Electrochemical DNA Sensor for *hly* Gene of *Listeria Monocytogenes* by Three-Dimensional Graphene and Gold Nanocomposite Modified Electrode

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A high performance electrochemical DNA sensor with three-dimensional graphene (3DGR) and gold (Au) nanocomposite modified electrode was developed for sensitive analysis of specific *hly* gene of *Listeria monocytogenes*. Nanocomposite was synthesized by electrochemical deposition of 3DGR and Au in turn on carbon ionic liquid electrode (CILE). Mercaptoacetic acid (MAA) was self-assembled on Au/3DGR/CILE by the specific binding of Au-S bond, which was used for the covalently linkage of ssDNA probe sequences. The fabricated ssDNA/MAA/Au/3DGR/CILE could interact with the target ssDNA sequence and the hybridization was recorded by using electrochemical indicator methylene blue (MB). Based on the reduction current of MB, this electrochemical DNA sensor was able to detect the target ssDNA sequence of *hly* gene with a wide linear concentration range (1.0×10^{-14} to 1.0×10^{-6} mol L⁻¹) and a low detection limit (3.3×10^{-15} mol L⁻¹, 3 σ). Furthermore, this biosensor was used to the detection of PCR amplification sample of *Listeria monocytogenes*.

Keywords: three-dimensional graphene, dendritic gold, electrochemical deposition, methylene blue, electrochemical DNA sensor.

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