

硫丹对草鱼I相、II相酶活性及DNA损伤的影响

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Effects of Endosulfan on the Phase I and II Enzyme Activities and DNA Damage of *Ctenopharyngodon idellus*

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摘要

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摘要 研究了硫丹对草鱼肝脏I相酶氨基比林-N-脱甲基酶(APND)和红霉素-N-脱甲基酶(ERND)、II相酶谷胱甘肽-S-转移酶(GST)活性及DNA受损细胞彗星尾长伤(TL)和尾部DNA含量(%TDNA)的影响。试验共设置0.18、0.36和0.71 $\mu\text{g}\cdot\text{L}^{-1}$ 3个暴露浓度组和1个空白对照组,分别在试验24、72、120和168h时取样测定各指标。结果表明,24h时,0.36和0.71 $\mu\text{g}\cdot\text{L}^{-1}$ 暴露组草鱼肝脏APND活性与对照组相比显著升高($P<0.05$ 或 $P<0.01$),72h后受到显著抑制($P<0.01$);120h后各暴露组APND活性与对照组相比均表现为受到显著抑制($P<0.05$ 或 $P<0.01$)。ERND活性总体表现为受诱导,GST活性总体表现为先受诱导后受抑制的变化趋势;0.36和0.71 $\mu\text{g}\cdot\text{L}^{-1}$ 暴露组GST活性均在72h时达到最高值,之后随暴露时间的延长缓慢降低,并在168h表现为受抑制;0.18 $\mu\text{g}\cdot\text{L}^{-1}$ 暴露组在120h达到最大值,之后降低,168h时GST活性与对照组水平相当。经硫丹暴露后,草鱼肝脏细胞DNA明显受损,TL与%TDNA均随硫丹浓度的升高或暴露时间的延长而增加,且相关显著。硫丹可影响草鱼肝脏I相、II相代谢酶活性,并对肝细胞DNA造成遗传损伤。

关键词: 硫丹 草鱼 酶活性 I相酶 II相酶 DNA损伤

Abstract: Effects of endosulfan were investigated on activities of Phase I enzymes(APND,ERND) and Phase II (GST) enzymes in the liver of *Ctenopharyngodon idellus* and on its DNA were investigated. The experiment was designed to have four treatments, that is CK and three levels of endosulfan concentration (A: 0.18, B: 0.36 and C: 0.71 $\mu\text{g}\cdot\text{L}^{-1}$). Samples of the fish were taken for analysis separately after they lived in these treatments for 24, 72, 120 and 168 h. Results show that in Treatments B and C the activity of APND was significantly higher after 24h ($P<0.05$ or $P<0.01$), but inhibited significantly after 72h ($P<0.01$) as compared to CK. It was inhibited to a significant extent after 120 h in all the treatments ($P<0.05$ or $P<0.01$). On the whole the activity of ERND was induced by the exposure, whereas the activity of GST was induced at the initial stage and then turned to be inhibited. In Treatments B and C the activity of GST peaked after 72 h of exposure and afterwards declined gradually with the duration of exposure, till 168 h when it turned to be inhibited, while in Treatment A, it peaked after 120 h and declined afterwards, too, till 168 h when it turned off to be equal to that in CK. The damage the exposure of the fish to endosulfan brought to DNA of its liver cells was significant. TL and %TDNA as indicators of DNA damage increased with the increasing dosage of endosulfan in treatment or the extending duration of exposure, showing a significant relationship. In conclusion, endosulfan affects activities of Phase I and Phase II enzymes in the liver of *Ctenopharyngodon idellus* and causes genetic damage to the DNA of liver cells of the fish.

Keywords: endosulfan *Ctenopharyngodon idellus* enzyme activity Phase I enzyme Phase II enzyme DNA damage

Received 2011-08-16; published 2012-01-25

Fund:

国家自然科学基金(30670226); 重庆市自然科学基金(CSTC, 2007BB1373)

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引用本文:

武焕阳, 靳涛, 许莉佳, Oscar Ortegon, 胡颖雄, 丁诗华, 李云. 硫丹对草鱼I相、II相酶活性及DNA损伤的影响[J] 生态与农村环境学报, 2012, V28(1): 54-60

WU Huan-Yang, JIN Tao, XU Li-Jia, Oscar Ortegon, HU Ying-Xiong, DING Shi-Hua, LI Yun. Effects of Endosulfan on the Phase I and II Enzyme Activities and DNA Damage of *Ctenopharyngodon idellus*[J] Journal of Ecology and Rural Environment, 2012, V28(1): 54-60

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