A Midgut-Specific Chitin Synthase of *Anthonomus grandis* as Target for Pest Control by RNAi

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**INTRODUCTION**: The cotton boll weevil (*Anthonomus grandis*) is the most destructive insect pest that attacks cotton crop in Brazil. The endophytic habit of this insect larva make difficult their chemical control. A promising alternative to inhibit early development of insect pests is based on gene silencing using the RNA interference technique. Among the metabolic pathways important during insect development, chitin biosynthetic pathway was the target of this study. Chitin is a major component of exoskeleton and peritrophic membrane found in insects. Therefore, the chitin synthesis represents a target of great potential for the development of strategies to control insect pests. In this context, the objectives of this study were obtain cDNA sequence of *A. grandis* midgut chitin synthase, evaluate its expression during insect development and check the silencing effect by RNAi.

**MATERIAL AND METHODS**: The chitin synthase cDNA sequence was isolated through PCR amplification using degenerated and specific primers. Relative expression of AntgCHS2 was evaluated by qPCR during all phases of the *A. grandis* life cycle. To further explore biological functions of AntgCHS2, RNAi was performed by microinjecting sequence-specific dsRNA, produced *in vitro*, into larvae and adults insects. **RESULTS**: Our results describe the cloning and characterization of a chitin synthase cDNAs sequence from *A. grandis*, named AntgCHS2, which was predicted to encode 1404 amino acid residues. This protein sequence exhibited high similarity with other insect chitin synthase. The transcriptional analysis indicated that AntgCHS2 gene demonstrated an expression restricted to the insect midgut during the third instar and adult stage, the feeding phases. The AntgCHS2 silencing it was observed adult insect mortality as well as reduced oviposition. **CONCLUSION**: The interruption of chitinous structures synthesis, as peritrophic membrane, using RNAi technology through AntgCHS2 gene silencing can therefore be considered as a promising strategy to generate resistant GM cotton to the boll weevil.

Keywords: *Anthonomus grandis*; Boll weevil; Chitin synthase; RNAi; Peritrophic membrane;

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