

ABSTRAK

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DETEKSI GEN VGSC SEBAGAI INDIKASI RESISTENSI INSEKTISIDA FENVALERAT PADA NYAMUK *Aedes aegypti* METODE *REAL-TIME* PCR
xvi + 90 Halaman + 5 Tabel + 13 Lampiran

Nyamuk *Aedes aegypti* merupakan agen penular utama infeksi DBD, yang bersifat endemis di negara tropis dan subtropis, termasuk Indonesia. Pengendalian vektor DBD di Indonesia terus dilakukan untuk menekan jumlah kasus. Sebagai langkah kesiapsiagaan, pendekatan molekuler seperti deteksi gen VGSC diperlukan untuk mengidentifikasi resistensi nyamuk *Aedes aegypti* terhadap insektisida kelompok piretroid. Penelitian ini bertujuan untuk mengetahui hasil gen VGSC sebagai indikasi yang menyebabkan resistensi pada nyamuk *Aedes aegypti* akibat paparan dari insektisida fenvalerat melalui teknik *Real-Time* PCR.

Penelitian ini dilaksanakan pada bulan Maret - April 2025 di Balai Besar Laboratorium Kesehatan Masyarakat (BBLKM) dan Laboratorium Biologi Molekuler Jurusan Teknologi Laboratorium Medis Poltekkes Kemenkes Surabaya. Penelitian tergolong deskriptif kuantitatif dengan metode analisa data observasi. Uji resistensi yang diterapkan adalah metode CDC *Bottleassay* yang terdiri dari 4 botol uji dan 1 botol kontrol. Setelah dilakukan uji resistensi, sampel nyamuk selanjutnya dibuat dalam bentuk suspensi untuk proses ekstraksi DNA. Tahap ekstraksi DNA dilanjutkan dengan pengujian kemurnian dan konsentrasi DNA. Deteksi gen VGSC kemudian dilakukan menggunakan metode *Real-Time* PCR, dengan hasil yang ditunjukkan dalam bentuk nilai *cycle threshold* (CT).

Hasil penelitian memperlihatkan jika 2 dari 4 sampel (R1 dan R4) terkonfirmasi positif/ ditemukan gen VGSC dengan nilai CT 1,67 untuk sampel 1 (R1) dan 1,63 untuk sampel 4 (R4), sementara dua lainnya (R2 dan R3) menunjukkan hasil N/A atau tidak ditemukan gen VGSC. Berdasarkan hasil tersebut, dapat disimpulkan bahwa sebesar 50% dari total sampel nyamuk *Aedes aegypti* terdeteksi adanya gen VGSC, sedangkan 50% sampel lainnya tidak terdeteksi adanya gen VGSC.

Kata kunci: Nyamuk *Aedes aegypti*, fenvalerat, gen VGSC, qPCR, nilai CT
Daftar bacaan = 16 buku (2016 – 2025)

ABSTRACT

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DETECTION OF VGSC GENE AS AN INDICATION OF FENVALERAT INSECTICIDE RESISTANCE IN Aedes aegypti MOSQUITO USING REAL-TIME PCR METHOD

xvi + 90 Pages + 5 Tables + 13 Appendices

Aedes aegypti mosquitoes are the main vectors of dengue fever, which is endemic in tropical and subtropical countries, including Indonesia. Dengue fever vector control in Indonesia continues to be carried out to reduce the number of cases. As a preparedness measure, a molecular approach such as VGSC gene detection is needed to identify the resistance of Aedes aegypti mosquitoes to pyrethroid insecticides. This study aims to determine the results of the VGSC gene as an indication that causes resistance in Aedes aegypti mosquitoes due to exposure to fenvalerate insecticide using the Real-Time PCR method.

This study was conducted in March - April 2025 at the Center for Public Health Laboratory (BBLKM) and the Molecular Biology Laboratory of the Department of Medical Laboratory Technology, Poltekkes Kemenkes Surabaya. The type of research used is quantitative descriptive with an observational data analysis method. The resistance test used is the CDC Bottleassay method consisting of 4 test bottles and 1 control bottle. After the resistance test was carried out, the mosquito samples were then made in the form of a suspension for the DNA extraction process. The DNA extraction stage was continued with testing the purity and concentration of DNA. VGSC gene detection was then carried out using the Real-Time PCR method, with the results shown in the form of cycle threshold (CT) values.

The results showed that of the 4 mosquito samples tested, 2 samples (R1 and R4) were confirmed positive/VGSC gene was found with a CT value of 1.67 for sample 1 (R1) and 1.63 for sample 4 (R4), while the other two (R2 and R3) showed N/A results or no VGSC gene was found. Based on these results, it can be concluded that 50% of the total Aedes aegypti mosquito samples detected the presence of the VGSC gene, while the other 50% of samples did not detect the presence of the VGSC gene.

Keywords: Aedes aegypti mosquito, fenvalerate, VGSC gene, qPCR, CT value

References : 16 books (2016 – 2025)