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Gene silencing and mortality in larval stages of *Anastrepha fraterculus* induced by RNAi

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The South American fruit fly, *Anastrepha fraterculus* (Wied. 1830) (Diptera: Tephritidae) is a major polyphagous pest of fruit crops. The main control tactic available for *A. fraterculus* in Brazil is the application of bait sprays. However, new environmentally sustainable tactics have been proposed to pest management, such as the RNA interference (RNAi) technique. Our study was designed to examine whether the sensitivity of *A. fraterculus* larvae to the uptake of double-stranded RNA (dsRNA) could generate an RNAi response. The dsRNA delivery was performed by soaking in second-instar larvae to evaluate the gene-silencing of V-ATPase, using GFP gene as control. The larvae were soaked in dsRNA solution (500 ng/μl) for 30 min. After the larvae were transferred to artificial diet and the mortality was monitored over a 7-day period. Larvae of *A. fraterculus* were stored at -80°C at 24, 48 and 72 h after dsRNA delivery for the RNAi silencing efficiency assay by quantitative PCR (qPCR). Larvae soaked in dsRNA solution showed a strong gene silencing of V-ATPase as early as 24 h after exposure to dsRNA. The soaking resulted in an 85% knockdown and increased to 100% after 48 h. The silencing effect persisted up to 72 h. The mortality induced by dsRNA reached 40% at 7 days. Our data demonstrated the existence of a functional RNAi machinery in the South American fruit fly, and we present a robust assay with the larval stages, that can further be used for screening of target genes for RNAi-based control of fruit fly pests. This is the first study that provides evidence of a functional RNAi machinery in *A. fraterculus*.

Palavras-Chave: RNA interference; dsRNA; South American fruit fly

Apoio Institucional: CAPES, CNPq, FWO-Vlaanderen, COST