TOYOHASHI UNIVERSITY OF TECHNOLOGY
Master Technology, Create Technology

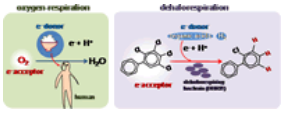
TOYOHASHI UNIVERSITY of TECHNOLOGY
e-Newsletter
News and views from one of Japan's most innovative and dynamic science and technology-based academic institutes

No. 2, Mar 2011

Research highlights

Health and environment: New microorganisms for cleaning up PCB contamination

Naoko Yoshida



Enlarge Image
Reductive dehalogenation by dehalorespiring bacteria (DHRB)

Polychlorinated biphenyls (PCBs) are a family of so-called 209 biphenyl congeners are major pollutants and pose a threat to human health and the environment.

A promising remediation technology is bioremediation using dehalorespiring bacteria (DHRB), which dehalogenate PCBs to less chlorinated biphenyls via respiration, although as yet only three bacteria have been isolated and their dehalogenation activities have been limited to doubly flanked chlorines of PCBs.

Now, Naoko Yoshida and colleagues at Ecotopia science institute in Nagoya University, Japan, successfully obtained DHRB that dehalogenated a variety of aromatic halides including polychlorinated phenols, benzenes, biphenyls, and dibenzo-*p*-dioxins.

The DHRB were obtained by sequential transfer culture of paddy-soil with lactate and 4,5,6,7-tetrachlorophthalide (commercially known as 'fthalide')—an effective fungicide for rice blast disease that is phylogenetically identified as a novel species of genus *Dehalobacter*.

The dechlorination activity of the *Dehalobacter* sp. for PCBs was observed for chlorines substituted at the *para*, *meta*, and *ortho* positions of PCBs, which included not only doubly flanked chlorine and but also singly flanked chlorines.

The researchers are confident that *Dehalobacter* sp will lead to an expansion of the dechlorination spectrum of PCBs in the bioremediation process for PCBs-contaminated sites.

Reference:

- Naoko Yoshida[1], Lizhen Ye[2], Daisuke Baba[2], and Arata Katayama[2]
- A novel *Dehalobacter* species is involved in extensive 4,5,6,7-tetrachlorophthalide dechlorination
- *Applied and Environmental Microbiology* **75**, 2400–2405 (2009).
- Digital Object Identifier (DOI): 10.1128/AEM.02112-08
- [1]Naoko Yoshida is now at the Electronics-Inspired Interdisciplinary Research Institute (EIIRIS), Toyohashi University of Technology, Aichi, Japan.
- [2]EcoTopia Science Institute, Nagoya University.
- Electronics-Inspired Interdisciplinary Research Institute (EIIRIS), Toyohashi University of Technology: http://www.eiiris.tut.ac.jp/
- EcoTopia Science Institute, Nagoya University: http://www.esi.nagoya-u.ac.jp/eng/