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Green Solution for Storage Pest Management: Insecticidal Effects of Neem Seed Oil on the Rice Moth, *Corcyra cephalonica* (Stainton)**T. Amarakoon*, M.M.S.C. Karunarathne***Department of Zoology, University of Sri Jayewardenepura, Sri Lanka***thilini.madhu21@gmail.com***Abstract**

Corcyra cephalonica is a notorious pest that causes substantial loss in quality and quantity of stored food commodities. The present study was thus carried out to assess the insecticidal effects of Neem (*Azadirachta indica*) seed oil against *C. cephalonica*, in the search for a more environmentally sound and an effective approach in stored grain protection. Contact, fumigation and feeding toxicity tests were conducted against 15-17 days old larvae and one day old unsexed adult moths, using five different concentrations of Neem oil in n-hexane (0.5, 1.0, 2.0, 3.0 and 4.0% v/v) to evaluate the toxicity effect. All bioassays were carried out under ambient laboratory conditions ($29\pm 20^\circ$ C and $84\pm 2\%$ RH). In all experiments, larval and adult mortality were used as indices of toxicity effects. Contact toxicity effect on larvae was tested by applying aliquots of 0.5 μ l of the prepared treatments topically on the second segment of the body. In fumigation toxicity test, adult moths (5 each) were exposed to same concentrations of Neem oil in a fumigation chamber for 3 hours and 6 hours. For feeding toxicity test on larvae, 30 g of partially milled and un-infested maize seeds were admixed with 3 ml of prepared treatments and larval mortality was recorded 7 days after their introduction.

Contact toxicity test of seed oil of *A. indica* exhibited 98% adult mortality within 3 hours after treatment and 100% larval mortality after nine hours of exposure at the two highest doses (3.0% v/v and 4.0% v/v) indicating a very high insecticidal effect. The results revealed that 100% fumigation toxic effect on adult moths within three hours after exposure. Amounts of Neem oil needed to kill 50% and 99% (LC₅₀ and LC₉₉) of rice moth adults were lower in fumigation toxicity test (1.37 ± 0.02 and 5.65 ± 0.18) when compared with the contact toxicity test (1.42 ± 0.02 and 6.46 ± 0.23). Moreover, 100% larval mortality was observed in the feeding toxicity test, indicating an extremely high insecticidal activity.

With the aim of obtaining more realistic picture of the composition of volatiles emitted by Neem oil, headspace solid phase microextraction (HS-SPME) was employed in the present study. In this analysis, only four volatile organic compounds (2-pentenal, 2-methyl, 3,4-dimethylthiophene, 3,4-dimethylthiophene and dipropyl disulfide) were identified, which represented about 92.34% of the total detected constituents. Overall findings of the study signify extremely high potential of using Neem oil as a sustainable grain protectant against *C. cephalonica* in storage pest management systems.

Keywords: *Azadirachta indica*, Neem oil, *Corcyra cephalonica*, Insecticidal effects