

NAME OF CANDIDATE: NICHOLAS KIBEGWA MAKWORO

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Title of thesis: A comparative efficacy study of commercially available insecticides against *An. gambiae*

ABSTRACT

The studies reported in this thesis were focused on testing the efficacy of commercially available insecticides from Kenya, Nigeria and South Africa against *Anopheles gambiae* mosquitoes. The mosquitoes were reared in the laboratory. Non-blood-fed, 2-5 day old female mosquitoes were liberated into Peet-Grady chambers sprayed with $0.3 \pm 0.1 \mu\text{g}$ of insecticides. KT_{50} , KT_{95} and mortality rates of the mosquitoes were noted 24hrs post-spraying. Field efficacy studies were carried out by spraying insecticides in houses with near uniform resting densities of *An. gambiae* complex mosquitoes. Mosquitoes entering the houses were collected using hand held aspirators, counted and the means calculated. *An. gambiae* complex mosquitoes were identified using species diagnostic primers. Laboratory results showed Ridsect and Mortein doom ultrafast to be fast acting with KT_{50} of 0.412 and 0.1983 minutes and KT_{95} of 4.339 and 5.947 minutes, respectively, among the Kenyan products. Baygon and Mobil had a fast knock down effect with KT_{50} of 0.415 and 0.551 and KT_{95} of 3.022 and 3.877 minutes, respectively, among the Nigerian samples. Mortein odorless had a faster knockdown effect with a KT_{50} of 0.632 and KT_{95} of 2.576 while Mortein ultrafast had a KT_{50} of 0.780 and KT_{95} of 2.654 minutes among the South African Samples. On mortality rates, Mortein doom ultrafast and Ridsect from Kenya achieved 100% mortality, Mortein PowerGard and Raid from Nigeria resulted to 99% mortality and Mortein odorless and Mortein ultrafast from S. Africa had 100% and 99% mortality. The field efficacy tests showed that the most effective products from Kenya, Nigeria and South Africa were Ridsect, Mobil and Mortein Ultrafast, respectively. Molecular identification assays revealed that the wild mosquitoes consisted of 66.34% (71/107) *An. arabiensis* and 33.66% (36/107) and would not be identified due to PCR amplification failure. Reconstitution of the insecticides with different active ingredients, substitution and optimization of others is recommended. More research on the biology of the malaria vector will help in improving the reconstitution of the insecticides