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Malaria Research Lead Programme

**Repellency Testing Of An Insecticide Impregnated Fabric  
Mattex: A division of Gommagomma  
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**Medical Research Council**

**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 Mattex.**

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## **Objective**

This study was conducted to determine if an insecticide impregnated fabric has a repellent effect against the malaria mosquito.

## **Materials and Methods**

Repellency tests had been conducted in accordance with the standard WHO protocol and using the target species, *Anopheles arabiensis* (WHO, 1996).

The rodent *Mastomys coucha* was the test animal used for the screening of the samples for repellency activity. Ethical approval for the use of *Mastomys* in these trials was sought from the MRC's Ethics Committee for Research on Animals.

Each adult *Mastomys* had been weighed individually, and injected intraperitoneally with sodium pentobarbital at a rate of 1ml per 2.25 kg. The anaesthetized rodents were shaven on the ventral surface and the product was applied.

Paper cups (500ml) were modified by replacing the base of the cup with mosquito netting held in place with a rubber band and covering the mouth of the cup with transparent plastic film.

The trial comprised of four tests namely, one sample, a repeat test, and two negative controls.

Thirty unfed 4-day old *Anopheles arabiensis* females was introduced into a cup and held in contact with exposed skin of each rodent. Mosquito activity was observed through the transparent plastic film. After a period of two minutes the number of mosquitoes probing had been recorded. The mosquitoes exposed to the product had been monitored one hour post exposure to determine if the product had induced a knockdown effect.

The rodent was returned to the animal facility and allowed to recover from the effects of the anesthetic. Each rodent was monitored for 7 days for adverse reactions to the sample.

## Results

**Table one:** Results of repellency trials

Test	2 minute exposure (%)	1 hour post exposure knockdown (%)
Sample One-Treated	83	3
Sample Two-Treated	97	0
Negative control-1	73	0
Negative control-2	67	0

## Discussion

Trials were conducted in an insectary under controlled conditions. Mattex had supplied the Malaria Laboratories with two samples of the same insecticide impregnated fabric and a sample of untreated fabric.

To ensure validity of results, the sample provided was tested twice and the untreated fabric was used as a negative control.

Upon exposure to each sample of fabric, a large number of mosquitoes landed on the material, however majority of the mosquitoes only remained for a period of 10 seconds.

Referring to Table 1, the results of the two minute exposure for the negative control trials had shown an average repellent effect of 70%. This high repellency could be attributed to the density of the fabric and the inability of the mosquito to probe and obtain a bloodmeal. 3% of the test

species tested on the untreated fabric had however been successful in acquiring a bloodmeal.

Results of the treated samples were very encouraging as an average 90% repellent effect was observed, with no blood meals acquired. The results of the samples tested had satisfied the assigned criteria of greater than 75% repellency in accordance with WHO's standards. This however can be questioned as it is not known if the density of the fabric could have contributed to the decrease in attractiveness and a higher repellent effect. Knockdown assessments conducted have shown discouraging results, as none of the test samples had shown any significant effect on the mosquitoes.

### **References**

WHO,CTD/WHOPES/IC/96.1 Protocols for laboratory and field evaluation of Insecticides and Repellents