Pengembangan Strip Test untuk deteksi Neuraminidase melalui reaksi Inhibisi Zanamivir pada Elektrod Pt-BDD berbasis elektrokimia = Development of Neuraminidase detection Based Ininhibition reaction of Zanamivir using pt modified diamond electrodes

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Abstrak

[Penyebaran virus influenza telah menarik perhatian yang tinggi karena efek samping terhadap kesehatan manusia. Deteksi Neuraminidase, sebagai salah satu enzim spesifik di virus ini diperlukan untuk mengurangi penyebaran virus influenza. Metode ini, sederhana, cepat, murah dan deteksi selektif menggunakan reaksi penghambatan oleh Zanamivir dikembangkan berdasarkan metode immunoreaction. Elektroda Platinum dimodifikasi boron-doped Diamond (Pt-BDD) digunakan sebagai elektroda kerja, sementara kawat Pt dan Ag / AgCl masing-masing sebagai elektroda counter dan referensi. Zanamivir tidak elektroaktif, tetapi memiliki respon saat oksidasi H+ yang dapat diamati di Pt-BDD. kehadiran Zanamivir mempengaruhi oksidasi H+, sehingga deteksi Zanamivir dapat dikembangkan. Batas deteksi 8,63x10-6M Zanamivir di peroleh %RSD sebesar 0,019%. Selain itu, metode ini digunakan untuk mendeteksi Neuraminidase dengan cara Zanamivir menghambat reaksi enzimatik Neuraminidase. Konsentrasi maksimumNeuraminidase dapat dihambat oleh 6x10-3M Zanamivir adalah 30 mU pada pH optimum 5,5 dengan waktu inkubasi 30 menit. Selektivitas sensor diuji dengan penambahan musin (lendir). Penambahan 0,01 mg/mL mucin Porcine Stomach, terjadi penurunan respon arus oksidasi 0,19%, sedangkan penambahan 0,01 mg/mL mucin Bovine Submaxillary Glands menurunkan respon arus oksidasi 0,14%. Hasil yang diperoleh menunjukkan bahwa sensor cukup menjanjikan untuk diterapkan sebagai deteksi neuraminidase., The spread of influenza viruses has attracted high attention because of its adverse effects on human health. Detection of Neuraminidase, as one of thespecific enzymes in these virus is needed to reduce neuraminidase’s spread.In this work, the simple, fast, low cost and selective detection using inhibition reaction by Zanamivir was developedbased on immunoreaction method. Platinum modified boron-doped diamond (Pt-BDD) electrode was used as a working electrode, while Pt wire and Ag/AgCl were usedasa counter and a reference electrodes, respectively. Zanamivir is not electroactive, butthe oxidation current response of H+oxidation can be observed at Pt-BDD. Since the presence of Zanamivir affects the oxidation of H+, the detection of Zanamivir can be developed.The detection limit of 8,63x10-6M Zanamivir can be achived with an RSD of 0,019%. Furthermore, the method was used for the detection of Neuraminidase as Zanamivir inhibits the enzymatic reaction of Neuraminidase. A maximum concentration ofNeuraminidase can be inhibited by 6x10-3 M Zanamivir was 30 mU at the optimum pH of 5.5 with incubation time of 30 min. The selectivity of the sensorwas examined with the addition of mucin (mucus). The addition of 0.01 mg/mL mucin Porcine Stomach, decreased the responses about 0.19 %, while the addition of 0.01 mg/mL bovine submaxillary mucin Glands decreased the respond of current about 0.14%.The results suggestedthat sensor developed is promising to be applied for Neuraminidase detection.]