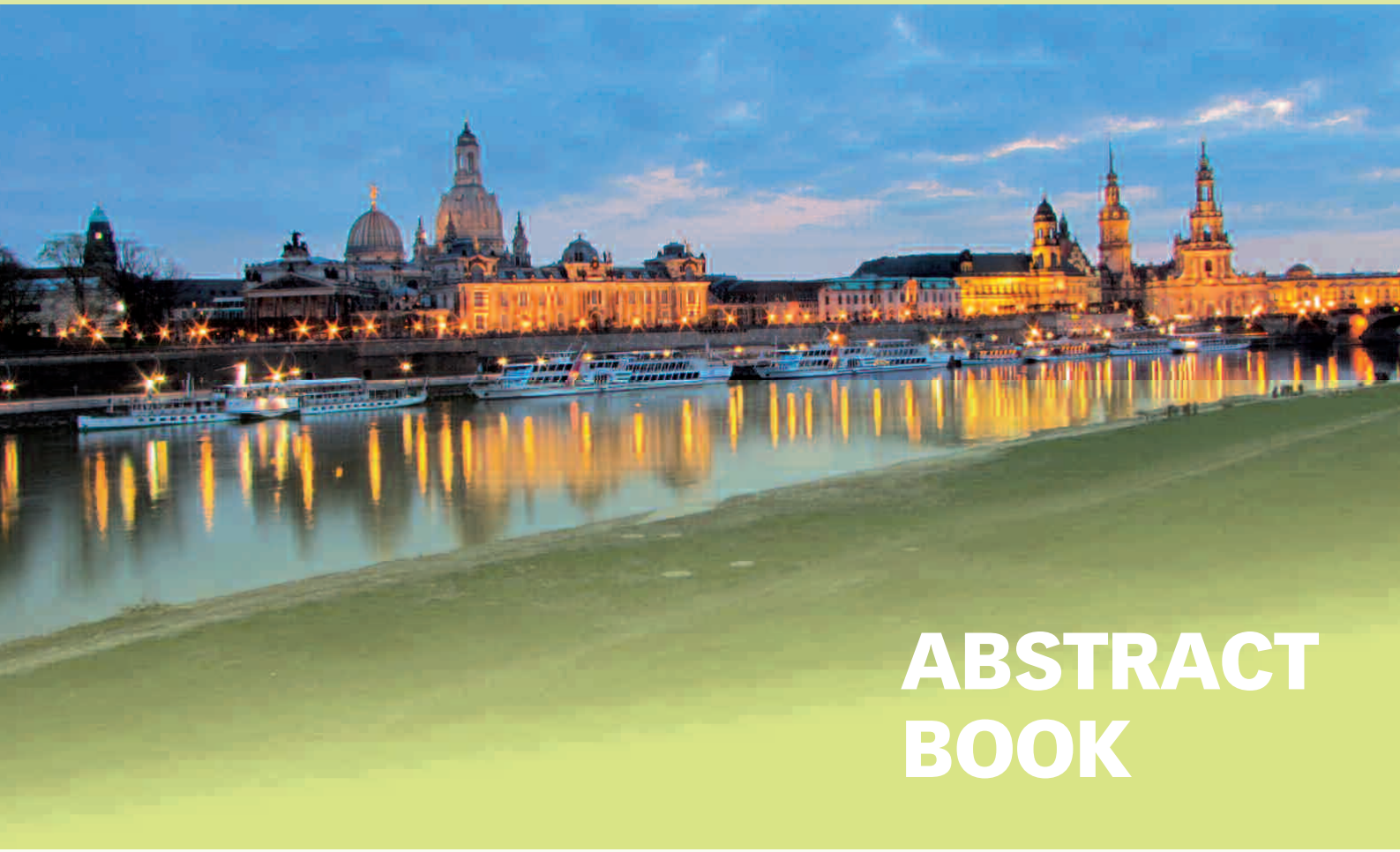
BioMetals X

10th International BioMetals Symposium 2016

July 10 –15, 2016 | art'otel | Dresden, Germany



ABSTRACT BOOK

Organized by Institute of Resource Ecology | Helmholtz-Zentrum Dresden-Rossendorf

