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Biological Compounds in Mealworm Control (*Alphitobius Diaperinus*) in Poultry Production Systems (PR-01)

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Abstract:

Mealworm control has been a challenge for the broiler production's system. The technical, economic, environmental and public health impacts are difficult to quantify, but economic losses are certain, considering that the adult insect and larvae, causes damage to the structure of the poultry house. In addition, the Mealworm contributes to the transmission of several diseases (viruses, fungi and bacteria), especially Salmonellosis, which causes illness in birds and humans, reducing zootechnical performance, such as weight gain and feed efficiency, and impacts to the producer health and the products quality, when the chemical insecticides are used for its control. Conventional control has been carried out using chemical insecticides, which have been facing a increasing challenges, such as resistance developed by insects and concerns about the sustainability of the production system. The present study aims to evaluate the degree lethality (DL) of the microorganisms *Bacillus Thuringiensis* (Bt), *Beauveria bassiana* (Bb) and *Metarhizium anisopliae* (Ma), in isolated and associated forms (Bt+Bb, Bt+Ma, Bb+Ma and, Bt+Bb+Ma), as well as a possibility of additive effects and synergism. Adult insects and larvae, 30 per development stage, were placed in petri dishes lined with filter paper and sprayed with compounds diluted at 3% in distilled water. In addition to the treatments, distilled water and a chemical/organic insecticide in development (QUIEMB-C), were used as a negative and positive control, respectively. A completely randomized design was used, consisting of 9 treatments, including isolated compounds (3), associated compounds (4) and controls (2), with 10 replicates/treatment. Statistical analysis demonstrated a significant effect between treatments for both stages of insect development. Regarding the larvicidal potential, the best results were obtained for Bt+Bb (73.00%), Bt (71.64%) and Bt+Ma (62.67%), while for adult insects the best results were for Bt+Bb (77.61%), Bb (75.34%) and Bb+Ma (62.31%). The Bt+Bb compound showed a significant additive effect, enabling high (DL) for both larvae and adult insects. The chemical/organic compound under development showed high DL for both adult insects (98.09%) and larvae (98.47%), indicating low resistance of the insects.

Keywords: Poultry Farming, Biological Control, Pests, Bioassay