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凡纳滨对虾乙酰胆碱酯酶组织分布及对有机磷农药敏感性分析

The tissue distribution of acetylcholinesterase from white shrimp (*Litopenaeus vannamei*) and sensitivity analysis of organophosphorus pesticides

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中文关键词: 凡纳滨对虾 乙酰胆碱酯酶 组织分布 有机磷农药 IC_{50}

英文关键词:*Litopenaeus vannamei* AChE tissue distribution organophosphorus pesticides IC_{50}

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中文摘要:

采用改进的ELLMAN法测定凡纳滨对虾（*Litopenaeus vannamei*）脑神经节乙酰胆碱酯酶（acetylcholinesterase，AChE）活性，确定其适宜测定条件，并在此基础上测定对虾不同组织AChE活性，比较毒死蜱、敌敌畏、辛硫磷和乙酰甲胺磷4种有机磷农药对凡纳滨对虾脑神经节AChE活性的影响。结果表明，温度35 ℃，磷酸缓冲液pH 7.5时，凡纳滨对虾的AChE活性最高，保温时间对酶活性影响很小；对虾AChE活性存在着明显的组织分布差异性，脑神经节AChE活性最高，为（49.73±8.42） nmol/(min·mg)，分别是鳃、肌肉和肝胰腺的3倍、15倍和19倍；对虾AChE 对敌敌畏最为敏感，IC_{50} 为0.19 μg/mL，对毒死蜱和辛硫磷敏感性较强，IC_{50} 分别为7.20 μg/mL和9.39 μg/mL， AChE对乙酰甲胺磷敏感性最弱，IC_{50} 为136.77 μg/mL。由此可见，对虾养殖中应注意防范敌敌畏、毒死蜱和辛硫磷等有机磷农药的毒性危害。

英文摘要:

The acetylcholinesterase (AChE) activity of cerebral ganglion from white shrimp (*Litopenaeus vannamei*) was determined by the improved method of ELLMAN. On the basis of suitable conditions for determination, the AChE activities of other tissues were determined. This study also compared the effects of chlorpyrifos, dichlorvos, phoxim and acephate on AChE activity in cerebral ganglion. The results showed that the highest activity of AChE was obtained at temperature of 35 ℃ and pH value of phosphate buffer solution of 7.5, while holding time had little effect on the AChE activity. The difference of AChE activitiy in different tissues from white shrimp was obvious. The AChE activity of cerebral ganglion was 49.73±8.42 nmol/(min·mg)protein, which was 3 times, 15 times and 19 times higher than that of gills, muscle and hepatopancreas, respectively. AChE was most sensitive to dichlorvos(IC_{50} =0.19 μg/mL) and sensitive to chlorpyrifos(IC_{50} =7.20 μg/mL) and phoxim (IC_{50}=9.39 μg/mL), but was less sensitive to acephate (IC_{50} =136.77 μg/mL). This shows that the shrimp culture should prevent the toxicity of organophosphorus pesticides, such as dichlorvos，chlorpyrifos and phoxim.

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