

ABSTRAK

Lonjakan kasus DBD (Demam Berdarah Dengue) perlu diwaspadai guna mencegah terjadinya Kejadian Luar Biasa (KLB). Direktorat P2PM mencatat kasus DBD pada 2020 sebanyak 81.382 kasus dengan kematian sebanyak 517 orang, hingga Januari 2022 terdapat 87.501 kasus dengan kematian 816 orang. Pengendalian vektor secara kimiawi atau penggunaan insektisida, salah satu malathion, yang selama bertahun-tahun telah digunakan dalam program pemberantasan DBD di Indonesia. Namun penggunaan suatu jenis insektisida dalam jangka waktu panjang dapat menyebabkan resistensi terhadap nyamuk *Aedes aegypti*. Penelitian kuantitatif dengan desain observasional (deskriptif) ini bertujuan untuk menemukan gen *Ace-1* pada sampel nyamuk *Aedes aegypti* dengan menggunakan metode qPCR. Ini karena gen ini memiliki target site enzim AChE (asetilkolinesterase). Penelitian dilakukan pada Oktober 2022 hingga Mei 2023. Uji resistensi dilakukan di Laboratorium Entomologi Dinkes Provinsi Jawa Timur menggunakan metode *CDC Bottle Bioassay* dengan perlakuan sebanyak 5 kelompok (4 botol uji dan 1 botol kontrol). Deteksi gen *Ace-1* dilakukan di Laboratorium Biomol jurusan Teknologi Laboratorium Medis Poltekkes Kemenkes Surabaya. Hasil akhir deteksi gen *Ace-1* dengan metode PCR berupa nilai CT, pada 4 sampel uji dan 1 kontrol menunjukkan hasil positif (terdeteksi adanya gen *Ace-1*) dengan nilai CT sampel 1 (F01) 15,89, sampel 2 (G01) sebesar 15,13, sampel 3 (H01) sebesar 13,94, sampel 4 (A12) sebesar 15,27, dan pada kontrol didapatkan nilai CT 29,53. Adanya gen *Ace-1* pada seluruh sampel menunjukkan resistensi *Aedes aegypti* terhadap malathion insektisida. Ini juga menunjukkan resistensi vektor DBD, yang memungkinkan evaluasi penggunaan insektisida.

Kata kunci : Nyamuk *Aedes aegypti*, Gen *Ace-1*, *Quantitative* PCR, Nilai CT

ABSTRACT

The surge in dengue cases needs to be watched out for to prevent extraordinary events, in Indonesian called (KLB). The P2PM Directorate recorded 81,382 dengue cases in 2020 with 517 deaths, until January 2022 there were 87,501 cases with 816 deaths. One of the prevention efforts in handling dengue cases is chemical vector control, or with the use of insecticides. Malathion insecticide is an insecticide that has long been used in dengue eradication programs in Indonesia, but the use of a type of insecticide in the long term can result in resistance to *Aedes aegypti* mosquitoes. Because the AChE enzyme (*acetylcholinesterase*) is the pesticide group's target site, the *Ace-1* gene is a significant indicator of *Aedes aegypti*'s resistance to malathion insecticides from the organophosphate family. The goal of this research is to determine the presence of the *Ace-1* gene as an indicator of resistance of *Aedes aegypti* to malathion insecticide by qPCR. It is a quantitative study with an observational (descriptive) research methodology. The research was conducted from October 2022 to May 2023. The resistance test was carried out at the Entomology Laboratory of the East Java Provincial Health Office using the *CDC Bottle Bioassay* method with 5 groups of treatment (4 test bottles and 1 control bottle). The detection of the *Ace-1* gene was carried out at the Molecular Biology Laboratory in the matter of Medical Laboratory Technology Poltekkes Kemenkes Surabaya. The final results of detection of the *Ace-1* gene by PCR method in the form of CT values, in 4 test samples and 1 control showed positive results (detected the presence of the *Ace-1* gene) with CT values of sample 1 (F01) 15.89, sample 2 (G01) of 15.13, sample 3 (H01) of 13.94, sample 4 (A12) of 15.27, and in the control obtained a CT value of 29.53. The presence of the *Ace-1* gene in all samples is an important indication of *Aedes aegypti* resistance to malathion insecticides as well as an effort to monitor dengue vector resistance so that the use of insecticides can be evaluated.

Keywords: *Aedes aegypti* mosquito, *Ace-1* gene, *Quantitative* PCR, CT value