EFFICACY OF THE INSECT GROWTH REGULATOR PYRIPROXYFEN FOR THE CONTROL OF *ANOPHELES GAMBIAE* GILES *SENSO STRICTO*
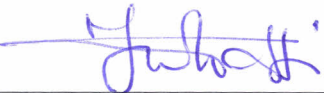
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DECLARATION

I, George William Chimile, hereby declare that this thesis is my original work and has not been presented for a degree in any other University.

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This thesis has been submitted for examination with our approval as supervisors:

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Abstract

Mosquito larval control is an important component in malaria vector control package which has been neglected for quite long time, but recently, a renewed interest on this tool has been observed by introduction of IGRs in field tests. In this study, the efficacy of the IGR pyriproxyfen, (registered as Sumilarv®) against *Anopheles gambiae s.s* larvae was determined. Susceptibility of the malaria vector to the different concentrations of Sumilarv®0.5G was tested under controlled conditions in screened green house. Effects of IGR in controlling the malaria vector were determined in the field where 18 plastic tubs of 20 liters capacity were buried on the ground with a spade of soil and 17 liters of water. Fifty, fourth and third instar of *An. gambiae s.s* (Mbita strain) were introduced for effectiveness of the IGR and treatment intervals under field condition. Emergence inhibition monitoring tool was also tested. *Anopheles gambiae s.s* was highly susceptible to pyriproxyfen 0.5G. The 50% and 90% emergence inhibitions (EI) were as low as $8.8*10^{-7}$ $(3.0*10^{-7} - 1.8*10^{-6})$ and $1.8*10^{-4}$ $(7.4*10^{-5} – 7.6*10^{-4})$, respectively. Dose responses were significantly different (P<0.01- 95% CI). In the field experiment, effectiveness was 100% at 0.01ppm active ingredient (a.i) the lowest dose recommended by the manufacturer, but its potency dropped down to 23.3% after 7 days. The highest recommended dose (0.05ppm a.i.) was equally effective but its efficacy decreased down to 33.4% after one week. At higher dosages beyond the recommended range, the residual effect varied, ranging from 7, 14, 28 and 60 days. The mosquito emergence inhibition monitoring tool was useful in determining the potency although there are more challenges when using it in an operational environment. Price was compared between *Bti* and pyriproxyfen where *Bti* was found to be relatively cost effective compared to pyriproxyfen 0.01ppm a.i. Climatic and physical environmental conditions in tropical Africa could be the influence on the lack of residual effect observed.