

Study Title

Determining the Efficacy of Boric Acid-Treated Insulation against Adult German
Cockroaches, *Blattella germanica*, Under Laboratory Conditions

Data Requirements

OPPTS Test Guidelines
810.3000

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Completion Date

[Date study director signs the final report]

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CONFIDENTIALITY STATEMENT

No claim of confidentiality is made for any information contained in this study on the basis of its falling within the scope of FIFRA (d)(1)(A), (B), or (C).

Company: Cellulose Technologies Group, Inc.

Company Agent: John Elliot

Title: Chairman

Signature: _____

Date: _____

GOOD LABORATORY PRACTICE STATEMENT

This study was not conducted in compliance with the requirements of the Good Laboratory Practice regulations (40 CFR, Part 160) but was conducted using sound scientific procedures and principles and the raw data are available for review.

Study Director: Dr. Brian T. Forschler

Date: _____

Sponsor/Submitter: John D. Elliot, Jr.

Date: _____

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Summary

Groups of five adult German Cockroaches were placed in 9-cm diameter petri dishes filled with boric acid treated insulation (containing 10, 11 and 12 % boric acid) or insulation without boric acid (controls) for twenty-four hours. Following exposure to a treatment, each petri dish was placed inside separate clear plastic boxes (17 x 12 x 6 cm) containing a moistened sponge and one piece of dried dog food. The number of cockroaches alive and dead was recorded for 14 days following release into the plastic box.

Mortality in the boric acid treated insulation which contained 10% boric acid was 50% compared to the control mortality of 15%. Mortality in the boric acid treated insulation, which contained 11 and 12% boric acid, was 100% as compared to mortality of 8% and 19% in the control groups, respectively.

Introduction

Boric acid's use as a pest control agent has been discussed in many studies. One successful attempt to combine boric acid and cellulose insulation (and bring the product to market) had been achieved a decade earlier. Applegate agreed to manufacture product for testing containing the EPA-labeled active ingredient, pure orthoboric acid (H_3BO_3), provided by National Boraxx Corporation of Cleveland, OH, to exacting parameters. Use of pure boric acid meant that significantly less dry chemical could be used to achieve the desired results, because of the absence of the dry sodium sulfate component.

Materials

Applegate Insulation Systems, Inc. of Cornelia, GA manufactured cellulose insulation according to ASTM standards (specific as to how it is applied) from recycled wood-based cellulosic fiber (largely pre- and post-consumer newsprint) with chemicals introduced to provide properties such as flame resistance, processing, and handling characteristics. Boric Acid was provided by the National Boraxx Corporation. *PF-24*TM (flame-retardant with *Dust-Trapper*TM) was provided by CAROSAN Corporation. Generic starch adhesive and soy oil were added as these components increase coverage and lubricate blowing hoses for finished product marketed by Applegate.

Methods

Efficacy testing for boric acid-treated and untreated insulation was done in 1998 at the University of Georgia by Dr. Brian Forschler of the Department of Entomology. The study was performed using German cockroaches (*Blattella germanicus*) as the target insect specimen because of its historical resiliency (resistance to chemical pest control formulations) relative to other pest/insects. A total of 280 cockroaches were taken from the University of Georgia, Department of Entomology's stock colony and five were placed in each of a total of 56 petri dishes, which contained either boric acid-treated insulation (4 dishes at the 10% level, 8 dishes at 11% and 16 dishes at 12%) or 28 dishes with untreated cellulose mulch (as a control). The cockroaches were forcibly exposed to the insulation samples for a 24-hour period. Subsequently the dishes were opened and placed into larger, separate clear plastic boxes (17 x 12 x 6 cm), where the cockroaches were allowed free access to food and water sources for a 14-day period or until all subjects were dead.

Results

See Table 1.

Discussion/Conclusions

It is clear from these data that boric acid treated cellulose will kill cockroaches following a 24-hour forced exposure period. Three concentrations of boric acid were tested (10%, 11%, and 12%). Concentrations at or above 11% provided full kills of the test subjects.

Table 1

Percent Survivorship of German Cockroaches Exposed to Boric-Acid Treated Cellulose Insulation as Compared to Untreated Cellulose Insulation

Treatment	Number of Replicates¹	Mean Number of Live Roaches Per Replicate²	Percent Survivorship
P 10	4	2.5 ± 1.3	50%
Control	4	4.3 ± 0.5	85%
B 12	8	0	0%
Control	8	4.6 ± 0.5	92%
P 11	16	0	0%
Control	16	4.0 ± 0.9	81%

¹ One replicate consisted of a petri dish containing five adult German cockroaches.

² The mean number of surviving cockroaches per replicate ± the standard error of that mean.