

TEST SYSTEMS FOR EVALUATION OF INSECTICIDES, ACARICIDES, AND REPELLENTS

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Abstract In the past years test systems for the evaluation of repellents, attractants and insecticides/acaricides have been developed and further refined in our laboratory. A standardized laboratory test system for the evaluation of tick repellents (Moving-Object (MO) Bioassay) has been extensively used with *Ixodes ricinus* ticks. The system is based on a rotating drum equipped with a tick attachment site heated to skin temperature (35-36°C). Ticks approach the drum and cling to the passing by attachment site as they do in nature when attaching to a passing host. The system is sufficiently attractive such that as a mean 89% of *I. ricinus* nymphs (n=390), 93% of Australian *I. holocyclus* adults (n=180), and 88% of *Rhipicephalus sanguineus* adults (n=150) approach and attach to the drum. By covering the drum attachment site with repellent, distance repellency can be detected by a reduced number of ticks clinging to this site, whereas contact repellency is shown by an increased number of ticks dropping off from that site. Several formulations of 10% dodecanoic acid (1 mg/cm² applied), revealed repellencies between 86 and 100% in the MO Bioassay, quite close to the value of 85% obtained with human volunteers (1.6 mg/cm² applied). This demonstrates the power of the laboratory test system yielding results that are relevant for the practice. In studies with impregnated clothing or acaricides for dogs simultaneous investigation of repellency and contact time-mortality relationship was performed demonstrating mortality already after contact times as short as 1 s in a spot-on formulation containing permethrin and imidacloprid. We also performed long term monitoring of efficacy (hours to weeks post application). Another specialty of our business are methods to evaluate products against clothes moths (*Tineola bisselliella*), e.g. investigation of the efficacy of moth pheromones or anti-moth insecticides. For the latter we developed a cage test aimed at mimicking practice conditions and involving a sheep wool substrate for moth development. The insecticidal effect of the test substances is determined by the number of living, moribund and dead adult moths in comparison to control runs. Transfluthrin (2.25 mg/89 l) caused a mortality rate of 100% after a test period of 72 hours whereas only 18% of the clothes moths were dead when testing d-phenothrin (250 mg/89 l). This highly discriminating test can also be performed with immature stages.