

**EVALUATION OF THE EFFECTS OF SELECTED INSECTICIDES ON
Anopheles gambiae IN SANGO OTA, OGUN STATE**

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AUGUST, 2024.

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BY

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE
STUDIES IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE
AWARD OF MASTER OF SCIENCE, (M.Sc) IN BIOCHEMISTRY IN THE
DEPARTMENT OF BIOCHEMISTRY, COLLEGE OF SCIENCE AND
TECHNOLOGY, COVENANT UNIVERSITY, OTA, OGUN STATE,
NIGERIA**

AUGUST, 2024

ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of a Master of Science (M.Sc) degree in Biochemistry in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Nigeria.

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DECLARATION

I, ADEDOYIN, ENIOLA DEBORAH (22PCP02372), declare that I conducted this research work with the supervision of Dr. Wisdom D. Cleanclay (Supervisor) of the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State. I certify that the dissertation has not yet been submitted in whole or in part for the conferment of any degree in another location. This dissertation contains facts and scholarly information from all sources, which were properly cited.

ADEDOYIN, ENIOLA DEBORAH

Signature and Date

DEDICATION

This dissertation is dedicated to God Almighty. I also dedicate this dissertation to my dear parents Mr. and Mrs. Adedoyin. You are lovely and inspire me daily; I hope this makes you even more proud of me.

CERTIFICATION

We certify that the dissertation titled “**EVALUATION OF THE EFFECTS OF SELECTED INSECTICIDES ON *Anopheles gambiae* IN SANGO OTA, OGUN STATE**” is a unique project completed by **ADEDOYIN, ENIOLA DEBORAH (22PCP02372)** under the supervision of Dr. Wisdom D. Cleanclay in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria. After reviewing the work, we have determined that it meets the qualifications needed to be awarded a Master of Science (M.Sc.) in Biochemistry.

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ABSTRACT

Carbamates, pyrethroids, organophosphates, and organochlorines are insecticide classes used for mosquito vector control, with organophosphates accounting for 3.1% and pyrethroids 89.9% of use in Africa. Resistance to one or more classes of insecticides has been detected in 78 of the 88 malaria-endemic countries, posing a significant threat to control efforts. This research investigates the resistance status of *Anopheles gambiae* mosquitoes to malathion, fenitrothion, alphacypermethrin, and deltamethrin in Sango Ota. Larvae and pupae were gathered from Atan and Nestle location

(6° 40' N, 3° 09' E, 6° 41' N, 3° 09' E) in Sango Ota using the standard dipping method, and raised to adulthood in the insectary. The sensitivity of female mosquitoes that were 2–5 days old and not given blood was assessed to 5% malathion, 1% fenitrothion, 0.05% deltamethrin, and 0.05% alphacypermethrin. WHO tube bioassay techniques determined the resistance status to the four insecticides, with a death rate of 100% in malathion and fenitrothion and 11.8% and 12.5% recorded in alphacypermethrin and deltamethrin exposure, respectively. Polymerase chain reaction (PCR) was used to detect *An. gambiae* species and also to detect L1014F (kdr W) mutation in mosquitoes exposed to deltamethrin and alphacypermethrin. The frequency of resistance was 1.0 for alphacypermethrin, meaning 100% of the mosquito population studied was resistant to this insecticide, while approximately 23.5% showed resistance to deltamethrin. This study indicated the high efficacy of malathion and fenitrothion for mosquito control in Sango Ota and the substantial resistance to alphacypermethrin and deltamethrin. Continued mosquito surveillance and resistance profiling are essential for effective malaria control and to inform future vector management strategies.

Keywords: *Anopheles mosquito, insecticides, resistance, mutation,*