CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Electrochemical sensing of biotin using Nafion-modified boron-doped diamond electrode
Authors	Buzid, Alyah;McGlacken, Gerard P.;Glennon, Jeremy D.;Luong, John H. T.
Publication date	2018
Original Citation	Buzid, A., McGlacken, G. P., Glennon, J. D. and Luong, J. H. T. (2018) 'Electrochemical sensing of biotin using Nafion-modified boron-doped diamond electrode', ACS Omega, 3(7), pp. 7776-7782. DOI:10.1021/acsomega.8b01209
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://pubs.acs.org/doi/10.1021/acsomega.8b01209 - 10.1021/acsomega.8b01209
Rights	©2018, American Chemical Society. This is an open access article published under an ACS AuthorChoice License, which permits copying and redistribution of the article or any adaptations for non-commercial purposes. https://pubs.acs.org/page/policy/authorchoice_termsofuse.html - https://pubs.acs.org/page/policy/authorchoice_termsofuse.html
Download date	2026-11-07 11:31:17
Item downloaded from	https://hdl.handle.net/10468/6682

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Electrochemical Sensing of Biotin using Nafion Modified Boron Doped Diamond Electrode

Alyah Buzid,[†,‡] Gerard P. McGlacken,[‡] Jeremy D. Glennon, [†,‡] and John H. T. Luong,*[,†,‡]

[†] Innovative Chromatography Group Irish Separation Science Cluster (ISSC) Ireland.

[‡] School of Chemistry and Analytical & Biological Chemistry Research Facility (ABCRF), University College Cork, Ireland.

* Corresponding author:

j.luong@ucc.ie (J. H. T. Luong)