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Enzymatic reduction of Se (IV) by *Stenotrophomonas* sp. BII-R7 under aerobic and anaerobic conditions: multidisciplinary approach study

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Radioactive wastes, mainly produced by the nuclear energy industry, must be stored for a long period of time until their toxicity decrease to non-dangerous levels. For this reason, the deep geological disposal of radioactive waste (DGR), encapsulated in metal containers and surrounded by geological barriers like bentonites, has been considered as the safest option for their disposal.

The present work aimed to study the selenium reduction by the bacterial strain *Stenotrophomonas* sp. BII-R7, isolated from bentonite formations of Cabo Gata Natural Park (Almería, Spain), under aerobic and anaerobic conditions. Se is considered as a significant component of high-level radioactive waste originating from nuclear industry. For this purpose, a combination of microbiological, spectroscopic and microscopic techniques was applied. Under aerobic conditions, the cells of this strain were able to reduce Se(IV) to Se(0) producing 30 nm sized Se NPs as was revealed by X-ray diffraction analysis. High resolution Scanning-Transmission Electron Microscopy (STEM) equipped with High-Angle Annular Dark Field (HAADF) detector indicated that these Se NPs are located intracellularly and within the extracellular space. Under anaerobic respiration conditions, relevant for the DGR, the cells used acetate as electron donor to reduce Se(IV) to Se(0) in presence of different electron acceptors including nitrates, Fe (III), etc. Preliminary BII-R7 draft genome analysis revealed the presence of genes which encode enzymes described for their ability to reduce Se (glutathione-related enzymes, NADH-dependent enzymes or thioredoxin reductase).

The results obtained in this work demonstrate the role of indigenous bentonite bacteria in the immobilization of Se through its reduction, which in turn indicate the potential positive impact of microbes on the long-term integrity of the repository system.

ACKNOWLEDGEMENTS

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17:10 **Enzymatic reduction of Se (IV) by *Stenotrophomonas* sp. BII-R7 under aerobic and anaerobic conditions: multidisciplinary approach study**
M. A. Ruiz-Fresneda, J. Gómez-Bolívar, I. Sánchez-Castro, M. L. Merroun, Spain

17:30 **Functional interaction between frataxin and oxidative stress control proteins**
T.-H.-L. Han, J. M. Camadro, J. M. El-Hage-Chahine, N. T. Ha-Duong, France

17:50 **MbfA, an Iron Export System in *Brucella* Providing a Novel Iron-mediated Mechanism for Resistance Against the Immune System**
C. Moon, P. Ireland, M. Lindars, J. T. M. Lewis, L. M. Wynne, E. Pohl, K. A. Karatzas, J. M. East, H. Atkins, S. C. Andrews, United Kingdom

18:10 Break

18:30 **Poster Session**

21:30 End

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CERTIFICATE OF ATTENDANCE

We confirm that

Miguel Ángel Ruiz Fresneda

Granada, Spain

has attended the "10th International BioMetals Symposium"
and paid the registration fee of 320,00 € and present the oral on July 12, 2016:

"Enzymatic reduction of Se (IV) by Stenotrophomonas sp. BII-R7 underaerobic and anaerobic conditions: multidisciplinary approach study"

Dr. Gerhard Geipel
Chair

Dresden, July 15, 2016

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CARL ZEISS - AWARD

ZEISS

This is to honor

Mr. Miguel Ángel Ruiz Fresneda

for the excellent presentation at the

10th International BioMetals Symposium
July 10-15, 2016 | Dresden, Germany

Abstract title:

"Enzymatic reduction of Se (IV) by Stenotrophomonas sp. BII-R7 under aerobic and anaerobic conditions: multidisciplinary approach study"

Dr. Pierre Cornelis
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