Alterations of exoskeletal surface roughness and chitin synthase 2 gene expression on *Macrophthalmus japonicus* crabs after hexabromocyclododecane exposure

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Abstract

Hexabromocyclododecanes (HBCDs), used as flame retardants, are ubiquitously distributed in marine organisms and the environment owing to their global widespread use for insulation applications in the form of expanded and extruded polystyrene foams. *Macrophthalmus japonicus* crabs are burrowing crabs, which have purification and nutrient cycling functions in tidal flat regions, and can be monitored as a potential coastal sediment environment bioindicator. In the study, we investigated the effects of HBCD exposure in the surface roughness of chitin-formed exoskeleton and chitin biosynthesis. To do this, the expression patterns of chitin synthase 2 gene and exoskeleton surface roughness were analyzed in the gills and hepatopancreases of *M. japonicus* after exposure to three concentrations of HBCD for 1, 4, and 7 days. As a results, *M. japonicus* chitin synthase 2 expression was significantly downregulated upon exposure to all HBCD concentrations on day 7. In addition, changes of exoskeleton surface roughness were observed in *M. japonicus* crabs exposed to all HBCD concentrations. These results suggest that HBCD toxicity induces a disruption in the biosynthesis of chitin, a major factor of the crustacean exoskeleton, and finally may relates to alterations in structural formations of crab exoskeletal surface.

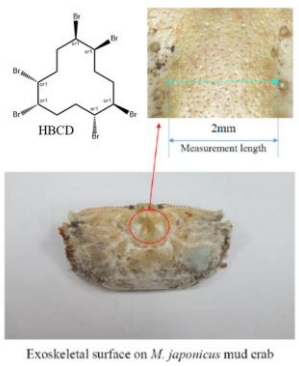

Figure 1: Changes in the exoskeleton surface roughness of *M. japonicus* crabs exposed to HBCD