Desalination and Water Treatment
www.deswater.com
1944-3994/1944-3986 © 2012 Desalination Publications. All rights reserved
doi: 10/5004/dwt.2012.2994

Taylor & Francis
Taylor & Francis Group

44 (2012) 161–167
June

Electrochemical determination of copper(II) ions at naringenin-modified glassy carbon electrode: application in lake water sample

İbrahim Ender Mülazımoğlu

Chemistry Department, Ahmet Keleşoğlu Education Faculty, Necmettin Erbakan University, 42090, Konya, Turkey
Tel. +90332 3238220; Fax: +90332 3238225; email: iemulazimoglu@gmail.com

Received 26 May 2011; Accepted 14 December 2011

ABSTRACT

Electrochemical modification of glassy carbon (GC) electrode by naringenin (NG), a flavonoid derivative, and applicability of electrode modified in this way for determination of copper(II) (Cu(II)) ions is reported in this study. Surface modification experiments were performed in phosphate buffer solution (PBS), pH 7, in the 0.0 mV and +1400 mV potential ranges with a sweep rate of 100 mV s^{-1} and 30 cycles. The surface modification of GC electrode was performed with NG using cyclic voltammetry (CV), whereas the characterization of this sensor electrode was performed using CV and electrochemical impedance spectroscopy (EIS). The sensitivity of GC electrode modified in described way towards Cu(II) ions was investigated in Britton–Robinson (BR) buffer solution, pH 5, by differential pulse voltammetry (DPV). For the calibration curve, a series of standard Cu(II) solution from 1.0×10^{-12} M to 1.0×10^{-6} M was prepared. The NG modified GC (NG/GC) sensor electrode, has a good repeatability, was applied for Cu(II) ions determination in Beyşehir lake (in Konya, Turkey) water sample. Detection limit was obtained as lower as 1.0×10^{-12} M. The proposed method was simple, rapid, low cost and sensitive for the determination of Cu(II) ions.

Keywords: Flavonoid; Cu(II) ions; Surface modification; Surface characterization; Differential pulse voltammetry; Cyclic voltammetry