Pengaruh laju dosis iradiasi gamma terhadap nyamuk aedes aegypti ditinjau dari aspek perilaku dan biomolekuler = The effects of gamma irradiation dose rate on male aedes aegypti assessed on behavioural and biomolecular aspects / Beni Ernawan

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Abstrak

ABSTRAK
Aedes aegypti merupakan vektor penting beberapa virus penyakit antara lain dengue, chikungunya, deman kuning yellow fever dan Zika. Pengendalian populasi vektor menggunakan teknik serangga mandul TSM adalah salah satu metode potensial untuk mencegah dan membatasi penyebaran virus penyakit tersebut. Penelitian ini dilakukan untuk mengevaluasi pengaruh laju dosis iradiasi gamma pada parameter kualitas nyamuk jantan mandul steril . Ae. aegypti jantan pada stadium pupa disterilisasi dengan iradiasi gamma dosis 70 Gy dengan variasi laju dosis, yaitu 0 kontrol , 300, 600, 900, 1200 dan 1500 Gy/jam menggunakan iradiator panorama. Nyamuk dewasa yang berkembang dari stadium pupa dievaluasi parameter kualitasnya, yaitu persentase kemunculan nyamuk dewasa, umur nyamuk, sterilitas, daya saing kawin, kandungan testosteron dan analisis sekuen pada faktor penentu nyamuk jantan, yaitu gen Nix. Hasil penelitian mengindikasikan bahwa tidak ada pengaruh signifikan laju dosis iradiasi gamma terhadap persentase kemunculan nyamuk dewasa, sterilitas dan kandungan testosteron. Secara umum, umur nyamuk iradiasi gamma lebih rendah dibanding kontrol. Data juga menunjukkan bahwa umur nyamuk naik secara signifikan dari laju dosis 300 Gy/jam hingga 900 Gy/jam, kemudian menurun hingga laju dosis 1500 Gy/jam. Daya saing kawin nyamuk jantan iradiasi gamma meningkat dari laju dosis 300 Gy/jam hingga 1200 Gy/jam, kemudian nilainya menurun secara signifikan pada laju dosis 1500 Gy/jam. Laju dosis iradiasi gamma menyebabkan mutasi gen Nix, faktor determinasi jantan pada nyamuk Ae. aegypti. Hasil penelitian memberikan informasi dan berkontribusi dalam upaya optimasi proses sterilisasi dengan iradiasi gamma dan parameter kualitas nyamuk jantan Ae. aegypti dalam TSM.
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ABSTRACT
Aedes aegypti is the most important vector for dengue, chikungunya, yellow fever and Zika viruses. Vector population control program utilizing radiation based sterile insect technique SIT is one of the potential methods for preventing and limiting the dispersal of these viruses. The present study was undertaken to evaluate the dose rates effects of irradiation on quality parameters of sterile males. Males Ae. aegypti at the pupal stage were sterilized by applying 70 Gy rays in varies dose rates, i.e. 0 control , 300, 600, 900, 1200 and 1500 Gy h utilizing panoramic irradiator. Adult males that emerged from the pupal stage were assessed for their quality parameters, which are the percentage of emergence, longevity, sterility, mating competitiveness, testosterone level and sequence analysis of the male determination factor, Nix gene. The results herein indicate that there was no major effect of dose rate on the percentage of emergence, sterility and testosterone level. Generally, the longevity of irradiated males was lower compared to control. The data also demonstrated that longevity was significantly increased at the dose rate from 300 to 900 Gy h, then decreased at the dose rate 900 to 1500 Gy h. Mating competitiveness of irradiated males was increased at the

dose rate from 300 to 1200 Gy h, then the value was decreased significantly at the dose rate 1500 Gy h. The dose rate was causes Nix gene mutation, Ae. aegypti male determination factor. The results give information and contribute to better understanding towards sterilization optimization and quality parameters of sterile male Ae. aegypti on SIT methods.