

## 红裸须摇蚊幼虫生物标志物系统对苯酚的响应

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**摘要** 以红裸须摇蚊4龄幼虫为对象, 测定了苯酚对摇蚊幼虫急性毒性、体质量、化蛹率及体内保护酶和解毒酶活性的影响。结果表明: 苯酚对摇蚊4龄幼虫6、24、48、72和96 h半致死浓度 $LC_{50}$ 分别为222.52、134.86、67.74、47.39和35.76  $mg \cdot L^{-1}$ ; 亚致死剂量苯酚(0.4、4和40  $mg \cdot L^{-1}$ )处理降低摇蚊4龄幼虫干湿质量和化蛹率; 摇蚊4龄幼虫暴露于苯酚液72 h, 过氧化氢酶(CAT)、超氧化物歧化酶(SOD)、谷胱甘肽S-转移酶(GST)和羧酸酯酶(CarE)均对苯酚暴露做出响应, 且随着浓度增加和暴露时间的延长呈现一定的剂量-时间效应, 而摇蚊体内酸性磷酸酯酶(ACP)和碱性磷酸酯酶(ALP)对苯酚暴露响应较迟钝, 仅高浓度(40  $mg \cdot L^{-1}$ )长时间(48 h和72 h)的胁迫才会产生显著抑制作用, 表明摇蚊体质量、化蛹率和CAT、SOD、GST、CarE可作为监测苯酚水体污染的生物标志物。

**关键词:** 红裸须摇蚊 苯酚 急性毒性 生长发育 酶活性 生物标志物

**Abstract:** Taking the 4th-instar larval *Prosilocerus akamusi* as test object, this paper studied the acute toxicity of phenol, and the body mass, pupation rate, protective enzyme activities, and detoxifying enzyme activities of the larvae under exposure to phenol. The  $LC_{50}$  value of phenol to the larvae after exposure for 6, 24, 48, 72, and 96 h was 222.52, 134.86, 67.74, 47.39, and 35.76  $mg \cdot L^{-1}$ , respectively, and the dry mass, fresh mass, and pupation rate of the larvae decreased under the exposure of 0.4, 4, and 40  $mg \cdot L^{-1}$ . During 72 h exposure to phenol, the larval catalase (CAT), superoxide dismutase (SOD), glutathione S-transferase (GST), and carboxylesterase (CarE) activities responded to phenol in concentration- and time-dependent way, while the acid phosphatase (ACP) and alkaline phosphatase (ALP) activities responded slowly and were only inhibited significantly under the exposure to 40  $mg \cdot L^{-1}$  of phenol for 48 and 72 h, respectively. It was suggested that the body mass, pupation rate, and CAT, SOD, GST, and CarE activities of 4th-instar larval *P. akamusi* could be used as the biological markers to monitor the phenol pollution of water body.

**Key words:** *Prosilocerus akamusi* phenol acute toxicity growth and development enzyme activity biological marker

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