The influence of Organophosphate flame retardants (OPFRs) and Cadmium co-contamination on *Corbicula fluminea* in sediments

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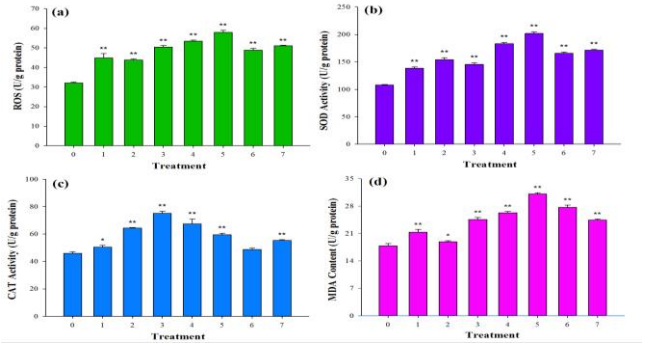
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Abstract

Organophosphate flame retardants (OPFRs) , as alternatives of brominated flame retardants (BFRs) and polybrominated diphenyl ethers (PBDEs), are widely used in commercial and consumer products. In recent years, OPFRs have been frequently detected in environment and biota, and have been demonstrated neurotoxic, endocrine disruptors, and carcinogenic on diverse organisms. All most studies of the influence of OPFRs on cellular detoxification and the defense system of organisms only focused on the aqueous phase. While aquatic sediment as source and sink of contaminates, contains more OPFRs and other pollutants. And the literature about the influence of OPFRs and heavy metals co-contamination on organisms is scare. In this study, we investigated that the effect of OPFRs and Cd co-contamination on cellular detoxification, the defense system and nervous system of Corbicula fluminea in sediment. The healthy and mature C. fluminea were exposed to 25mg/kg dw Cd and a gradient concentration of OPFRs from 24mg/kg-216mg/kg for 7 days. The results showed that the activity of reactive oxygen species (ROS), superoxide dismutase (SOD), and catalase (CAT) were significantly enhanced with the gradient concentration of OPFRs ($p<0.01$), up to max then reduced. The content of malondialdehyde (MDA) was greatly increased compared with control group ($p<0.01$), which indicated the excess ROS production exceed the elimination of antioxidant enzymes and the lipid was peroxidated. To better understand the influence of co-contamination, the content of metallothionein (MT), cytochrome P450 (CYP450) and the activity of acetylcholinesterase (AChE) were also used to evaluate the cellular detoxification and nervous system of C. fluminea in this study. They all allergic to OPFRs. Data provided here will be helpful to comprehensively understand the influence of OPFRs and heavy metals on benthic organism.

Image



Recent Publications

1. Fan X, Wang C, Wang P (2008). TiO_2 nanoparticles in sediments: Effect on the bioavailability of heavy metals in the freshwater bivalve *Corbicula fluminea*. Journal of Hazardous Materials, 342: 41-50
2. Fan X, Wang C, Wang P (2007). Effects of carbon nanotubes on physicochemical properties and sulfamethoxazole adsorption of sediments with or without aging processes. Chemical Engineering Journal, 310: 317-327.
3. Qian J, Li K, Wang P (2017) Toxic effects of three crystalline phases of TiO2 nanoparticles on extracellular polymeric substances in freshwater biofilms. Bioresource Technology,241: 276-283
4. Yi X, Wang C, Wang P (2017) Effects of cerium oxide nanoparticles on the species and distribution of phosphorus in enhanced phosphorus removal sequencing batch biofilm reactor. Bioresource Technology,227:393-397.
5. You X, Wang P (2017) Insights into the short-term effects of CeO2 nanoparticles on sludge dewatering and related mechanism. Water Research. Doi:10.1016/j.watres.2017.04.011.



Biography

Xiulei Fan focuses on evaluating the risk of nanomaterial (TiO2 nanoparticles and carbon nanotubes) in the aquatic environment, especially in the sediments. He has investigated the effects of nanomaterial (TiO2 nanoparticles and carbon nanotubes) on the toxic pollutants adsorption behaviors in sediments, and explored the nanomaterial on the accumulation and toxicity of pollutants in *Corbicula fluminea*.

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Notes/Comments: