Identification of UDP-glycosyltransferases genes in *Glyphodes pyloalis* (Lepidoptera:Pyralidae) and their expression patterns under stress of Chlorfenapyr

*Xin-Hao Liang[1], Meng-Wen Yan[1], Zhi-Xiang Liu[1], Jian-Hao Ding[1], De-Lei Jiang[1], Yi- jiangcheng Li[1], Jun Wang[1,2], Fu-an Wu[1,2], Sheng Sheng**

[1] School of biotechnology, Jiangsu University of Science and Technology, 212018 Zhenjiang, China;

[2] Sericultural Research Institute, Chinese Academy of Agricultural Sciences, 212018 Zhenjiang, China.

Introduction

Glyphodes pyloalis Walker is a serious pest in mulberry fields, which threatens sericulture in china. For the control of *G. pyloalis* population, the primary strategy of preventing is to use organophosphorus insecticides. However, inappropriate use of insecticides has caused *G. pyloalis* outbreak and insecticide resistance. Chlorfenapyr is a new type of arylpyrrole insecticide and acaricide modified and synthesized by natural antibiotics. In the face of various insecticides, one of the strategies adopted by insects is the overexpression of detoxifying enzymes. There are few reports about whether UDP-glycosyltransferases that an important detoxification enzyme exist in *G. pyloalis* and whether they can metabolize Chlorfenapyr. In a word, the application of fenapyr to control *G. pyloalis* can reduce the use of pesticides and realize the sustainable development of land resources.

Methods

We quantitatively measured the expression levels *of GpylUGTs* by qRT-PCR to conducte the concentration-mortality response of *G. pyloalis* against chlorfenapyr .To further study the function of UGTs, dsRNA injection knocked down the expression of *GpylUGTs* and resulted in a significant decline of detoxification in *G. pyloalis* .The morality of larvae that silenced *GpylUGTs* was significantly higher than that infected with dsGFP. In conclusion, the present study revealed that UDP-glycosyltransferases contributed to the detoxification process of *G. pyloalis* when they were under the stress of commonly used insecticides.

Results & Discussion

Fig.1 The mulberry leaf treated with chlorfenapyr was fed to the *G. pyloalis* . In order to prevent mulberry leaves from drying, a layer of agar was laid at the bottom of the plastic box to keep moisture.

