Degradation of Organotin Compounds by Peptide Siderophore

Organotin contamination caused by antifouling paints and agrochemicals has been considered to be one of important ecotoxicological problems. We discovered that a bacterial peptide siderophore (pyoverdine), which is a powerful Fe$^{3+}$ chelator and an efficient Fe$^{3+}$ transporter, possesses a catalytic function for organotin degradation. The reaction leads to the dephenylation of tri- and diphenyltin under mild conditions. Furthermore, the activity for diphenyltin is increased by addition of Cu$^{2+}$, suggesting that the siderophore also behaves as a metal-complexation catalyst. The new function found in peptide siderophore should be available for the design of a functional chelator to degrade trace organometallic compounds.