



RESIDUAL EFFECTIVENESS EVALUATION OF INSECTICIDES AGAINST COCKROACHES ON POROUS SURFACE

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INTRODUCTION

Nowadays more than 600 species of cockroaches are described in Brazil. The species *Blattella germanica* and *Periplaneta americana* show a general occurrence in Brazilian territory, as these insects have a high capability to adapt to many conditions (or to many structures made by humans). The cockroaches are mechanic vectors of diseases because they can carry pathogens when they walk on garbage, sewerage system or other contaminated places. The control of the German cockroach *Blattella germanica* is a major challenge for Brazilian Pest Control Operators (PCOs) due to their great capacity for reproduction and dispersal.

OBJECTIVES

The residual effect of an insecticide is directly related to its formulation, active ingredient and application rates. The aim of this study was to evaluate the effectiveness of 2 distinct commercial insecticides products against *Blattella germanica* and *Periplaneta americana* during the following six months after their application on porous surface.

MATERIAL AND METHODS

The tested products were P1: 2.5% Lambda-cyhalothrin on a microencapsulated formulation (Demand 2.5 CS®) and P2: 3.5% Lambda-cyhalothrin combined with 11.6% Thiamethoxam on a EZ formulation – microencapsulated + suspension concentrate, respectively (Tandem®). The tested dosage were: P1: 10mL/1L of water and P2: 8mL/1L of water. Each insecticide solution was sprayed on a 20cm x 20cm cement surface, following 1L/20m² proportion. Two hours after the application, 10 *Blattella germanica* individuals (5 males and 5 females) were exposed on the treated surface for 15 minutes (Fig. 1), and, after that, 10 individuals of *Periplaneta americana* (5 males and 5 females) were also exposed to the same surface, for the same time. Five repetitions were made for each treatment. Residual effectiveness was evaluated at 30, 60, 90, 120, 150 and 180 days after application. These evaluations followed the same proceedings: individuals exposed for 15 minutes, 5 repetitions for each treatment. All the surfaces were kept in a laboratory, under room temperature and humidity. After exposure, all the individuals were moved to an insecticide free arena, with food and water available. Mortality was evaluated until 96 hours after exposition.

RESULTS

Results showed that P1 and P2 provided 100% of control even 6 months after applications. For both products, LT50 (time to reach 50% of mortality) for *Blattella germanica* and *Periplaneta americana* was inferior to 1 hour at 0, 30, 60, 90, 120, 150 and 180 days after application (Table 1). LT90 (time to reach 90% of mortality) for both species was also inferior to 1 hour for both products, even after 180 days after application (Table 2). Microencapsulated formulations provided long lasting residual effectiveness even on porous surface. The obtained information is valuable when designing an effective cockroach control program where residual effectiveness is required.



Fig. 1. *Blattella germanica* exposed to treated surface.

Table 1. LT50 (hours) for *Blattella germanica* and *Periplaneta americana*. São Paulo/SP, September 2015 to March 2016.

Treatment	Lethal Time(TL ₅₀)						
	0 day	30 days	60 days	90 days	120 days	150 days	180 days
Demand®	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1
Tandem®	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1	0 < LT ₅₀ < 1
Control	-	-	-	-	-	-	-

Table 2. LT90 (hours) for *Blattella germanica* and *Periplaneta americana*. São Paulo/SP, September 2015 to March 2016.

Treatment	Lethal Time(TL ₉₀)						
	0 day	30 days	60 days	90 days	120 days	150 days	180 days
Demand®	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1
Tandem®	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1	0 < LT ₉₀ < 1
Control	-	-	-	-	-	-	-

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