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 penislin 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 Î¼M. Uji sensitifitas menunjukkan nilai limit deteksi aptasensor penisilin G sebesar 1 mg/L dan mampu mendeteksi penislin G dalam kisaran 1-27 mg/L. Aptasensor penisilin G menujukkan hasil yang spesifik dalam mendeteksi penisilin G setelah dilakukan uji dengan beberapa antibiotik; ampisilin, kanamisin, kloramfenikol dan eritromisin. Hasil mutasi iradiasi ultaviolet dan iradiasi gamma terhadap P.chrysogenum tipe liar menunjukkan peningkatan produksi pensilin 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 ± 0,004; 25,25 ± 0,005; 37,5 ± 0,005; dan 45 ± 0,004 mg/L.

.....The development of biosensors with a combination of aptamer DNA from penislin 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 Î¼M, respectively. The sensitivity test showed the aptasensor penicillin G detection limit value of 1 mg/L and was able to detect penicline 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 ultaviolet 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.