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The optimization of self-assembled monolayer of thiols on screen-printed gold electrode

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Abstract
The activated gold-modified electrode surface for self-assembled monolayer (SAM) is suitable for N-(3-dimethylaminopropyl)-N-ethylcarbodiimide hydrochloride (EDC), 16-mercaptohexadecanoic acid (16-MDA), and N-hydroxysuccinimide (NHS). The various substrates could potentially be used for surface functionalization that binds to one another. Using modified screen-printed gold electrodes, 16-MDA, EDC, and NHS, we developed a self-assembling monolayer. Different 16-MDA concentrations were applied to the surface of a screen-printed electrode surface to enhance the sensitivity of the working electrode. The impact of different EDC, NHS, and 16-MDA concentrations (0.4 M, 0.8 M, 1 M, 1.2 M, 1.4 M, and 1.8 M) and incubation times between 5 and 30 minutes were examined and compared. The binding surface of the screen-printed gold electrode was characterized using the differential pulse voltammetry (DPV) technique. It has been demonstrated that the substrate concentrations at 5 minutes and 30 minutes of incubation time used to have the highest surface coverage and electron transfer rates. This concentration would be utilized in the subsequent experiment to evaluate the binding of various bacterial species. These findings suggest that the SAM in a modified screen-printed gold electrode may be functionalized to detect microorganisms.

Author Keywords
16-mercaptohexadecanoic acid; EDC; Electrode; N-hydroxysuccinimide; Self-assembled monolayer; Thiols

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