

## 内分泌攪乱物質により汚染された 土壌・底質のバイオリクターによるリスク削減

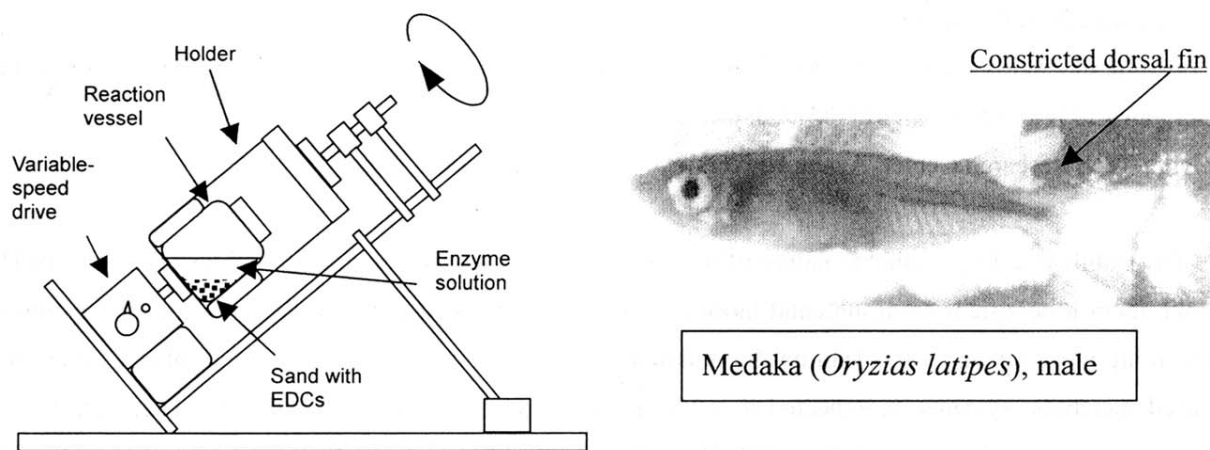
田中孝明,<sup>1</sup> 能勢正崇,<sup>1</sup> 遠藤亜友子,<sup>1</sup> 藤井智幸,<sup>2</sup> 谷口正之<sup>1</sup>  
新潟大学工学部機能材料工学科,<sup>1</sup> 東京大学大学院農学生命科学研究科<sup>2</sup>

### Reduction in Risk of Soils and Sediment Contaminated with Endocrine Disrupting Chemicals by Using a Bioreactor

Takaaki Tanaka,<sup>1</sup> Masataka Nose,<sup>1</sup> Ayuko Endo,<sup>1</sup> Tomoyuki Fujii,<sup>2</sup> and Masayuki Taniguchi<sup>1</sup>

Department of Materials Science and Technology, Niigata University,<sup>1</sup> and Graduate School of Agricultural and Life Sciences, University of Tokyo,<sup>2</sup> Japan.

Hydrophobic endocrine disrupting chemicals such as nonylphenol are higher in the bottom sediment rather than in the surface water in the water environment. In this paper we developed a biocatalytic treatment system to reduce the risk of contaminated areas. Sea sand with the endocrine disrupting chemicals ( $2\text{--}3\ \mu\text{mol g}^{-1}$ ) as model contaminated soil was treated by laccase, an oxidizing enzyme. A rotating reactor was used for the biocatalytic treatment. Laccase from *Trametes* sp. (Laccase Daiwa, Daiwa Kasei) decreased the amount of nonylphenol, octylphenol, bisphenol A, and ethynylestradiol (synthetic estrogen) at pH 5 and at a rotating speed of 10 rpm. The phenolic endocrine disrupting chemicals would have polymerized via the enzymatic oxidative conversion to their phenoxyl radicals. The estrogenic activities of the product compounds, which were measured by Medaka Vitellogenin ELISA System (EnBio), were decreased by the biocatalytic treatment. Our treatment system with a rotating reactor will be useful for the remediation of bottom sediment and soil contaminated with endocrine disrupting chemicals in the leachates and effluents from waste landfills, industrial plants, and sewage-treatment works.



**Fig.** Rotating reactor for the treatment of endocrine disrupting chemicals adsorbed on soil and sediment and Medaka (*Oryzias latipes*) used for the assay of estrogenic activity of nonylphenol treated by laccase.