



Electrochemical detection of pyocyanin as a biomarker for bacterial infections

Al Atraktchi, Fatima Al-Zahraa; Svendsen, Winnie Edith; Breum Andersen, Sandra; Molin, Søren; Johansen, Helle Krogh

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Al Atraktchi, F. A-Z., Svendsen, W. E., Breum Andersen, S., Molin, S., & Johansen, H. K. (2015). *Electrochemical detection of pyocyanin as a biomarker for bacterial infections*. Poster session presented at 25th European Congress of Clinical Microbiology and Infectious Diseases, Copenhagen, Denmark.

General rights

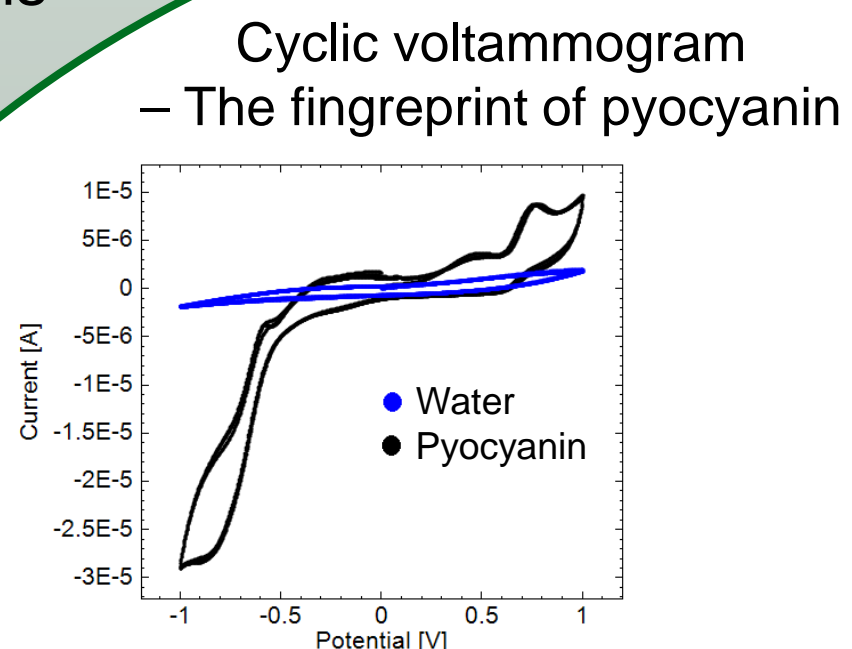
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

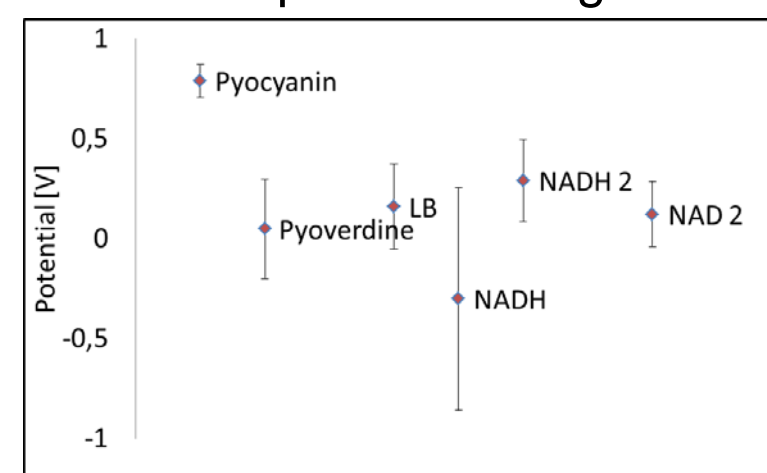
Motivation

The redox-active pyocyanin is produced by *P. aeruginosa* during infections and is released prior to virulent activity. Monitoring the level of pyocyanin as an infection biomarker could enable early detection of bacterial infections.



