Title Factors affecting the insecticidal efficacy of an enhanced diatomaceous earth formulation against three stored-product insect species

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Abstract

An enhanced mixture of diatomaceous earth (DE) with the plant extract bitterbarkomycin (BBM) was evaluated in the laboratory against adults of three major stored-product pest species. This mixture (DEBBM) was applied at three dose levels; 50 ppm, 100 ppm and 150 ppm and on four grain commodities; hard wheat, barley, rice and maize. The species tested were *Sitophilus oryzae*, *Tribolium confusum* and *Cryptolestes ferrugineus*. In order to determine the influence of temperature and r.h. on the efficacy of DEBBM the bioassays were carried out at three temperatures; 20, 25 and 30 °C and two relative humidity (r.h.) levels; 55% and 75%. Mortality and progeny production of each species were assessed after exposures of 7 and 14 d. DEBBM efficacy was increased with the increase of dose, exposure and temperature whereas it was decreased with the increase of r.h. Mortality of all species was higher in treated barley compared to the other grains, although significant differences between barley and wheatwere not recorded in all cases. Also, DEBBM performance in maize and rice was lower compared to that in barley or wheat. DEBBM was very effective against *C. ferrugineus* as mortality of this species that was achieved with 150 ppm was always >85%. Of the remaining species the least susceptible to DEBBM was *T. confusum*. Although DEBBM caused significant mortality to all three species, progeny production was not totally avoided. However, progeny production was significantly lower in comparison with the untreated commodities.