

INDOXACARB AS A NEW ACTIVE INGREDIENT FOR THE PEST CONTROL INDUSTRY: DEVELOPMENT OF A COCKROACH GEL BAIT AS A CASE STUDY

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Abstract Indoxacarb, with a novel mode of action, is in a new class of chemistry called Oxadiazines. The compound was registered in the United States in 1999 for agricultural uses and Dupont Professional Products is developing the compound for new uses in the Structural Pest Control industry. One of the first products to be developed is a new cockroach gel bait. The development of a new bait product for the control of cockroaches was approached in two phases. The first effort surrounded the exploration of food preferences to determine a suitable bait matrix followed by a second phase to determine appropriate insecticide rates within the lead formulation that resulted in desired mortality curves. A wide variety of food ingredients representing carbohydrate, lipid and protein sources were evaluated for palatability and several gelling agents and preservatives were also considered. A final gel matrix was identified and subsequently submitted to rate testing utilizing the active ingredient Indoxacarb. In laboratory arena trials, the Indoxacarb-based gel bait was determined to be equally palatable to German and American cockroaches up to the highest rate tested, 1.0%. The unique mode of action of Indoxacarb includes a slight delay in activity that should allow cockroaches in the field to consume a lethal dose and return to harborage sights prior to their behavior being adversely affected. Mortality was observed in German cockroaches at concentrations as low as 0.01%. American cockroaches, however, required a significantly higher dose between 0.5 and 1.0%. Further refinement led to the final formulation at 0.6% Indoxacarb. In laboratory arena tests, 100% control was achieved within 48 hrs on German cockroaches and within 72-96 hrs on American cockroaches. This is equal to or superior to current commercial products. In addition, Indoxacarb gel baits provided equal mortality in the presence of alternative food choices. In a field trial using heavily infested apartment units, Indoxacarb 0.6% gel bait provided 56% median reduction in German cockroaches at 3 days and 90% reduction by 56 days after application. These results were superior to MaxForce FC and slightly less than MaxForce Select suggesting the population tested may exhibit bait-aversion. The commercial product, Dupont Advion™ Cockroach Gel Bait, is expected to be registered in the U.S. in 2005 and in additional countries in 2006.