



Separation Science and Technology >

Volume 37, 2002 - [Issue 16](#)

262 | 10 | 0
Views | CrossRef citations to date | Altmetric

Original Articles

EFFICIENCY ENHANCEMENTS THROUGH THE USE OF MAGNETIC FIELD GRADIENT IN ORIENTATION MAGNETIC SEPARATION FOR THE REMOVAL OF POLLUTANTS BY MAGNETOTACTIC BACTERIA

A. S. Bahaj , P. A. B. James & F. D. Moeschler

Pages 3661-3671 | Received 01 Sep 2001, Published online: 19 Aug 2006

Cite this article <https://doi.org/10.1081/SS-120014825>



Full Article

Figures & data

References

Citations

Metrics

Reprints & Permissions

Read this article

Share

Abstract

Orientation magnetic separation (OMS) represents a simple method that permits motile, field-susceptible magnetotactic bacteria (MTB) to be separated from water. Such an approach can be used to decontaminate polluted water through uptake of contaminants by the bacteria and their subsequent removal by the application of magnetic fields. In OMS, a separation channel through which an MTB culture is flowing is subjected to a magnetic field perpendicular to the flow direction. The bacteria "sense" the magnetic field, orientating themselves parallel to the field lines and then swim to the channel sides where they accumulate. The fluid flow through such a

standard separation channel has been shown to cause dislodgement of accumulated bacteria. To reduce this effect, a new approach has been developed utilizing magnetic gradients to retain the bacteria at the walls of the separator. A study comparing the operation of a standard channel separator with three new designs containing nickel wire matrices has been carried out. The resultant separation efficiencies and the effect on separation of varying both the flow rate and the applied magnetic field are described. The new separators enhance the separation efficiency by up to 300% over the standard separator.

Keywords:

Biomagnetism

Orientation magnetic separation

Magnetotactic bacteria

Acknowledgments

Related research

People also read

Recommended articles

Cited by
10

Information for

Authors

R&D professionals

Editors

Librarians

Societies

Opportunities

Reprints and e-prints

Advertising solutions

Accelerated publication

Corporate access solutions

Open access

Overview

Open journals

Open Select

Dove Medical Press

F1000Research

Help and information

Help and contact

Newsroom

All journals

Books

Keep up to date

Register to receive personalised research and resources
by email

 Sign me up

  

  

Copyright © 2025 Informa UK Limited Privacy policy Cookies Terms & conditions

Accessibility



Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG