

研究论文

艳婀珍蝶取食对薇甘菊叶片生理指标的影响

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摘要 艳婀珍蝶取食后, 对薇甘菊叶片的超氧化物歧化酶(SOD)、过氧化氢酶(CAT)、过氧化物酶(POD)、多酚氧化酶(PPO)的活性, 总酚含量, 有机自由基(DPPH·)清除能力进行分析。结果表明, 取食后3h内所测各量即发生变化, 但与对照差异不显著。取食4d中, 叶片的SOD、POD活性总体上分别高于对照, CAT活性总体上低于对照, 说明在艳婀珍蝶胁迫过程中, SOD和POD所起的作用比CAT大。取食叶SOD、POD活性均在48h时达到最大值, 之后下降; CAT活性在24h时达到最大值, 之后也迅速下降。取食叶PPO活性动态变化程度较大, 表现出3个峰值, 分别为对照的1.83, 1.92倍和2.17倍; 总酚含量表现为先上升后下降的趋势; 对DPPH·的清除力一直显著性甚至极显著性低于对照。取食叶的SOD与CAT和POD均呈正相关性, 且相关性大于对照; PPO与总酚含量在取食叶与对照中也均呈弱正相关性。实验结果表明, 薇甘菊的保护酶对艳婀珍蝶胁迫的应激效应是短暂而有限的, 艳婀珍蝶的取食破坏了薇甘菊叶片功能, 较大程度的干扰了薇甘菊保护酶系统的防御代谢, 薇甘菊的总抗氧化能力降低。薇甘菊也不能通过改变酚类物质含量来抵御艳婀珍蝶的取食, 艳婀珍蝶取食对薇甘菊有较明显的控制作用

关键词 薇甘菊; 艳婀珍蝶; 保护酶; 总酚; 有机自由基

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Effects of *Actinote thalia pyrrha* (Fabricius) feeding on the physiological indexes in *Mikania micrantha* leaves

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Abstract *Mikania micrantha* is a dangerous exotic weed that is now widely distributed in Guangdong, China. The lepidopteran defoliator *Actinote thalia pyrrha* (Fabricius), introduced from the Indonesian Oil Palm Institute, is a potential biological control factor for *M. micrantha*. The change in activities of superoxide dismutase (SOD), catalase (CAT), peroxidase (POD), polyphenoloxidase (PPO), the content of total phenolics and the capacity of scavenging 1,1-diphenyl-2-picrylhydrazyl (DPPH·) free radical in *M. micrantha* leaves were analyzed after infestation by the larvae of *A. thalia pyrrha*. The results showed that a slight change of all the indexes in damaged leaves appeared within 3h. After four days of *A. thalia pyrrha* infestation, the activities of SOD and POD in damaged leaves were higher than the control, but the activity of CAT was lower than the control indicating that the functions of SOD and POD were impeded more than CAT. The activities of SOD and POD reached their highest value after 48h of *A. thalia pyrrha* feeding, then decreased, while the highest activity of CAT occurred after 24h before decreasing. The activity of PPO fluctuated greatly, its three peak values were 1.83, 1.92 and 2.17 times that of the control. Total phenolics content increased at first then decreased after 72h of *A. thalia pyrrha* feeding. The capacity of scavenging DPPH· was significantly lower than that of the control ($p < 0.05$). SOD activity was positively correlated with CAT and POD activities for both da

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amaged and normal leaves, however the value of correlation coefficient in damaged leaves was higher than in normal leaves. The content of total phenolics also showed a weak positive correlation with PPO activity. It is suggested that the protective response of *M. micrantha* to *A. thalipyrha* infestation was short and limited, but resulted in reduced function of leaves, disturbed metabolism in the protective enzyme system, and decreased antioxidative capacity. *M. micrantha* was not able to resist the feeding stress by altering content of total phenolics.

Key words [Mikania micrantha](#) [Actinote thalia pyrha](#) [protective enzyme](#) [total phenols](#) [organic free radical](#)

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