

**A PRELIMINARY STUDY ON LARVICIDAL EFFICACY OF *Piper nigrum* L.  
(PIPERACEAE) EXTRACTS AGAINST DENGUE VECTOR,  
*Aedes albopictus* (DIPTERA: CULICIDAE)**

**Emira Izzati Abdul Aziz<sup>1</sup>, Nor Aliza Abdul Rahim<sup>2\*</sup>, Siti Zaleha Raduan<sup>2</sup> &  
Razitasham Safii<sup>3</sup>**

<sup>1</sup>Entomology and Pests Unit,  
Kota Marudu District Health Office,  
Sabah State Health Department, Ministry of Health Malaysia

<sup>2</sup>Department of Paraclinical Sciences,  
Faculty of Medicine and Health Sciences,  
Universiti Malaysia Sarawak

<sup>3</sup>Department of Community Medicine and Public Health,  
Faculty of Medicine and Health Sciences,  
Universiti Malaysia Sarawak

\*Corresponding author: [arnaliza@unimas.my](mailto:arnaliza@unimas.my)

**ABSTRACT**

Botanical insecticides have become an alternative biocontrol tool in controlling mosquito population worldwide. Hence, the current study was conducted to determine the efficacy of Sarawak *Piper nigrum* ethanolic extracts as larvicidal potential on its morphological abnormalities against larvae and pupae of *Aedes albopictus*. Plant samples of *P. nigrum* were extracted in 95% ethanol, evaporated and analysed using standard qualitative method. Phytochemical screening revealed the presence of alkaloid, flavonoid, tannin, triterpenes and steroid in the fruit and leaf extracts, while saponins was only found in the leaf extract. Larval bioassays were conducted using the crude extracts following WHO standard for larval susceptibility test. After 24 hours of exposure, the total mortality of larvae was achieved at 10.5 ppm and 450 ppm for *P. nigrum* fruit and leaf extracts, respectively. Fruit extract has shown a more remarkable larvicidal potential with lower LC<sub>50</sub> (5.07ppm) and LC<sub>90</sub> (7.85ppm) as compared to the leaf extract which required higher LC<sub>50</sub> (108.893ppm) and LC<sub>90</sub> (213.796ppm). Analysis of variance (ANOVA) demonstrated a significant difference in the mean mortality of larvae between each concentration of fruit extract (F=121.202, df=6, p<0.05) and leaf extract (F=452.875, df=6, p<0.05) as compared to the control groups. It was observed that both *P. nigrum* extracts induced several morphological abnormalities at larval and pupal stage that finally led to the individual mortality. Various phytochemical constituents detected in *P. nigrum* extracts may possess the mosquito larvicidal properties and cause the morphological abnormalities in mosquitoes. Hence, the ethanolic extracts of *P. nigrum* from Sarawak may pave the way for the development of an environmentally safe mosquito biopesticide.

**Keywords:** *Aedes albopictus*, *Piper nigrum*, larvicidal potential, morphological abnormalities, phytochemical constituents