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锌对镉在河南华溪蟹鳃组织亚细胞中富集的影响

Effects of zinc exposure on the bioaccumulation of cadmium in the subcellular fractions of freshwater crab *Sinopotamon henanense* gills

关键词：河南华溪蟹 鳃 亚细胞组分 富集 镉锌联合

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摘要：为了研究锌对镉在河南华溪蟹（*Sinopotamon henanense*）鳃中富集的影响，本文选择不同浓度镉锌联合处理14 d和28 d后，采用亚细胞分离法将鳃组织分为热稳定蛋白（HSP）、富含金属颗粒（MRG）、生物活性部分（BAM）和细胞碎片部分（CD），其中，热稳定蛋白（HSP）和富含金属颗粒（MRG）组成生物解毒部分（BDM），利用火焰原子吸收分光光度法（AAS）测定各个亚细胞组分中镉的含量.结果显示，BDM是镉富集的重要场所，镉在其中所占比例达到50%.其中，BDM包括热稳定蛋白（HSP）和富含金属颗粒组分（MRG）.随着镉处理浓度的增加，锌对镉在HSP和MRG中的蓄积表现为先促后抑的作用.在BAM中，加锌促进镉的蓄积，且相较于高浓度锌（1000 μg • L^{-1}），低浓度锌（100 μg • L^{-1}）的促进作用更为显著.研究表明，锌对镉在河南华溪蟹鳃中的富集及分布有一定影响.

Abstract: To investigate the effects of zinc exposure on the bioaccumulation of cadmium in the gills of the freshwater crab, laboratory-reared *Sinopotamon henanense* were exposed to either cadmium alone or the combination of cadmium and zinc at different concentrations, and then were sampled at day 14 and day 28 after exposure. By using the subcellular fractionation method, the collected grills were separated into four parts, namely, the heat-stable protein (HSP), metal-rich granules (MRG), biologically active metals (BAM) and the cellular debris (CD). The HSP and MRG belong to biological detoxified metals (BDM). The cadmium accumulation in each part was measured by the flame atomic absorption spectrophotometry (AAS). The results demonstrated that BDM contained 50% of cadmium in all the parts, suggesting an important fraction for cadmium accumulation. Either high (1000 μg • L^{-1}) or low (100 μg • L^{-1}) concentration of zinc promoted cadmium accumulation in the HSP and MRG at low exposure concentration of cadmium, while inhibiting its accumulation at high exposure concentration. In BAM, either high or low concentration zinc played promoting effects at certain degree on cadmium accumulation, while lower concentration of Zn showed better promoting performance than higher concentration of Zn. In summary, the results suggested that exposure to Zn affected the bioaccumulation and distribution of Cd in the gills of the freshwater crab *Sinopotamon henanense*.

Key words: *Sinopotamon henanense* gills subcellular fractions accumulation cadmium and zinc

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