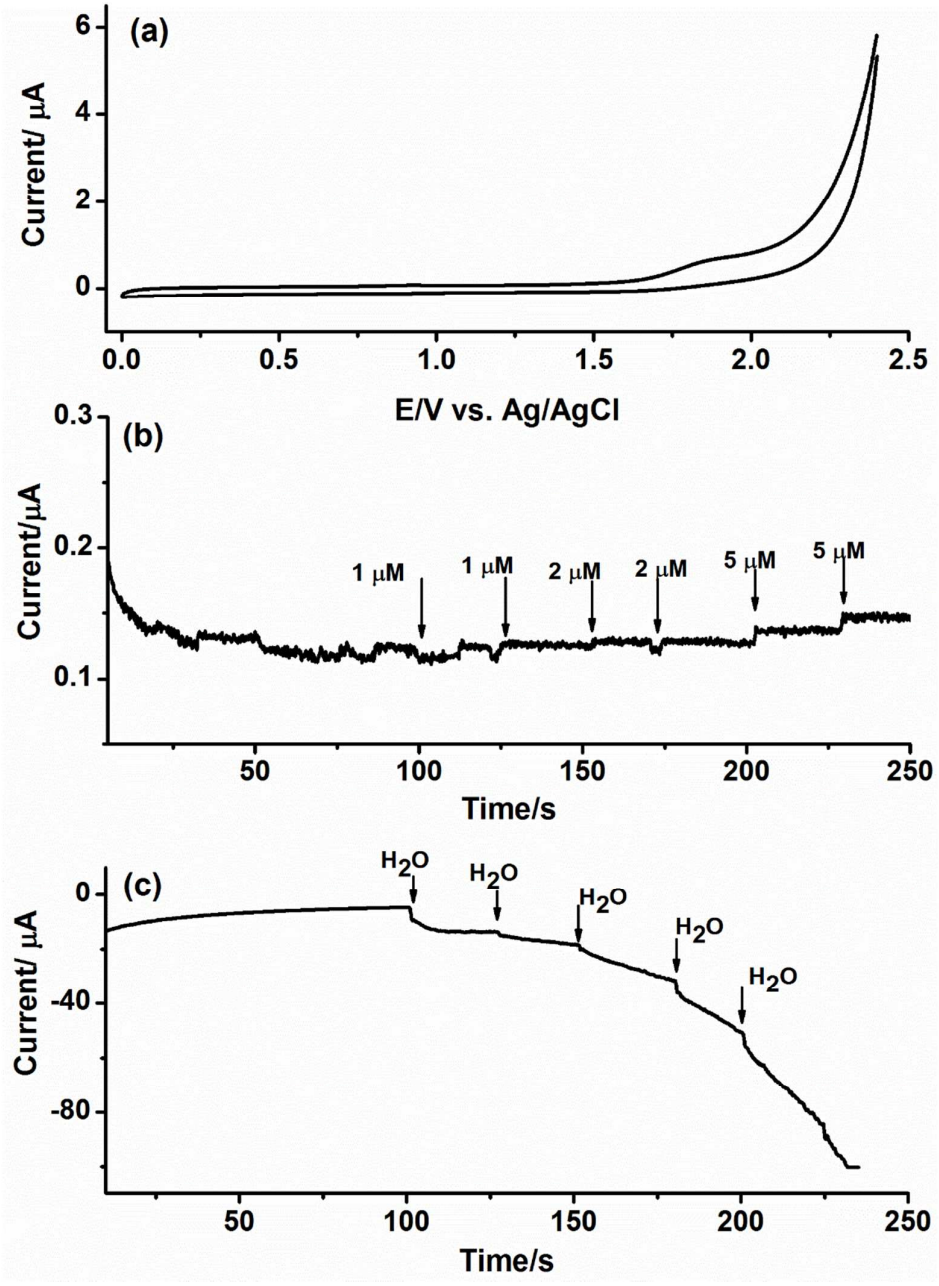


Figure S1. (a) CV of 50 μM biotin, a scan rate of 50 mVs^{-1}. (b) LOD of biotin using the *i-t* curve at + 1.8 V. (c) Water also induced the signal response, indicating its reduction at -1 V. Electrolyte: 0.2 M TBAPF in MeCN. The detection was achieved on the bare BDD electrode vs. Ag/AgCl.

