
Factors Influencing the Adsorptive Stripping Potentiometric Response of Synthetic Oligonucleotides

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Received: November 17, 1999

Final version: December 28, 1999

Abstract

The adsorptive stripping potentiometric behavior of synthetic oligonucleotides at carbon paste electrodes is examined using oligo(dG)₇, oligo(dG)₁₂, oligo(dG)₁₅, oligo(dG)₂₀, oligo(dG)₃₀, oligo(dAG)₆, and oligo(dA)₆(dG)₆ as models. Factors influencing the adsorption behavior and the resulting response are investigated. These include the role of the oligonucleotide length and concentration, its guanine +adenine content and sequence, and accumulation time. The results indicate that the stripping performance is influenced not only by the length of the oligonucleotide (i.e., degree of surface contact) but also by its base content and sequence. Trace (mg/L) levels of the oligonucleotides can thus be readily detected following short accumulation times, with good reproducibility (RSD = 3–6%) and detection limits down to 3 µg/L.

Keywords: Stripping potentiometry, Oligonucleotides, Adsorption, Nucleic acids

Dedicated to Professor Emil Paleček on the Occasion of His 70th Birthday