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Larvicidal Activity of Essential Oils of Piper betle from the Indonesian Plants against *Aedes Aegypti* L

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ABSTRACT

Among the alternative strategies, the use of plants, insecticidal chemicals appears to be promising. Aromatic plants, and their essential oils, are among the most efficient botanicals. This study was undertaken to assess the larvicidal potential of the essential oil of the *Piper betle* from the Indonesian Plants against Aedes *aegypti* L. Aedes aegypti *L.* is the major vector of dengue fever, an endemic disease in Indonesian. Dengue fever is endemic over large areas of tropics and subtropics. Outbreaks of dengue have repeatedly occurred in Indonesian over the last 10 years. The larvicidal activity of essential oils of *Piper* from the Indonesian Plants was tested using third-instar larvae of *Aedes aegypti*. Methods: Essential oil was hydro distilled in the laboratory from the Indonesian Plants were analyzed by measurement of their LC50. The essential oils were extracted by steam distillation. Bioefficacy o f the essential oil was evaluated under laboratory conditions using third-instar larvae of *Aedes aegypti*. The results from the *A. aegypti* larvicidal assay using ssential oils of *Piper* from the Indonesian Plants . The most active essential oils against third instar larvae of *A. aegypti* were those of the 24hour exposed, LC_{50} = 13,1 ppm . For the 48 hour exposed, LC_{50} = 11,2 ppm. The Essential Oils of *Piper Betle* from the Indonesian Plants against *Aedes aegypti* L present potential alternatives of new bioinsecticide replacing for insect resistance to insecticidal *Bacillus thuringiensis* toxins expressed in transgenic plant.

Keywords: *Aedes aegypti* , Essential Oils, *Piper betle* Plants.

INTRODUCTION

Insects form the largest class of the animal kingdom and include nearly 80% of known animal species. Among them, tens of thousands of species are considered as high risk species for Man. They have a double impact: (1) medical; insects are pathogenic agents or disease vectors for men and domestic animals and (2) agricultural; they devastate crops. Phytophagous insect's damage rice crops (58% losses), cotton (47%), and cause the loss of more than a third of corn and sugar-cane crops and nearly a fifth of wheat.

Ae. aegypti are the major vector most important of insects well-known for their public health importance, since they act as vector for many tropical and subtropical diseases such as dengue fever, yellow fever, Dengue fever is endemic over large areas of tropics and subtropics Outbreaks of dengue have repeatedly occurred in Indonesian over the last 10 years., the major urban vectors of dengue. The approach to combat these diseases largely relied on interruption of the disease transmission cycle by either targeting the *Aedes aegypti* larvae through spraying of stagnant water breeding sites or by killing the adult of *Aedes aegypti*. using insecticides2.Larviciding is a successful way of reducing *Aedes aegypti* (Ryan, M.F. and Byrne, O. (1988). While most patients are asymptomatic, reinjection with different serotypes of dengue viruses may lead to hemorrhagic fever with high mortality. During outbreaks, public health authorities in Indonesian have standardized the use of aerolized pyrethroid insecticides that can cause allergies. This measure only partially controls the mosquito population since it eliminates the adult flying insects but does not eliminate the breeding places. In these breeding sites, the larvicide used is usually the organophosphorate Temephos, although very slightly toxic may cause headaches, loss of memory, and irritability (Ryan, M.F. And Byrne, O. (1988).

Insect Pest management (IPM) has to face up to the economic and ecological consequences of the use of pest control measures. Fifty years of sustained struggle against harmful insects using synthetic and oil-derivative molecules has produced perverse secondary effects (mammalian toxicity, insect resistance and ecological hazards). The diversification of the approaches inherent in IPM is necessary for better environmental protection. One of the fractions of aromatic plants, most frequently used for industrial applications, and which has shown promise for use in IPM, is the fraction of volatile fragrant compounds commonly called essential oils.

Among current alternative strategies aiming at decreasing the use of classical insecticides, ecochemical control based on plant-insect relationships is one of the most promising methods. For centuries,

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