

ABSTRACT

DETECTION OF MONOOXYGENASE ENZYME ACTIVITY IN *Aedes aegypti* MOSQUITO IN SEKIP, SLEMAN, YOGYAKARTA

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Background. Dengue Hemorrhagic Fever (DHF) is still an endemic communicable disease in Yogyakarta. *Aedes aegypti* mosquito is the main vector that transmits the virus that causes dengue. The use of chemical insecticides has been an important component to control population of dengue vectors. The four common classes of insecticides are organochlorine, organophosphate, carbamates and pyrethroids. Unfortunately, the continued use of these insecticides may lead to resistance. Resistance of insecticides will cause problem in controlling the vector and spreads of dengue fever. There are various mechanisms of resistance. One of the most common is metabolic resistance, and one of the families of metabolic enzymes that have been implicated in the metabolism of insecticides is monooxygenase. In this research, the activity of monooxygenase enzyme in *Ae. aegypti* will be evaluated.

Objective. Detect the activity of monooxygenases enzyme activity in *Ae. aegypti* mosquito in Sekip, Sleman, Yogyakarta.

Method. This study is a descriptive study to detect the activity of monooxygenase enzyme in *Ae. aegypti* mosquito using Biochemistry Test with microplate assay with the wavelength of $\lambda 595$ nm. The results are compared with cut-off point generated from mean of negative control absorbance value.

Result. Color eye score of the larva samples from Sekip, Sleman show 86.1% of colorless to faint blue result. The average absorbance value was 0.137 and both of those result was considered as highly susceptible and indicate low monooxygenase enzyme activity.

Conclusion. Larva samples of *Ae. aegypti* from Sekip, Sleman have low activity of monooxygenase enzyme activity which indicate high susceptibility towards pyrethroid insecticide.

Keyword: *Aedes aegypti*, resistance, monooxygenase enzyme, pyrethroid, Sekip

INTISARI

DETEKSI AKTIVITAS ENZIM MONOOXYGENASE PADA NYAMUK *Aedes aegypti* DI SEKIP, SLEMAN, YOGYAKARTA

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Latar Belakang. Demam Berdarah Dengue (DBD) masih merupakan penyakit menular endemic di Yogyakarta. Nyamuk *Ae. aegypti* adalah vector utama dalam menstransmisikan virus yang menyebabkan demam berdarah. Penggunaan insektisida kimia menjadi komponen penting untuk mengendalikan populasi vector dengue. Empat kelas insektisida yang umum digunakan adalah Organochlorine, Organophosphate, Carbamates dan Pyrethroid. Namun, penggunaan insektisida secara terus menerus dapat menyebabkan resistensi. Salah satu yang paling umum adalah resistensi metabolik, dan salah satu keluarga enzim metabolic yang telah terlibat dalam metabolisme insektisida adalah monooxygenase (P450s). Dalam penelitian ini, aktivitas enzim monooxygenase pada nyamuk *Ae. aegypti* akan dievaluasi.

Objektif. Mendeteksi aktivitas enzim monooxygenase di *Ae. aegypti* di Sekip, Sleman, Yogyakarta.

Metode. Penelitian ini merupakan penelitian deskriptif untuk mendeteksi aktivitas enzim monooxygenase pada nyamuk *Ae. aegypti* menggunakan uji biokimia dengan mikroplat dengan panjang gelombang $\lambda 595$ nm. Hasilnya dibandingkan dengan cut-off point yang didapatkan dari rerata nilai absorbansi control negatif.

Hasil. Skor warna mata dari sampel larva yang berasal dari Sekip, Sleman menunjukkan hasil 86,1% tidak berwarna hingga biru pudar. Nilai absorbansi rata-rata sampel adalah 0,137 dan kedua hasil tersebut dapat dikategorikan sangat rentan dan menunjukkan aktivitas enzim monooxygenase yang rendah.

Kesimpulan. Sampel larva *Ae. aegypti* dari Sekip, Sleman memiliki aktivitas enzim monooxygenase yang rendah yang mengindikasikan kerentanan tinggi terhadap insektisida pyrethroid.

Kata kunci: *Aedes aegypti*, resistensi, enzim monooxygenase, piretroid, Sekip