

MICROBIAL SULPHATE REDUCTION USING DEFINED CARBON SOURCES
AND ARTIFICIAL ACID MINE DRAINAGE

COETSER, S E

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MICROBIAL SULPHATE REDUCTION USING DEFINED
CARBON SOURCES AND ARTIFICIAL ACID MINE
DRAINAGE

the requirements for the degree

MASTER OF SCIENCE

In the Faculty of Biological and Agricultural Sciences

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Department of Microbiology and Plant Pathology

University of Pretoria

Pretoria

South Africa

December 1997

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AND ARTIFICIAL ACID MINE DRAINAGE**

I, the undersigned, certify the thesis hereby submitted to the University of Pretoria for the degree of M.Sc. and the work contained herein is my own original work and has not previously, in its entirety or in part, been submitted at any university for a degree.

By

SUSANNA ELIZABETH COETSER

Signature:



Date:



Submitted in partial fulfilment of
the requirements for the degree

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DECLARATION

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President:

Signature:

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Date:

27/11/1998..

SUMMARY

The present study was conducted to determine the effect of different carbon sources on the rate of sulphate reduction in defined carbon sources and artificial AMD. The results showed that the rate of sulphate reduction was significantly higher in defined carbon sources than in artificial AMD. The results also showed that the rate of sulphate reduction was significantly higher in defined carbon sources than in artificial AMD.

The present study was conducted to determine the effect of different carbon sources on the rate of sulphate reduction in defined carbon sources and artificial AMD. This was done in a pilot scale for the evaluation of the laboratory procedure for the evaluation of carbon sources for use in the treatment systems of AMD.

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by

SUSANNA ELIZABETH COETSER

Promoter: Prof. T.E. Cloete
Department: Microbiology and Plant Pathology
Degree: M.Sc. (Microbiology)

SUMMARY

The production of acid mine drainage (AMD) containing high amounts of sulphate, heavy metals and low pH is of increasing concern. Due to the fact that it is highly corrosive, it results in environmental and economic problems.

The potential use of different defined carbon sources to drive sulphate reduction in artificial AMD was studied. This was done in a process for developing a standard laboratory procedure for the evaluation of carbon sources for potential use in passive treatment systems of AMD.

The conceptual model for the passive treatment of AMD accounts for major events of interest occurring within the passive treatment system. This model will assist in identifying the parameters that significantly influence the system response as well as possible causes for malfunction.

MIKROBIOLOGIESE SULFAAT REDUKSIE DEUR GEBRUIK TE MAAK VAN GEDEFINIEERDE KOOLSTOF BRONNE EN KUNSMATIGE SUURMYNAFLOOP

deur

SUSANNA ELIZABETH COETSER

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OPSOMMING

Die toenemende produksie van suurmynafloop is kommerwekend. Suurmynafloop bevat groot hoeveelhede sulfaat, swaar metale en 'n lae pH. As gevolg van die feit dat dit hoogs korrosief is, veroorsaak dit omgewing en ekonomiese probleme.

Die potensiaal om verskillende gedefinieerde koolstof bronne te gebruik vir die reduksie van sulfaat in suurmynafloop is bestudeer. Dit is gedoen deur 'n standaard laboratorium prosedure te ontwikkel vir die evaluasie van koolstof bronne vir potensiale gebruik in passiewe behandeling stelsels van suurmynafloop.

Die konseptuele model vir passiewe behandeling stelsels van suurmynafloop beskryf die belangrikste gebeure in hierdie passiewe behandeling stelsels. Die konseptuele model identifiseer die belangrikste parameters wat stelsels negatief kan beïnvloed.

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