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Malaria Research Lead Programme

**Dose Response Evaluation Of AquaQure Insecticide Against The  
Adult Stages Of The Mosquito to determine its LD<sub>50</sub> values**

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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 AquaQure Global Solutions.**

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## **Objective**

This study was conducted to determine the dose response activity of Nomolaria against the adult stages of the malaria mosquito.

## **Materials and Methods**

### Test mosquitoes

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

### Application of insecticide

The insecticide had been applied to tiles using a calibrated Potter's Spray Tower. Each concentration had been sprayed in duplicate onto ceramic tiles.

De-ionized water used to dilute the product had been used as the negative control. A pyrethroid had been used as the positive control.

### Bio-Assays

Bio-assays were carried out using four day old *Anopheles arabiensis*.

The treated tiles had been air dried and activity determined within 24hrs of spraying.

The method included a standard bioassay cone (WHO, 1975) being fixed onto a sprayed tile and introducing thirty blood-fed *Anopheles arabiensis* mosquitoes into the cone. The test species had been monitored for knockdown rates at 30 minute intervals for a period of 60 minutes during exposure. Thereafter the mosquitoes had been removed from the bioassay cone, transferred to a holding cage in the insectary and given a nutrient solution. Mortality had been determined 24 hours post exposure.

## Results

**Table one:** Dose response assays conducted using Nomolaria

Final Concentration %	Knockdown(Minutes ) %			Mortality(Hours) %
	0	30	60	24
1	0	0	0	2
2	0	0	2	5
10	0	3	5	15
100	0	5	8	17
Negative control	0	0	0	0
Positive control	0	33	100	100

**Table two:** Insecticide trials conducted using the new batch of Nomolaria

Final Concentration %	Knockdown(Minutes) %			Mortality(Hours) %
	0	30	60	24
2% {Results from Initial trials }	0	0	10	33
2%-{Repeat trials conducted }	0	0	0	3
Negative control	0	0	0	0
Positive control	0	40	97	100

## **Discussion**

The trials had been conducted in an insectary maintained at 27°C with 70 % relative humidity.

To ensure validity of results all trials had been conducted in duplicate and a negative and positive control test had been included.

Results from preliminary laboratory trials had shown that the product had induced one hundred percent mortality using a two percent concentration, however subsequent dose response assays conducted had produced discouraging results.

Referring to Table one, residual insecticidal activity of Nomolaria had decreased considerably when tested at the same concentration using the same batch of product previously tested. A new batch of product had been requested from AquaQure and tested. Results obtained (Table two) had shown that upon receipt of the samples trials conducted had produced 33% mortality however subsequent repeat trials conducted had not indicated any significant activity.

It had been observed that a colour change from green to blue had occurred in the sample over time. Possible reasons for irreproducible results may include sensitivity of the product to light, change in pH of solution and/or degradation of active ingredients by temperature. The factors mentioned have not been determined to be the cause of the inconsistent results however it could have attributed to the differing outcomes.

Variables such as contamination during spraying was not responsible for this phenomenon since the negative controls tested had produced no mortality and the positive control had induced one hundred percent mortality within 24 hours post exposure. The solution had been diluted

using deionised water and therefore active ingredients from Nomolaria could not have reacted with chlorine.

### **Conclusion**

Due to the inconsistency in results, the correct efficacy of Nomolaria could not be determined since the exact cause for the irreproducible results could not be established.

### **References**

WHO. 1975. Manual on practical entomology. WHO, Geneva