

1.0 TITLE

A laboratory evaluation of household insecticide product, aerosol, against *Periplaneta americana* cockroaches using plywood/tile residual method.

2.0 OBJECTIVE

To evaluate bioefficacy of household insecticide product, aerosol, against *Periplaneta Americana* cockroaches using plywood/tile residual method

3.0 RESEARCH PERSONNEL

Associate Professor Dr Zairi Jaal (Principal Investigator)
Mr Adanan Che Rus (Senior Research Scientist, Vector Control Research Unit)
Supporting staff of VCRU, USM to assist.

4.0 MATERIALS AND METHOD

4.1 Test Samples

A minimum of 6 cans of each aerosol formulations were provided by the company. The products will be thoroughly shaken before dispensing.

Aerosol samples	Active ingredient
SSF/024/07	Cypermethrin 1.7% w/w
SSF/025/07	Prallethrin 0.05%, Imiprothrin 0.05%, Cypermethrin 0.1%

4.2 Test Methods

Plywood Residual Methods

A known quantity of insecticide formulation was sprayed within a diameter of 12.5 or 18.5 cm on an unpainted plywood plate measuring 15 x 15 cm or 25 x 25 cm for tested against German and American cockroaches, respectively. A number of plywood plates were sprayed simultaneously and were left air-dried for at least 24 hours before testing and storage. Ten male or female cockroaches of approximate known age group were used per treated surface per test. The cockroaches were exposed on the treated surface and were enclosed by a polyethylene cylinder (diameter 12.5 or 18.5 cm, height 10 cm). Inert grease was applied to the inner surface of the cylinder to prevent the cockroaches from crawling up the cylinder. Exposure time for each interval (days) of the residual test was 2 hours. Knockdown of cockroaches at specific intervals within 2 hours were recorded. The cockroaches were then transferred to a clean glass container with food and water. The mortality values were recorded at 24, 48 and 96 hours post-treatment. The mortality value was based on a combination of dead and moribund cockroaches over the total number of cockroaches initially exposed. All test were conducted at temperature of 26-28 °C and relative humidity of 65-85%. A minimum of three replicates were conducted for each insecticide formulation tested. The duration for residual tests on plywood plate/cement block were days 1, 7, 14, 21 and 28. The experiments were terminated whenever residual mortality drops below 50%. The results were statistically analysed to obtain the knockdown values (KT50 and KT95) and regression slope, using a probit analysis (SPSS Version 2000 computer program).

5.0 RESULT

TABLE 1

Discharge rate (gm/sec) and dosage used for aerosol samples received from MSR Green Corporation (S) Pte Ltd tested against *American* cockroaches using the Plywood Residual method.

(Application No: MSR GREEN/009/2006; Dated: 23 October 2007)

Samples	Discharge rate (gm/sec)	Spraying time (sec)	Total Discharge Per Test (gm)
<i>American</i>			
SSF/024/07	1.81	3.31	5.90
SSF/025/07	2.20	2.73	6.00

TABLE 2

Time-response values (KT50 and KT95) of aerosol samples (SSF/024/07 and SSF/025/07) received from MSR Green Corporation (S) Pte Ltd, tested against *Periplaneta americana* cockroaches. Knockdown values from Plywood Residual method. A minimum of 10 cockroaches of each species and each sex were used for the test and three replicates were conducted.

(Application No: MSR GREEN/009/2007; Dated: 23 October 2007)

Samples	KT50 & Confidence limit (min)	KT95 & Confidence limit (min)	Regression coefficient \pm Std Errors	24h mortality (%) Mean \pm SE	48h mortality (%) Mean \pm SE	72h mortality (%) Mean \pm SE
SSF/024/07						
MALE						
Day 1	15.28 14.12-16.63	30.05 25.54-39.14	5.60 \pm 0.74	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 7	15.15 14.31-15.96	20.86 19.19-24.18	11.86 \pm 1.90	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 14	8.35 7.53-9.15	17.56 15.14-21.93	5.09 \pm 0.60	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 21	11.25 10.17-12.80	24.01 18.92-38.78	5.00 \pm 0.90	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 28	10.38 9.47-11.25	20.08 17.61-24.45	5.74 \pm 0.68	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
FEMALE						
Day 1	22.56 21.25-24.03	37.74 33.71-44.69	7.36 \pm 0.82	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 7	20.31 18.89-21.75	35.22 30.59-45.68	6.88 \pm 1.11	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 14	17.04 15.82-18.44	33.04 28.47-41.62	5.72 \pm 0.69	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 21	12.89 11.73-14.01	26.52 22.73-34.06	5.25 \pm 0.70	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 28	14.05 12.63-15.34	29.14 24.34-41.03	5.19 \pm 0.88	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00

* A heterogeneity factor is used in the calculation of confidence limits.

Samples	KT50 & Confidence limit (min)	KT95 & Confidence limit (min)	Regression coefficient \pm Std Errors	24h mortality (%) Mean \pm SE	48h mortality (%) Mean \pm SE	72h mortality (%) Mean \pm SE
SSF/025/07						
MALE						
Day 1	8.90 7.96-9.75	18.11 15.55-23.28	5.33 \pm 0.76	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 7	15.29 14.13-16.26	24.07 21.95-27.94	8.34 \pm 1.17	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 14	8.59 7.16-9.93	37.19 27.52-62.05	2.58 \pm 0.37	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 21	8.68 7.76-9.57	20.21 17.27-25.47	4.48 \pm 0.51	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 28	11.36 10.25-12.37	22.43 19.28-29.03	5.57 \pm 0.82	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
FEMALE						
Day 1	14.46 13.32-15.58	28.87 25.47-34.57	5.48 \pm 0.58	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 7	25.21 23.38-27.15	51.43 44.53-63.95	5.31 \pm 0.61	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 14	15.61 13.40-18.33	65.85 42.70-175.82	2.63 \pm 0.53	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 21	20.42 18.91-22.12	42.81 36.60-54.36	5.12 \pm 0.59	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00
Day 28	18.22 17.05-19.35	30.15 27.15-35.48	7.52 \pm 0.94	100 \pm 0.00	100 \pm 0.00	100 \pm 0.00

* A heterogeneity factor is used in the calculation of confidence limits.

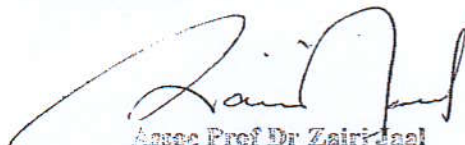
6.0 COMMENTS

Aerosol samples received from MSR Green Corporation (S) Pte Ltd (SSF/024/07 and SSF/025/07) give an excellent residual activity with 100% of mortality up to 4 week against *Periplaneta americana* cockroaches, male and female.

7.0 Reference

SIRIM (MS 1130: 1989). Method for the evaluation of the effectiveness of insecticidal aerosol as contact and residual insecticides: plywood plaque method. UDC 632.982.2.

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