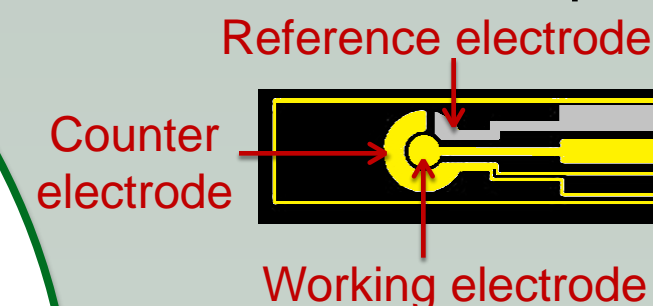
2

Selective detection of pyocyanin
- No overlap between signals



Concept

Electrochemical sensing of pyocyanin is conducted using micro-sensors. The sensor consists of three electrodes and requires only micro-liter volume of the sample.



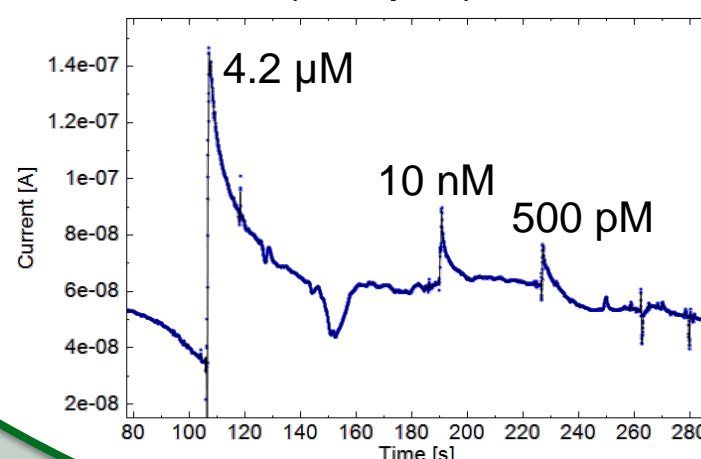
Electrochemical detection of pyocyanin as a biomarker for bacterial infections

Impact

Development of this novel detection technique will optimize early diagnosis of bacterial infections and lead to new guidelines in this area. The information revealed by pyocyanin sensing will be of great value when designing new antibiotic treatment strategies.

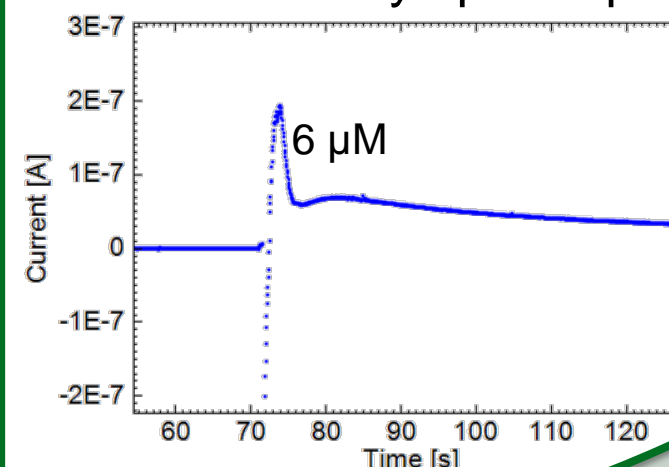
3 Chronoamperometry

– Quantification of pyocyanin below detection limit of HPLC (7.2 μM)



4

Detection of pyocyanin in isolate from cystic fibrosis patient
- No pyocyanin was detected in isolate by spectrophotometry!



Summary

A precise and early diagnosis of an infection is essential for successful eradication treatment. Hence early diagnosis has direct impact on the morbidity and mortality of patients. This can be achieved by electrochemical micro-sensing of pyocyanin as an infection biomarker.

Copyright © 2015 Fatima AlZahra'a Alatraktchi^{1,2,3}, Winnie E. Svendsen¹, Sandra Breum Andersen³, Søren Molin^{2,3}, Helle Krogh Johansen^{3,4}

¹ Department of Micro- and Nanotechnology – Technical University of Denmark

² Department of Systems Biology

³ Novo Nordisk Foundation Center for Biosustainability - Technical University of Denmark

⁴ Cystisk fibrose klinikken & Klinisk mikrobiologisk afdeling - Rigshospitalet