



Malaria Research Lead Programme

Chemcity-Sasol
Laboratory Testing Of Insecticidal Treated Material
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The work described in this report is being carried out in the Durban laboratories of the Malaria Research Programme of the Medical Research Council and was commissioned for Chemcity and Sasol.

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Materials

Test species

Blood fed adult female *Anopheles arabiensis* KGB (Kanyemba Gambiae spB, Zimbabwe) from the colony maintained at the Malaria Research Lead Programme was used in the bioassays.

Methods

Chemcity provided the MRC laboratories with eighteen insecticide impregnated fabrics which had been washed fifteen, twenty five and thirty times.

Bio-Assays

Efficacy testing of insecticide impregnated material had been carried out using thirty *Anopheles arabiensis* non-blood fed female mosquitoes in an insectary, free from contamination.

The test species was exposed to the netting material for a period of three minutes, under standard WHO cones (WHO 2005). The mosquitoes were thereafter removed, and the number of knockdowns was determined after sixty minutes. A nutrient solution was thereafter made accessible to the mosquitoes and after 24 hours, mortality had been measured.

In accordance with WHO standards, the criteria set for determining if the samples display high activity was, greater than 95% knockdown after 60 minutes and more than 80 % mortality after 24 hours.

Results

Table one: Results of insecticide testing

Type	No. of washes	% Knockdown		% Mortality	
		3 min	1 hour	24hrs	
ST	15.1	0	0	0	
	15.2	0	0	3	
	15.3	3	5	5	
	25.1	0	3	3	
	25.2	0	0	0	
	25.3	2	3	7	
	30.1	0	5	7	
	30.2	0	3	5	
	30.3	0	0	0	
	Negative control		3	3	3
	GR	15.1	3	93	81
		15.2	0	80	84
15.3		3	100	100	
25.1		0	100	87	
25.2		0	90	83	
25.3		3	100	74	
30.1		3	100	62	
30.2		2	87	83	
30.3		3	100	74	
Negative control			0	0	3

Discussion

All trials had been conducted in a temperature controlled insectary. Each trial included a negative control. All samples had been undergone duplicate testing to ensure validity of results.

Two sets (GR and ST) of nine samples each had been tested. Each set of nine samples had included 3 nets per fifteen, twenty five and thirty washes.

Referring to **Table one**, mortality observed in the negative control could have been attributed to injury caused during the trial.

Results have shown that the GR set had displayed a much more significant effect on the *Anopheles arabiensis* compared to ST. The initial three minute exposure did not indicate any immediate effect on the test species in either of the sets.

High knockdown rates produced by the GR samples were indicative of temporary paralysis of the mosquitoes however the effect of the insecticide had gradually decreased in some samples and the number of mosquitoes dead after 24 hours had been lower than that of the initial knockdown rate. The GR samples had produced between 62 to 100 percent mortality after twenty four hours post exposure. It was observed that activity decreased as the samples had been repeatedly washed with the lowest mortality arising from samples that had been washed thirty times.

The ST samples were not effective enough to induce a mortality of greater than 7 percent in the 9 samples. Knockdown rates during the first hour post exposure had not shown any significant activity.

Conclusion

The GR samples which had been washed fifteen and twenty five times had induced the greatest effect on the *Anopheles arabiensis* mosquitoes and had therefore satisfied the criteria assigned to determine high activity.

Reference

WHO/CDS/WHOPES/GCDPP/2005.11

Guidelines for laboratory and field testing of long lasting insecticidal mosquito nets.