

Pengembangan aptasensor berbasis kolorimetri nanopartikel emas (AuNP) untuk deteksi penisilin G = Development of aptasensor based on colorimetric gold nanoparticles (AuNPs) for penicillin G detection

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Abstrak

Pengembangan biosensor dengan kombinasi DNA aptamer dari penisilin G dan nanopartikel emas (AuNP) digunakan untuk mendeteksi penisilin G. Kondisi optimum aptasensor diperoleh dengan konsentrasi NaCl dan aptamer masing-masing 0,25 M dan 2×10^{-4} M. Uji sensitifitas menunjukkan nilai limit deteksi aptasensor penisilin G sebesar 1 mg/L dan mampu mendeteksi penisilin G dalam kisaran 1-27 mg/L. Aptasensor penisilin G menunjukkan hasil yang spesifik dalam mendeteksi penisilin G setelah dilakukan uji dengan beberapa antibiotik; ampicilin, kanamisin, kloramfenikol dan eritromisin. Hasil mutasi iradiasi ultraviolet dan iradiasi gamma terhadap *P. chrysogenum* tipe liar menunjukkan peningkatan produksi penisilin G secara signifikan. Melalui metode deteksi aptasensor menunjukkan bahwa penisilin G dari strain *P. chrysogenum* tipe liar, mutan (iradiasi ultraviolet), mutan (iradiasi gamma), serta mutan (iradiasi ultraviolet dan iradiasi gamma) masing-masing menunjukkan konsentrasi deteksi sebesar $9,75 \pm 0,004$; $25,25 \pm 0,005$; $37,5 \pm 0,005$; dan $45 \pm 0,004$ mg/L.

.....The development of biosensors with a combination of aptamer DNA from penisilin G and gold nanoparticles (AuNP) was used to detect penicillin G. The optimum condition of aptasensor was obtained with NaCl and aptamer concentrations of 0.25 M and 2×10^{-4} M, respectively. The sensitivity test showed the aptasensor penicillin G detection limit value of 1 mg/L and was able to detect peniciline G in the range 1-27 mg/L. Aptasensor penicillin G shows specific results in detecting penicillin G after testing with several antibiotics ampicillin, kanamycin, chloramphenicol and erythromycin. The results of ultraviolet irradiation and gamma irradiation on wild-type *P. chrysogenum* showed a significant increase in production of penicillin G. Through aptasensor detection method showed that penicillin G from strains of wild type *P. chrysogenum*, mutants (ultraviolet irradiation), mutants (gamma irradiation), and mutants (ultraviolet irradiation and gamma irradiation) showed detection concentrations of 9.75 ± 0.004 ; 25.25 ± 0.005 ; 37.5 ± 0.005 ; and 45 ± 0.004 mg / L, respectively.