

## INTISARI

### INDEKS ENTOMOLOGI DAN STATUS KERENTANAN NYAMUK *Aedes aegypti* DI KELURAHAN SUNGAI ANDAI, KECAMATAN BANJARMASIN UTARA, KOTA BANJARMASIN, PROVINSI KALIMANTAN SELATAN TERHADAP MALATION

Yudi Yahya

Magister Ilmu Biomedik, Fakultas Kedokteran, Kesehatan Masyarakat, dan Keperawatan, Universitas Gadjah Mada

**Latar Belakang:** Penggunaan insektisida malation sebagai salah satu program pengendalian vektor demam berdarah dengue dalam waktu lama dapat menyebabkan timbulnya resistensi. Resistensi nyamuk terhadap malation dapat terjadi melalui mekanisme peningkatan aktivitas enzim esterase non spesifik atau mutasi gen *Ace-1*. Kelurahan Sungai Andai merupakan salah satu kelurahan dengan jumlah kasus penularan virus dengue terbesar di Kota Banjarmasin, Provinsi Kalimantan Selatan.

**Tujuan:** Penelitian ini bertujuan untuk mengetahui status kerentanan *Ae. aegypti* terhadap malation dan menganalisis indeks entomologi di Kelurahan Sungai Andai, Kota Banjarmasin, Provinsi Kalimantan Selatan.

**Metode:** Penelitian ini merupakan penelitian deskriptif dengan rancangan *cross-sectional*. Survei dilakukan dengan metode *single larva* dan koleksi telur menggunakan ovitrap. Status kerentanan diuji dengan metode *CDC bottle bioassay*, deteksi aktivitas enzim esterase non spesifik menggunakan uji biokimia, dan deteksi mutasi gen *Ace-1* menggunakan PCR dan sekuensing.

**Hasil:** Berdasarkan *maya index* terdapat 87,14% rumah termasuk kategori rendah dan 12,86% rumah termasuk kategori sedang sebagai tempat nyamuk berkembang biak. Kelurahan Sungai Andai berisiko sedang sebagai tempat perkembangbiakan nyamuk *Ae. aegypti* dengan Angka Bebas Jentik = 81,43 %; *House Index* = 18,57%; *Container Index* = 2,38%; *Breteau Index* = 21,43%; *Pupae Index* = 4,29%; *Density Figure* = 4; *Ovitrap Index* level = 1-2. *Aedes aegypti* di Kelurahan Sungai Andai tergolong toleran terhadap malation dengan rata-rata mortalitas 95,5%. Uji biokimia menunjukkan terjadi peningkatan aktivitas enzim esterase non spesifik sebesar 38,19%. Hasil sekuensing tidak menunjukkan adanya mutasi gen *Ace-1*.

**Kesimpulan:** Kelurahan Sungai Andai berisiko sedang sebagai tempat perkembangbiakan *Ae. aegypti*. Meskipun *Ae. aegypti* di wilayah ini tergolong toleran terhadap malation dan tidak mengalami mutasi gen *Ace-1*, potensi terjadinya penularan DBD masih tetap ada.

**Kata Kunci:** *Aedes aegypti*, indeks maya, malation, uji biokimia, gen *Ace-1*

## ABSTRACT

### ENTOMOLOGICAL INDEX AND SUSCEPTIBILITY OF *Aedes aegypti* MOSQUITO TO MALATION IN SUNGAI ANDAI VILLAGE, NORTH BANJARMASIN SUB-DISTRICT, BANJARMASIN, SOUTH KALIMANTAN

Yudi Yahya

Master in Biomedical Sciences Program,  
Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada

**Background:** Long-term usage of malathion insecticides as a part of dengue vector control programs can lead to resistance. Resistance of *Aedes aegypti* to malathion can occur via the mechanism of increased activity of non-specific esterase enzymes or mutations in the *Ace-1* gene. Sungai Andai Village is one of the villages, in Banjarmasin, South Kalimantan with the highest number of dengue virus transmission cases.

**Objective:** This study aims to determined the susceptibility status of *Ae. aegypti* against malathion and analyzed the entomological index in Sungai Andai Village, Banjarmasin, South Kalimantan.

**Methods:** A cross-sectional design was used in this descriptive study. The survey was conducted using the single larvae method and the eggs were collected by ovitraps. Susceptibility status was determined by a CDC bottle bioassay. A biochemical assay was used to detect non-specific esterase enzyme activity. PCR and sequencing were carried out to detect *Ace-1* gene mutation.

**Results:** Based on the Maya Index, 87.14% and 12.86% of houses in the low and moderate categories as *Ae. aegypti* breeding sites, respectively. Sungai Andai was at moderate risk as an *Ae. aegypti* breeding site (Angka Bebas Jentik = 81.43%; House Index = 18,57%; Container Index = 2,38%; Breteau Index = 21,43%; Pupae Index = 4,29%; Density Figure = 4; Ovitrap Index level = 1-2). *Aedes aegypti* in Sungai Andai were tolerant (95,5 % average mortality). The biochemical assay showed increased activity of non-specific esterase enzymes by 38.19%. Sequencing results did not show any mutations in the *Ace-1* gene.

**Conclusion:** Sungai Andai Village is at moderat risk as an *Ae. aegypti* breeding site. Although *Ae. aegypti* in this area is classified as tolerant due to the presence of elevated non-specific esterase activity and no mutation in the *Ace-1* gene, the potential for dengue transmission still remains.

**Keywords:** *Aedes aegypti*, maya index, malathion, biochemical assay, *Ace-1* gene