Protein Profile of Mayze Weevil (Sitophilus zeamais) in Direct Response to Deltamethrin Induced-Hormesis

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INTRODUCTION: Hormesis is a widely used in toxicology to describe the biphasic dose-response curve, when exposure to the same chemical or physical stress induces a stimulatory and inhibitory response dose-dependent. A reparameterized logistic-logarithmic model was used to describe deltamethrin insecticide dose-response and test for the presence of hormesis in a strain of the maize weevil (Sitophilus zeamais). MATERIAL AND METHODS: Two-dimensional electrophoresis was used to identify differentially express proteins in direct response to deltamethrin induced-hormesis. The maximal insecticide dose that induced hormesis in the S. zeamais was tested to protein expression profile through the software Image Master 2D Platinium 7.5 (GE Healthcare). RESULTS AND DISCUSSION: Hormesis was confirmed by the statistical model test for the presence of hormesis. Deltametrin induced a biphasic dose-response curve with the strain tested. Two-dimensional gel electrophoresis showed spots well resolved across the entire pH range (3 up to 11). A total of 1204 protein spots were observed, twenty-three spots were up-regulated and eight spots were down-regulated by the hormeric insecticide dose. Organism’s response induced by the moderate stress can elicit a myriad of physiological stimuli ultimately affecting fitness. Here, we observed deltametrin low dose stimulate S. zeamais growth population while high dose induced inhibitory effect. Furthermore, molecular events associated with S. Zeamais response to moderate stress (low dose insecticide) are demonstrated through profile protein alteration and fitness gain (growth population). Deltamethrin exposure even to moderate doses induces many changes in the profiling protein expression and affects fitness of the S. zeamais. CONCLUSION: In a next step the identification of differentially expressed proteins would be of great importance to understand the molecular mechanisms involved with moderate stress response and life history traits.

Keywords: insecticide, two-dimensional electrophoresis, biphasic dose-response, moderate stress.
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