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无机镉对魁蚶(Scapharca broughtonii)毒性效应及其安全性评价

刘天红, 于晓清, 刘广斌, 王颖, 吴莹莹, 刘恩孚, 邱兆星

山东省海洋生物研究院 青岛 266100



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摘要:

为研究无机镉对不同规格魁蚶的毒性,采用急性毒性试验方法和定性定量研究Cd²⁺对不同规格魁蚶(Scapharca broughtonii) 24、48、72、96 h的半致死浓度(LC₅₀)和安全养殖浓度(SC₅₀)。结果显示,Cd²⁺对小规格魁蚶24、48、72、96 h的LC₅₀和SC₅₀分别为131.11、41.40、3.57、3.37、1.24 mg/L;Cd²⁺对中规格魁蚶24、48、72、96 h的LC₅₀和SC₅₀分别为54.10、9.46、2.54、0.50、0.09 mg/L;Cd²⁺对大规格魁蚶24、48、72、96 h的LC₅₀和SC₅₀分别为157.36、38.13、8.90、3.46、0.67 mg/L,Cd²⁺对于各规格魁蚶的安全养殖浓度均高于国内各类养殖水质标准。结果表明,Cd²⁺对于小规格魁蚶属于中毒类物质,对于中规格魁蚶属于剧毒类物质,对于大规格魁蚶属于高毒类物质,小规格魁蚶可能对无机镉产生明显的毒物兴奋效应。

关键词: Cd²⁺ 不同规格 魁蚶 安全养殖浓度 毒物兴奋效应

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The Safety Evaluation of the Acute Toxicological Effects of Inorganic-Cadmium on Scapharca broughtonii

LIU Tianhong¹, YU Xiaoqing¹, LIU Guangbin^{1,2}, WANG Ying¹, WU Yingying^{1,2}, LIU Enfu^{1,2}, QIU Zhaoxing^{1,2}

1.Marine Biology Institute of Shandong Province Qingdao 266100;2.Key Laboratory of Benthic Fisheries Aquaculture and Enhancement Qingdao 266100

Abstract:

Heavy metals are considered as the most deleterious contaminants in the environment due to their non-degrading and bioaccumulative properties. Shellfish have been used as an indicator for the toxicity of Cd, Pb, and other heavy metals. However, there are very few studies about the effects of heavy metals on Scapharca broughtonii. The safety of the seafood largely depends on the level of heavy metals accumulated in the body, which is determined by the content of heavy metals in the aquaculture environment. Here qualitative and quantitative methods were conducted to study the acute toxicity of cadmium on S. broughtonii with different sizes, which serves as a sign of the seafood safety. We determined the semi lethal concentration (LC₅₀) and the safety concentration (SC₅₀) of cadmium in different time courses (24 h, 48 h, 72 h and 96 h), by SPSS18.0 statistical software (Prob-Ig). The LC₅₀ values of small S. broughtonii were 131.11, 41.40, 3.57 and 3.37 mg/L corresponding to the time courses above, and the SC₅₀ value was 1.24 mg/L. In the medium S. broughtonii the LC₅₀ values were 54.10, 9.46, 2.54, and 0.50 mg/L, and the SC₅₀ value was 0.09 mg/L. About the large S. broughtonii the LC₅₀ values were 157.36, 38.13, 8.90, 3.46 mg/L and the SC₅₀ value was 0.67 mg/L. These results demonstrated that the SC₅₀ values of Cd²⁺ in S. broughtonii were higher than the water quality standard in aquaculture. The toxicity of Cd²⁺ was identified as moderate for small S. broughtonii, extreme toxicity medium S. broughtonii, and high toxicity for large S. broughtonii. There was hermetic effect on inorganic cadmium for small S. broughtonii.

Key words: Key Laboratory of Benthic Fisheries Aquaculture and Enhancement Qingdao 266100

