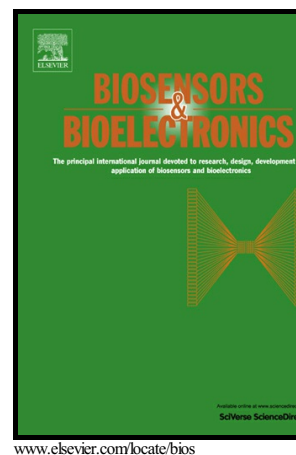


Sensitive and rapid detection of pathogenic bacteria in small volumes using impedance spectroscopy technique

Namrata Pal, Shashank Sharma, Shalini Gupta



PII: S0956-5663(15)30433-4
DOI: <http://dx.doi.org/10.1016/j.bios.2015.09.037>
Reference: BIOS8004

To appear in: *Biosensors and Bioelectronics*

Received date: 18 May 2015
Revised date: 13 September 2015
Accepted date: 15 September 2015

Cite this article as: Namrata Pal, Shashank Sharma and Shalini Gupta, Sensitive and rapid detection of pathogenic bacteria in small volumes using impedance spectroscopy technique, *Biosensors and Bioelectronics* <http://dx.doi.org/10.1016/j.bios.2015.09.037>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

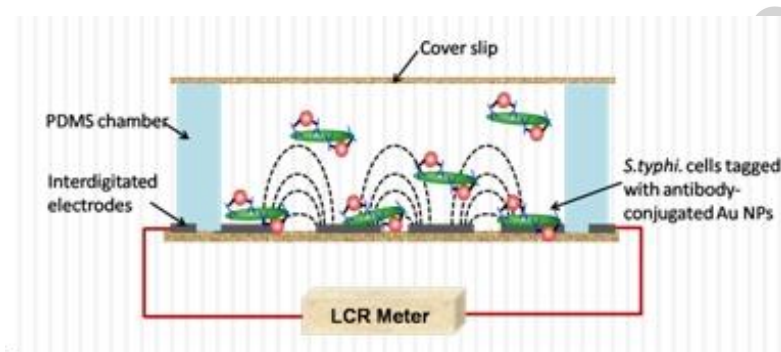
Sensitive and Rapid Detection of Pathogenic Bacteria in Small Volumes using Impedance Spectroscopy Technique

Namrata Pal, Shashank Sharma[#] and Shalini Gupta^{*}

Department of Chemical Engineering, Indian Institute of Technology Delhi, Hauz Khas, New Delhi, India 110016

^{*}Corresponding author. E-mail: shalinig@chemical.iitd.ac.in

Graphical abstract



Abstract

We illustrate a novel impedance immunosensor which rapidly and sensitively detects typhoid-causing infectious bacteria *Salmonella enterica* serovar (*S. typhi*) in 10 μ L of sample volume. The bacteria are tagged with gold nanoparticles (Au NPs) via high-affinity antigen-antibody interactions for enhanced signal amplification and selectivity. The cell-particle bioconjugates are then subjected to alternating current (AC) electric fields applied through interdigitated microelectrodes. The immunosensor performance is optimized with respect to electric field frequency, cell concentration, incubation times and the type of blocking agent to achieve a low limit of detection (LOD) of 100 CFU/mL. The approach is extendable to a wide spectrum of clinical diseases and offers an efficient and cost-effective solution for point-of-care diagnosis.

Keywords: Impedance, gold nanoparticle, detection, *Salmonella*, biosensor, typhoid

Download English Version:

<https://daneshyari.com/en/article/7231381>

Download Persian Version:

<https://daneshyari.com/article/7231381>

[Daneshyari.com](https://daneshyari.com)