

**EFFECTS OF SPINOSAD ON THE HEAT TOLERANCE OF
Tribolium castaneum AND *Sitophilus oryzae***

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Tribolium castaneum and *Sitophilus oryzae* are serious pests of stored products. Exposure to high or low temperatures is effective in controlling them but expensive. Spinosad, derived from the bacterium *Saccharopolyspora spinosa*, is an effective insecticide but has not been tested with high or low temperatures. This study evaluated whether spinosad affects heat tolerance and heat acclimation of *T. castaneum* and *S. oryzae*. Adults of *T. castaneum* and *S. oryzae* were exposed to 25 ppm (label rate) of spinosad or water (control), acclimated at 35°C for 6 hours, 40°C for 3 hours, and finally held at 45°C for 0, 6, 9, 12, 15, 18, 24 or 30 hours for *T. castaneum* and 0, 6, 8 or 12 hours for *S. oryzae*. The mortality of adults at different durations was recorded and LT_{50} values (duration to kill 50% of population) were calculated. In *T. castaneum* unacclimated adults, LT_{50} was 15.9 hours in 0 ppm and 14.6 hours in 25 ppm. In heat-acclimated *T. castaneum* adults LT_{50} was 21.4 hours and 18.6 hours when exposed to 0 ppm and 25 ppm, respectively. In unacclimated *S. oryzae* adults exposed to 0 ppm, LT_{50} was 6.7 hours, which was increased to 8.2 hours following acclimation. Exposure to spinosad before heat exposure reduced the heat tolerance of *T. castaneum* and *S. oryzae*. Acclimation at intermediate temperatures 35°C and 40°C increased the heat tolerance of both *S. oryzae* and *T. castaneum* adults. More work is needed to determine the effect of spinosad on the heat tolerance and heat acclimation of other stored-product insect species.

Keywords: Heat acclimation, Heat tolerance, LT_{50} , Spinosad, Stored-product insects