

Anthraquinone Labelled DNA for Direct Detection and Discrimination of Closely Related DNA Targets

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Abstract : A novel detection approach using immobilized DNA probes labeled with Anthraquinone (AQ) as an electrochemically active reporter moiety has been successfully developed as a new, simple, reliable method for the detection of DNA. This method represents a step forward in DNA detection as it can discriminate between multiple nucleotide polymorphisms within target DNA strands without the need for any additional reagents, reporters or processes such as melting of DNA strands. The detection approach utilizes single-stranded DNA probes immobilized on gold surfaces labeled at the distal terminus with AQ. The effective immobilization has been monitored using techniques such as AC impedance and Raman spectroscopy. Simple voltammetry techniques (Differential Pulse Voltammetry, Cyclic Voltammetry) are then used to monitor the reduction potential of the AQ before and after the addition of complementary strand of target DNA. A reliable relationship between the shift in reduction potential and the number of base pair mismatch has been established and can be used to discriminate between DNA from highly related pathogenic organisms of clinical importance. This indicates that this approach may have great potential to be exploited within biosensor kits for detection and diagnosis of pathogenic organisms in Point of Care devices.

Keywords : Anthraquinone, discrimination, DNA detection, electrochemical biosensor

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