STUDIES ON GENE REGULATION OF SOME GENES THAT RELATED TO *BT*. TOXINS RESISTANCE IN THE COTTON WORM, *Spodoptera littoralis*

By

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ABSTRACT

A better understanding of the processing of *Bacillus thuringiensis* (*Bt*) Cry1C toxin in the midgut of *Spodoptera littoralis* larvae is very important to characterize the main regulatory elements of *Bt* tolerance. The current study aimed to evaluate the mRNA level of trypsin (Try), aminopeptidase N (APN), alkaline phosphatase (ALP), cadherin (Cad), and cytochrome P450 (CYP) in both susceptible and *Cry1C*- tolerant strains of *S. littoralis*. Total RNA was extracted from susceptible and tolerant strains to construct cDNA. Quantitative real-time PCR (qPCR) showed a significant upregulation of CYP gene in tolerant strain. In contrast, the levels of expression of Try, ALP and Cad were significantly downregulated in tolerant strain. APN relative mRNA expression did not show significant differences between susceptible and tolerant strains. Histologically, the midgut of late third-instar larvae of tolerant population *S. littoralis* showed vacuolization of the epithelium and disruption of both the peritrophic membrane and the striated boarder compared to the susceptible strain. Our data indicate the important roles of CYP, Try, ALP and Cad in the resistance development and toxicity to *Bt* Cry1C. The obtained results are useful for further illustrating of *Bt* Cry1C processing and *S. littoralis* tolerance.

Key words: *Spodoptera littoralis*, *Bacillus thuringiensis*, *Bt* Cry1C toxin, Tolerance, qPCR

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