Phthalic symbol: Important symbol of pollution is broken down by microbes

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Immobilized microbes can break down potentially harmful phthalates, according to researchers in China, writing in the *International Journal of Environment and Pollution*. The microbes might be used to treat industrial waste water and so prevent these materials from entering the environment.

Phthalic Acid Esters (PAEs), commonly known as phthalates, are widely used as additives in polymer manufacture as plasticizers. They do not readily degrade in the environment and so have become widely distributed in natural water, wastewater, soils, and sediment.

Concerns about their suspected ability to cause genetic mutations and cancer have led to their listing as priority pollutants by the US Environmental Protection Agency, the European Union, the China National Environmental Monitoring Centre, and other regulatory authorities.

Weizhong Wu of the College of Environmental Sciences and Engineering, at Peking University, in Beijing, and Xianlin Meng of Harbin Institute of Technology, in Nangang District, have identified and isolated a microbe that can digest one of the most common PAEs, d-n-butyl phthalate. This compound is widely used and is one of the most frequently found in diverse environmental samples including groundwater, river water, drinking water, open ocean water, soil humates, lake sediments and marine sediments, the researchers say.

They have now used acclimation and enrichment techniques to ferment adequate quantities of the active microbe, which was obtained from the activated sludge from a wastewater treatment plant. It was enriched and acclimated by incubating activated sludge. This involves cultivating the microbes in a solution containing phthalate as the only source of carbon for the microbes. Successive divisions of microbial cells quickly leads to the evolution of a strain that can quickly metabolize the phthalate and convert it into the raw materials for microbial growth and reproduction.

The researchers then tested this phthalate-digesting microbe by immobilizing cells on a new type of ceramic honeycomb support. They then measured the before and after concentration of phthalate in a simulated wastewater sample. Initial concentration was 100 milligrams per liter which fell to less than 1.0 milligram per liter within two days of treatment with the microbial honeycomb.

The team points out that the rate of degradation was two and a half times faster with immobilized microbes than with microbes floating free in the sample.

More information: "Biodegradation of plasticiser di-n-butyl phthalate by immobilised microbial cells" in *Int. J. Environment and Pollution*, 2009, 38, 203-211

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