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研究报告

重金属离子对凡纳滨对虾肝胰脏、鳃丝和血液SOD活力的影响

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摘要

研究了3种重金属离子(Cu^{2+}、Zn^{2+}、Cd^{2+})在96 h内对凡纳滨对虾(Litopenaeus vannamei)对肝胰脏、鳃丝和血液超氧化物歧化酶(SOD)活力的影响.结果表明，凡纳滨对虾SOD活力在3种重金属离子作用下随取样时间变化显著($P<0.05$)，Cu^{2+}在实验浓度范围内(0.1～1 mg·L^{2+})，肝胰脏、鳃丝和血液的SOD活力随时间延长呈一峰值变化，Zn^{2+}在10 mg·L^{-1}时对肝胰脏表现为显著抑制作用，Cd^{2+}在0.5 mg·L^{-1}时对肝胰脏和鳃丝起显著抑制作用，0.25 mg·L^{-1}对鳃丝SOD活力无显著变化($P>0.05$)，其他浓度Zn^{2+} (<10 mg·L^{-1})、Cd^{2+} (<0.25 mg·L^{-1}) 对各组织器官SOD活力的影响随时间延长均呈现先升高后下降的趋势.3种重金属离子对凡纳滨对虾肝胰脏、鳃丝、血液SOD活力的影响呈现明显的剂量-时间效应关系.其SOD活力大小顺序为肝胰脏＞鳃丝＞血液，3种重金属离子对凡纳滨对虾伤

害大小顺序为Cd2+＞Cu2+＞Zn2+.

关键词 重金属离子,凡纳滨对虾,肝胰脏,鳃丝,血液,SOD

分类号

Effects of heavy metal ions on SOD activity of Litopenaeus vannamei hepatopancreas,gill and blood

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Abstract

This paper studied the effects of Cu^{2+} ,Zn^{2+} and Cd^{2+} on the superoxide dismutase (SOD) activity of Litopenaeus vannamei hepatopancreas,gill and blood.The results showed that the SOD activity changed significantly with prolonged exposure of these ions ($P<0.05$).The SOD activity of all test objectives changed with a single peak under the exposure of 0.1～1 mg Cu^{2+} ·L^{-1} ,that of hepatopancreas and of hepatopancreas and gills was inhibited obviously under 10 mg Zn^{2+} ·L^{-1} and 0.5 mg Cd^{2+} ·L^{-1} , respectively, while 0.25 mg Cd^{2+} ·L^{-1} had no significant effect on that of gill.The SOD activity of hepatopancreas,gill and blood all increased first and then decreased under the prolonged exposure of <10 mg Zn^{2+} ·L^{-1} and <0.25 mg Cd^{2+} ·L^{-1} .There was an obvious dose-time response relationship between test metal ions and SOD activity.The SOD activity was decreased in order of hepatopancreas>gill>blood,while the toxicity of test metal ions was in order of Cd^{2+} >Cu^{2+} >Zn^{2+}.

Key words Heavy metal ions Itopenaeus vannamei Hepatopancreas Gill Blood SOD

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