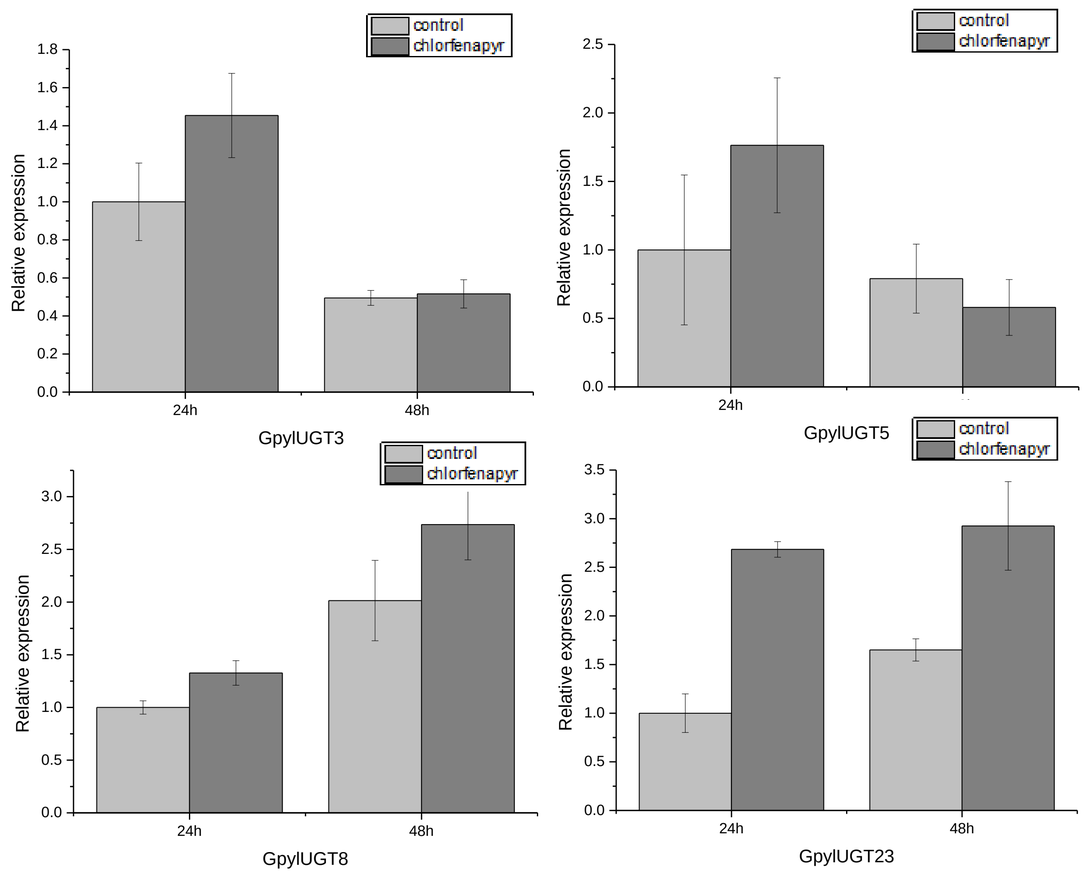

Fig.2 Relative expression profiling of *GpylUGTs* after Chlorfenapyr treatment.

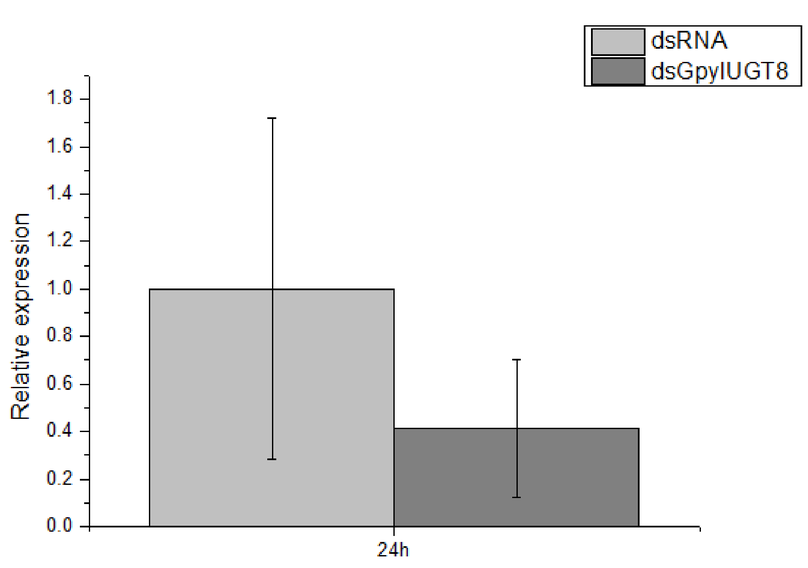

Fig.3 Relative expression profiling of *GpylUGT8* after dsRNA treatment.

Conclusion

Twenty four UGT genes were identified from the transcripts of *G. pyloalis* . The expression levels of eight UGT genes increased significantly after chlorfenapyr treatment, and decreased significantly after interference with *GpylUGT8*. Chlorfenapyr is effective on *G. pyloalis* and can be used as one of the control methods, which can also greatly reduce the pollution of harmful substances.

Acknowledgement

National Natural Science Foundation of China (31500312)
Key Research and Development Program (Modern Agriculture) of Zhenjiang City (NY2019021)

References

Marziyeh Oftadeh,Jalal Jalali Sendi,Asgar Ebadollahi. Pesticide Biochemistry and Physiology,2020.
Saif Ullah,Sarfraz Ali ShadCrop Protection,2017,99.
Li Xiuxia,Shi Haiyan,Gao Xiwu,Liang Pei. Pest management science,2018,74(3).