RESUMO SIMPLES - ECTOPARASITOS: SISTEMÁTICA, EPIDEMIOLOGIA E CONTROLE

ACTIVITY OF DIFLUBENZURON IN FIRST-INSTAR LARVAE OF COCHLIOMYIA HOMINIVORAX (DIPTERA: CALLIPHORIDAE)

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The screwworm Cochliomyia hominivorax is the most important primary myiasis-causing species in Brazil, affecting livestock, companion animals, and humans, resulting in significant morbidity and mortality. This may lead to substantial economic losses in agribusiness and represents a public and animal health concern. The resistance of these parasites to classical treatments due to the continuous use of conventional insecticides, along with environmental and health issues, has stimulated the search for new alternatives. Insect growth

disruptors (IGDs) have emerged as promising tools, acting primarily on immature stages. Diflubenzuron, a chitin synthesis inhibitor, has shown efficacy in controlling dipterans. Therefore, the aim of this study was to evaluate the in vitro activity of diflubenzuron against first-instar larvae of C. hominivorax. The in vitro assay was conducted at the Clinical Research and Technological Innovation Center in Veterinary Medicine – Laerte Grisi, UFRRJ, using biological material originating from the colony (CEUA 8634020223) maintained at the facility. A total of 840 first-instar larvae (L1) of C. hominivorax were challenged, distributed into 12 groups with six replicates each, and 10 larvae per replicate. A control group was prepared with larval diet only, and a placebo group with larval diet plus the diluent used in the formulation (16% acetone and two drops of Tween 80). Diflubenzuron dilutions were incorporated into the diet at the following concentrations: 0.001, 0.005, 0.01, 0.05, 0.1, 0.5, 1, 25, 50, and 100 μg·mL^{-1}. Experimental units were kept in a climate chamber at 35 °C (±2 °C) and 80% (±10%) humidity for 10 days. After 48 hours, 50% of the initial volume of larval diet without diflubenzuron was added to all replicates, respecting the biontophagous nature of the larvae. At 72 hours, the replicates were transferred to containers with vermiculite to support the biological cycle. Visual monitoring was conducted from incubation until day 14, avoiding direct handling of the biological material. At the end of this period, samples were evaluated and quantified. Data were analyzed regarding interference with pupal development and adult emergence. Inhibition of pupation was calculated from first-instar larvae to pupae, considering larvae that did not reach the pupal stage as dead. Inhibition of adult emergence was calculated from first-instar larvae to adults, considering larvae that did not emerge as adults as dead. PROBIT analysis was performed to estimate lethal concentrations using R Studio. Interference with pupation was observed beginning at 0.1 μg·mL^{-1}, with 81% inhibition; concentrations above 0.5 μg·mL^{-1} resulted in 100% inhibition. The most significant percentage changes in adult emergence began at 71.1% inhibition at 0.05 μg·mL^{-1}, followed by 100% inhibition at concentrations ≥0.5 μg·mL^{-1}. The LC_{50} for inhibition of pupation was 0.01 μg·mL^{-1} (0.008–0.02 μg·mL^{-1}), and 0.01 μg·mL^{-1} (0.01–0.15 μg·mL^{-1}) for inhibition of adult emergence. Based on these results, diflubenzuron demonstrates significant effects on C. hominivorax larvae, interfering with their developmental cycle and exhibiting larvicidal activity against first-instar larvae of this species.

Palavras-chave: myiasis; igds (insect growth disruptors); parasitic control; larvicide.