



Extracellular polymeric substances play roles in extracellular electron transfer of *Shewanella oneidensis* MR-1

Xiao, Yong; Zhang, En-Hua; Christensen, Hans Erik Mølager; Zhang, Jingdong; Zhao, Feng

Publication date:
2016

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):

Xiao, Y., Zhang, E-H., Christensen, H. E. M., Zhang, J., & Zhao, F. (2016). *Extracellular polymeric substances play roles in extracellular electron transfer of Shewanella oneidensis MR-1*. Abstract from 3rd European Meeting of the International Society for Microbial Electrochemistry and Technology, Rome, Italy.

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.

Extracellular polymeric substances play roles in extracellular electron transfer of *Shewanella oneidensis* MR-1

Yong Xiao^{1,2}, En-Hua Zhang¹, You-Fen Dai¹, Hans E. M. Christensen², Jingdong, Zhang², Feng Zhao^{1*}

¹ CAS Key Laboratory of Urban Pollutant Conversion, Institute of Urban Environment, Chinese Academy of Sciences, Xiamen, China (Presenting author: yxiao@iue.ac.cn; Corresponding author: fzhao@iue.ac.cn)

² Department of Chemistry, Technical University of Denmark, Kgs. Lyngby, Denmark

It is well known that microorganism is surrounded by extracellular polymeric substances (EPS) which include polysaccharides, proteins, glycoproteins, nucleic acids, phospholipids, and humic acids. However, previous studies on microbial extracellular electron transfer (EET) are conducted on cells without extracting EPS or cells collected from log stage or early-steady stage cultures with little EPS. Therefore, microbial cells are believed in contact directly with each other or electrode. Such attempt apparently ignored the role of EPS in microbial EET, even though many components of EPS, such as DNA, humic acids and some proteins, are electrochemically active or semiconductive. Herein, we report experimental evidences of EPS role on EET for *Shewanella oneidensis* MR-1.

Atomic force microscopy clearly showed that the cell surface was cleaned and few EPS could be observed on MR-1 after the extraction (Figure 1.a and 1.b). Comparing to cells in control group, MR-1 treated at 38 °C for EPS extraction showed different electrochemical characterizations as revealed by differential pulse voltammetry (Figure 1.c). EPS extracted from MR-1 also was proved to be electrochemically active. The present study indicated that EPS play important roles in EET of MR-1.

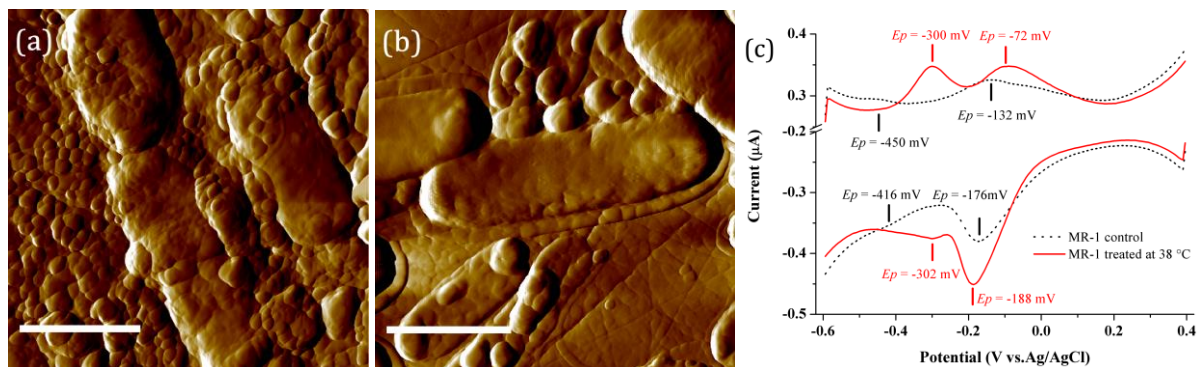


Figure 1 Atomic force microscopy shows more EPS surrounding the MR-1 cells in control groups treated 30 °C (a), comparing to those treated at 38 °C (b). Scale bar: 2 µm. Voltametric analysis of MR-1 treated at 30 °C (dotted line) and 38 °C (solid line) (c).

Acknowledgement: The study was supported by National Natural Science Foundation of China (51478451), Chinese Academy of Sciences (IUQN201306) and Carlsberg Foundation (CF15-0164)

Preferred presentation type: ORAL