

Use of magnetoresistive biochips for monitoring of pathogenic microorganisms in water through bioprobes: Oligonucleotides and antibodies

Martins V., Fonseca L.P., Ferreira H.A., Graham D.L., Freitas P.P.,
Cabral J.S.

Centre for Biological and Chemical Engineering-IST, Av. Rovisco Pais, 1049-001 Lisboa, Portugal;
Institute of Engineering of Systems and Computers-Microsystems and Nanotechnologies-INESC-MN, Rua
Alves Redol, 9, 1000-029 Lisboa, Portugal

Abstract: Magnetoresistive spin valve sensors have been integrated in a micro-engineered biochip and applied to the detection of pathogenic microorganisms for water biological quality management. Two different strategies of biomolecular recognition events, involving 16S rDNA oligonucleotide sequences and antibodies as recognition agents, are suggested for the detection of *Escherichia coli* and *Salmonella* sp. as model microorganisms. The development of the platform involves the immobilization of specific probes for target capture, as well as the labeling of the target species with nanometer-sized paramagnetic markers. The molecular interaction between probe and target is monitored almost in real-time through the measurement of the variation of the sensor resistance with the magnetic stray fields created by the labels. Preliminary results for the detection of *Salmonella* whole cells using this immunosensor platform are presented.

Author Keywords: Biochips; Biomolecular recognition; Biosensors; Magnetoresistive sensors; Paramagnetic particles

Year: 2005

Source title: 2005 NSTI Nanotechnology Conference and Trade Show - NSTI Nanotech 2005 Technical Proceedings

Page : 493-496

Cited by: 1

Link: [Scopus Link](#)

Document Type: Conference Paper

Source: Scopus

Authors with affiliations:

1. Martins, V., Centre for Biological and Chemical Engineering-IST, Av. Rovisco Pais, 1049-001 Lisboa, Portugal
2. Fonseca, L.P., Centre for Biological and Chemical Engineering-IST, Av. Rovisco Pais, 1049-001 Lisboa, Portugal
3. Ferreira, H.A., Institute of Engineering of Systems and Computers-Microsystems and Nanotechnologies-INESC-MN, Rua Alves Redol, 9, 1000-029 Lisboa, Portugal
4. Graham, D.L., Institute of Engineering of Systems and Computers-Microsystems and Nanotechnologies-INESC-MN, Rua Alves Redol, 9, 1000-029 Lisboa, Portugal
5. Freitas, P.P., Institute of Engineering of Systems and Computers-Microsystems and Nanotechnologies-INESC-MN, Rua Alves Redol, 9, 1000-029 Lisboa, Portugal
6. Cabral, J.S., Centre for Biological and Chemical Engineering-IST, Av. Rovisco Pais, 1049-001 Lisboa, Portugal

