Turkish Journal

of

Chemistry

Keywords
Authors

chem@tubitak.gov.tr

Scientific Journals Home Page

# Turkish Journal of Chemistry

## DNA Biosensor for Microcystis spp. Sequence Detection by Using Methylene Blue and Ruthenium Complex as Electrochemical Hybridization Labels

Arzum ERDEM, Kagan KERMAN, Burcu MERİÇ,
Dilşat ÖZKAN, Pınar KARA, Mehmet ÖZSÖZ
Department of Analytical Chemistry, Faculty of Pharmacy, Ege University,
35100 Bornova-İzmir, TURKEY
e-mail: ozsozs@pharm.ege.edu.tr

**Abstract:** An electrochemical biosensor for the voltammetric detection of DNA sequences related to the bloom-forming genera of cyanobacteria, Microcystis spp., is described. A specific DNA ``probe'' is designed based on sequence polymorphism within the 16S ribosomal DNA (rDNA) of the Microcystis spp. These single-stranded probes were immobilized onto carbon paste electrode (CPE) with the adsorption at a controlled potential. The probes were hybridized with the complementary ``target'' sequences at the electrode. The formed hybrids on the electrode surface were evaluated by differential pulse voltammetry (DPV) and cyclic voltammetry (CV) using methylene blue (MB) and tris (2,2' --bipyridine) ruthenium (II) chloride ($[Ru(bpy)_3]^{2+}$) as the labels of hybridization. The response of the probe modified CPE to the exposure of the non--complementary oligonucleotide proves the specificity of the hybridization with the target. The two-bases mismatch could also be discriminated and specific detection of Microcystis spp. was achieved by using the difference between the voltammetric peaks of MB and $[Ru(bpy)_3]^{2+}$ obtained with the probe and hybrid-modified CPEs. The detection of Microcystis spp. target DNA from real tap water and river water samples was also achieved.

**Key Words:** DNA Biosensor, Microcystis spp., Methylene Blue, Ruthenium Bipyridine.

Turk. J. Chem., **26**, (2002), 851-862.
Full text: pdf
Other articles published in the same issue: Turk. J. Chem.,vol.26,iss.6.