

EFFICACY AND TRANSMISSION OF INDOXACARB AS LIQUID TERMITICIDE IN EASTERN SUBTERRANEAN TERMITE (ISOPTERA: RHINOTERMITIDAE)

XING-PING HU

Department of Entomology and Plant Pathology, Auburn University, AL, USA, 36849

Abstract Indoxacarb is an EPA designated reduced risk insecticide. This study was to evaluate indoxacarb for its toxicity, non-repellency, and transmission as liquid termiticide against eastern subterranean termite, *Reticulitermes flavipes* (Kollar). Toxic effectiveness and non-repellency were determined using laboratory glass tube bioassay. Field-collected termites were exposed to soil treated at five concentrations (0, 1, 10, 50, or 100 ppm) and two thicknesses (2 or 5 cm). Toxic effectiveness was accessed by termite mortality during a 4-wk trial. Data were analyzed using ANOVA followed by mean separation by HSD. Concentration and treatment thickness significantly affected termite mortality. Termite mortality was significantly greater in all treatments of 10 ppm than controls and 1 ppm. Termites were killed in concentrations =50 ppm in less than three wks regardless of treated soil thickness. Treated soil thickness had significant effects as well. At 10 ppm of indoxacarb, 5-cm and 2-cm treatments resulted in 71% and 40% mortality at the end of the 4 wk trial, respectively. 100% termite mortality was not obtained until 7 days after treatment even at the highest concentration of 100 ppm suggests the slow-acting of indoxacarb. Non-repellency was evaluated by penetration of termites into treated soil. Termites completely penetrated through treated soil of all treatments. Lethal transfer of indoxacarb from workers to workers was evaluated using a simple donor/recipient model in a laboratory study. Six doses (0, 10, 20, 50, 100, or 200 ng) of indoxacarb were topically applied to donor's dorsal thorax in 0.2 ul of indoxacarb/water solution (w/w). Donors were replaced with untreated recipient workers in three D:R ratios (50:50, 20:80, or 10:90). Lethal transfer was measured by recipient mortality 24 d after treatment. Recipient mortality from most treatments was significantly greater than that of control, except for 10 ng treatment at ratios = 20:80. Greater than 95% recipient mortality was obtained in doses of 100 and 200 ng, regardless of D:R ratios. Transfer of indoxacarb from workers to other colony castes was accessed using 2-yr old laboratory recipient colonies. Sixty workers from each colony were treated using the same method aforementioned, and returned to their original colony to allow for social interactions. The colonies were dissected at day 8 to access mortality of worker, soldier, reproductive, and young. Significant lesser survival individuals of each caste in treatments than control (ANOVA: $F(3,11) = 15.87$, $P = 0.0029$, Critical T value = 2.45) indicated successful transfer of indoxacarb within the tested colonies. This study suggests that indoxacarb is an excellent candidate as liquid termiticide for subterranean termite control. Possible transfer mechanisms are discussed.