of thiocyanate biodegradation system performance. The experiments were conducted in triplicates.
Data source location	Cape Town, South Africa (33.9324°S, 18.6406°E)
Data accessibility	Data is available in the article

Value of the data

- This research data provides a rapid microbial performance assessment technique in thiocyanate biodegradation systems.
- The data can be utilized by researchers who are active in the development of a robust biological method for the bioremediation of thiocyanate that originates from mining, gasification and coking wastewaters.
- The presented data had a good correlation with the tested traditional techniques that are commonly utilized in microbiology and hence it can be utilized as an indicator for thiocyanate biodegradation process performance.

1. Data

The data presented here demonstrates the utilization of sulphates as an indirect determination of thiocyanate biodegradation systems' performance. Table 1 demonstrates the biodegradation of SCN⁻ by the TDO with the subsequent production of ammonium while Fig. 1 illustrates the production of sulphates in comparison to the tested traditional microbial growth/activity techniques.

Table 1
Thiocyanate degradation and ammonium formation during experimentation.

Measured parameters	Time (h)				
	0	26.5	51.2	74.0	98.0
Biodegraded SCN ⁻ (mg/L)	160.42	156.25	33.47	1.67	0.07
Produced NH ₄ ⁺ – N (mg/L)	0.00	9.25	68.35	32.50	24.90

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