Detection of Insulin Using Mutiara/Silica Gel/Ni(OH)$_2$ Nanoparticles Modified Silver Electrode

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ABSTRACT

In this research, pearl/silica gel/modified silver electrode was done and used for electrochemical detection of insulin. Pearls and silica gel paste were prepared by bulk modified with mixing amount of pearls, paraffin, and silica gel directly. The electrochemical detection was done by using cyclic voltammetry method.

Response of silica gel modified silver electrode against insulin solution showed increasing in cathodic current signal with increasing concentration of insulin. The response showed increasing of the signal at reduction potential -0.520 V, limit of detection and sensitivity of the electrode are 2.2139 μAμM$^{-1}$mm$^{-2}$ and 2.7555 μM. The respectively silica gel/Ni(OH)$_2$ nanoparticles modified silver electrode gives signals at the oxidation potential 0.150 V with limit of detection and sensitivity are 1.8262 μAμM$^{-1}$mm$^{-2}$ dan 1.024 μM. Silica gel/Ni(OH)$_2$ nanoparticles modified silver electrode showed a peak response higher than silica gel modified silver electrode.

Keyword: silver electrode, silica gel, insulin, cyclic voltammetry, Ni(OH)$_2$ nanoparticles