

# Method development to follow degradation of organotin compounds by litter-decomposing fungi

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**Background:** Organotin compounds are organic derivatives of a tin atom covalently bound to one or more alkyl or aryl groups. Especially tri-substituted organotin compounds such as tributyltin exhibit highly toxic characteristics and endocrine disrupting activities. Organotins have been used in antifouling paints on ship hulls for several decades and are found in sediments. Without any treatment dealkylation and dearylation takes place in sediments with half-lives of several years. Litter-decomposing fungi produce powerful enzymes that degrade recalcitrant plant lignin and also a variety of persistent chemicals in nature, and these fungi can be easily added to contaminated soil.

**Aims:** 1) Degradation of organotin compounds in sediments using litter-decomposing fungi, 2) Follow the removal of endocrine disrupting activity using a bioluminescent yeast assay displaying the retinoid X receptor, 3) Determination of metabolites using GC-MS and proposal of degradation pathways

**Results:** A bioluminescent yeast strain has been equipped with a plasmid carrying a hybrid retinoic X receptor. This newly designed bioreporter was found sensitive enough to detect the organotin compounds tributyltin and triphenyltin at nanomolar concentrations. Furthermore it was used to measure tributyltin directly in untreated spiked sediments (Kabiersch *et al.* 2013). A set of fungi was screened for the ability to grow on agar plates containing tributyltin and to grow into sediment spiked with tributyltin. Two litter-decomposing fungi were chosen for further degradation studies, in which the removal of endocrine disrupting activities (determination by the bioluminescent yeast assay) and the formation of metabolites (determination by GC-MS) will be followed.

**Reference:** Kabiersch *et al.* (2013) Analytical Chemistry 85: 5740-5745