

The Chemical Composition and Larvicidal Activity of Essential Oils Derived from *Piper Longepetiolatum* and *Piper Brachypetiolatum* (Piperaceae) Against *Aedes Aegypti* Larvae (Culicidae) Were Investigated

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Abstract : Dengue is fatal arboviruses transmitted by the *A. aegypti* mosquito to more than 100 countries, for which the WHO estimates that 2.5 million people will be infected by these disease. The widespread of these diseases is due, among other factors, to the resistance that *A. aegypti* has to several commercial insecticides. On the other hand, natural products based on plants of the genus *Piper* (Piperaceae) are characterized by their insecticidal activities against mosquitoes. *Piper longepetiolatum* and *Piper brachypetiolatum* are species with wide distribution in the State of Amazonas. However, there is no investigation of phytochemical or biological of these plants against mosquitoes such as *A. aegypti*. The main of this study was to identify the chemical composition of the essential oil (EOs) from *P. longepetiolatum* and *P. brachypetiolatum* and to evaluate the biological activity against *A. aegypti*. The EOs were extracted by hydrodistillation from leaves (200 g) of *P. longepetiolatum* and *P. brachypetiolatum* and analyzed by GC-MS and GC-FID. The main compounds β -caryophyllene (99.9% of purity) and E-nerolidol (99.4% of purity) were purchased from Sigma-Aldrich® Brazil. The larvicidal activity of EOs (20 to 100 ppm), β -caryophyllene and E-nerolidol (10 to 50 ppm) was performed according to WHO protocol against *A. aegypti* larvae. The GC-MS and GC-FID analysis of EOs from *P. longepetiolatum* and *P. brachypetiolatum* indicated the majority presence of β -caryophyllene (35.42%) and E-nerolidol (49.79%), respectively. The results showed that all natural products presented larvicidal activity against *A. aegypti*. In this aspect, the OE from *P. brachypetiolatum* (LC50 of 15.51 ppm and LC90 of 22.79 ppm) was more active than the OE from *P. longepetiolatum* (LC50 of 47.17 ppm and LC90 of 69.60 ppm) ($p < 0.05$). Regarding of main compounds, E-nerolidol (LC50 of 9.50 ppm and LC90 of 23.89 ppm) showed higher larvicidal activity than the β -caryophyllene compound (LC50 of 79.00 ppm and LC90 of 230.91 ppm) ($p < 0.05$). The larvae treated with these natural products showed tremors and lethargic movements, suggesting that these natural products have neurotoxic action. These observations support studies to investigate the mechanism of action. This is the first record of the chemical composition and larvicidal activity of the EO from *P. longepetiolatum* and *P. brachypetiolatum* rich in β -caryophyllene and E-nerolidol against *A. aegypti* larvae.

Keywords : piperaceae, aedes, sesquiterpenes, biological control

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