Electrochemical DNA Sensor for *adh 1* Gene Sequence from Corn Endogenous with Carbon Microsphere Modified Electrode

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In this paper carbon sphere (CS) and chitosan (CTS) were used to modify carbon ionic liquid electrode (CILE). Then CTS-CS/CILE was further used to immobilize probe single-stranded DNA (ssDNA) sequence to get an electrochemical DNA sensor. The presence of CS provides a big surface area and CTS exhibits strong electrostatic affinity to the negatively charged ssDNA, therefore oligonucleotides probe sequence could be fixed on CTS-CS/CILE tightly. Target *adh 1* ssDNA sequence from corn endogenous in the solution was measured by this electrochemical sensor with methylene blue (MB) as the hybridization indicator, which could distinguish ssDNA and dsDNA on the electrode surface. At the optimal conditions the reduction current of MB had a linear relationship with *adh 1* gene sequence concentration from 1×10^{-13} to 1.0×10^{-6} mol L⁻¹ with the detection limit as 6.42×10^{-14} mol L⁻¹ (3 σ). This electrochemical DNA sensor could discriminate different mismatched ssDNA sequences, and further applied to the detection of polymerase chain reaction amplification product of *adh 1* gene sequences of corn endogenous from edible oil.

Keywords: Carbon sphere; chitosan; electrochemical DNA biosensor; carbon ionic liquid electrode; *adh 1* gene.

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