

New trends for controlling *Sitophilus oryzae* concerning adult mortality, offspring production, mode of action, and grain quality

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Journal of Consumer Protection and Food Safety 16: 343–351. (2021)

Abstract

This study was carried out to find eco-friendly control measures to protect wheat from the rice weevil (*Sitophilus oryzae*) for safe food. Efficiency of some synthetic monoterpenes (carvone, 1,8-cineole, cuminaldehyde, and linalool) as well as *Yucca shedjera* extract was evaluated under laboratory conditions against *S. oryzae* and compared to malathion regarding mortality and progeny development inhibition of *S. oryzae* adults. In addition, the mechanism of the toxic action of the tested control agents against *S. oryzae* was studied. The impact of the selected control agents on wheat grain quality was also evaluated. The examined control agents showed a high potential for controlling *S. oryzae* concerning the adult's mortality and offspring production. The insecticidal activity of the examined control agents against *S. oryzae* may be due to the disruption of acetylcholinesterase, alpha-amylase, and alkaline phosphatase activity. The quality of the stored wheat grains, which were treated with the tested control agents, did not change and was sometimes better compared to the untreated stored healthy grains. This study suggests that these control agents could be used to protect wheat grains in place of chemical insecticides.