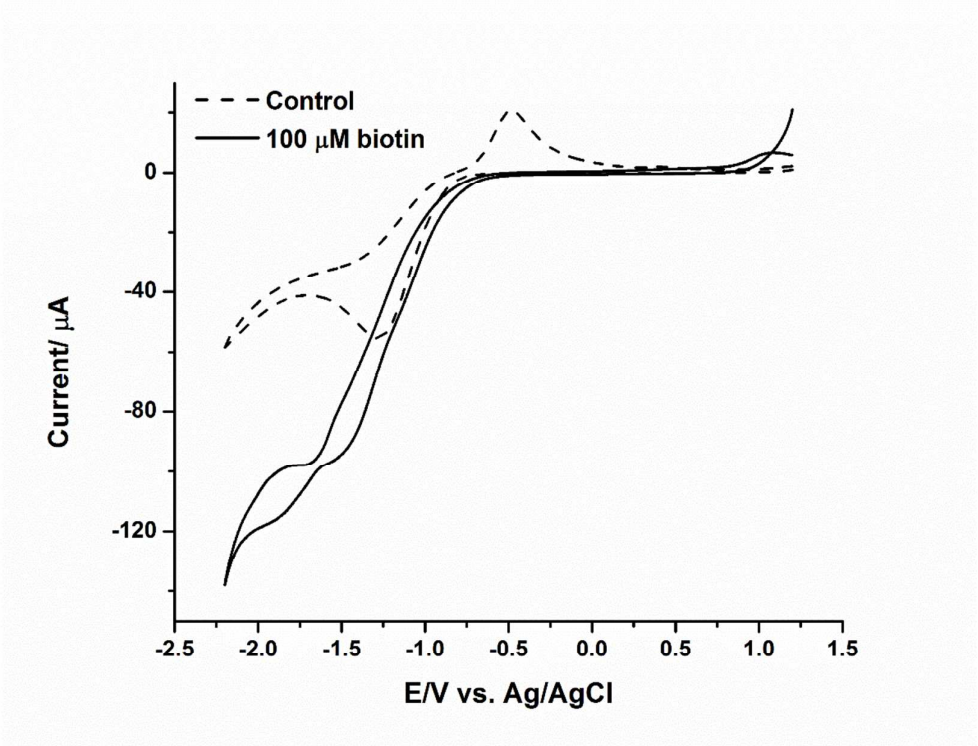


Figure S2. The CV of 100 μM biotin obtained by the bare BDD electrode in Electrolyte: 0.2 M TBAPF in MeCN, at a scan rate of 100 mVs^{-1}.

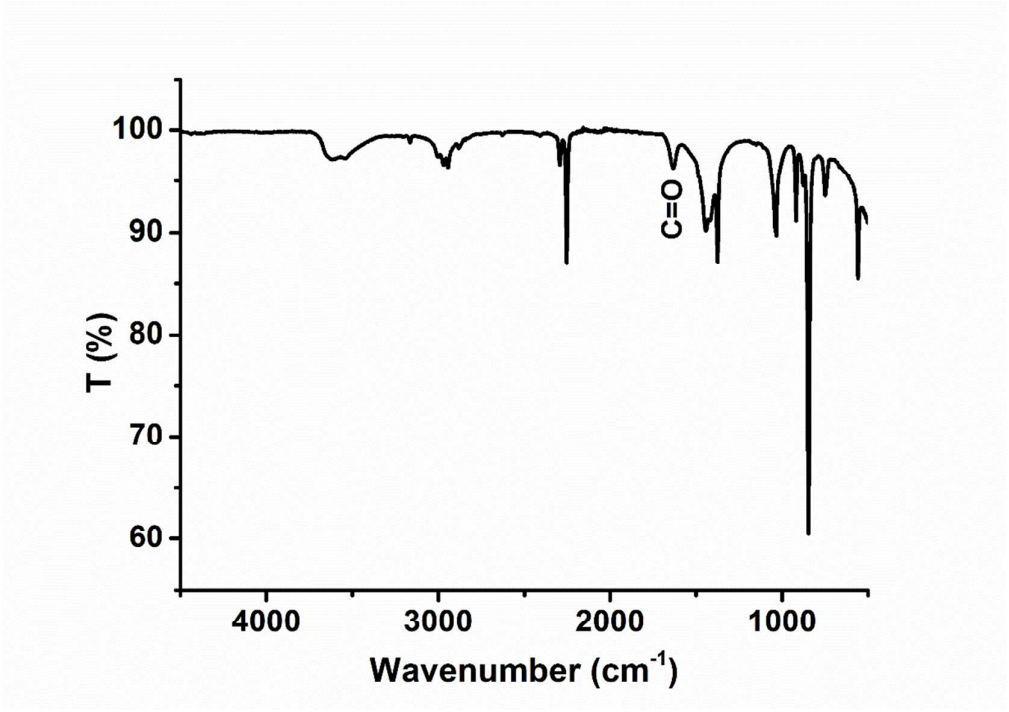


Figure S3. IR spectra of 0.2 M TBAPF in MeCN contains 1 % water after 30 cycles of voltammetry (-2.5 to + 2.5 V at 100 mVs^{-1}).

Table S1. Parameters obtained for the bare and Nafion modified BDD electrodes using an equivalent circuit R_s (C_{dl}(R_{ct} Zw)). The parameters were obtained by ZnSimpWin.

	Bare BDD	**Nafion BDD**
R_s (Ω) -solution	71.3	75.4
C_{dl} (F) – double layer	1.26×10^{-7}	2.24×10^{-7}
R_{ct} (Ω)- charge transfer	36.4	43.2
Z_w (Ω $s^{-1/2}$)-Warburg model	0.001851	0.001372
Chi Square	0.0014	0.0036

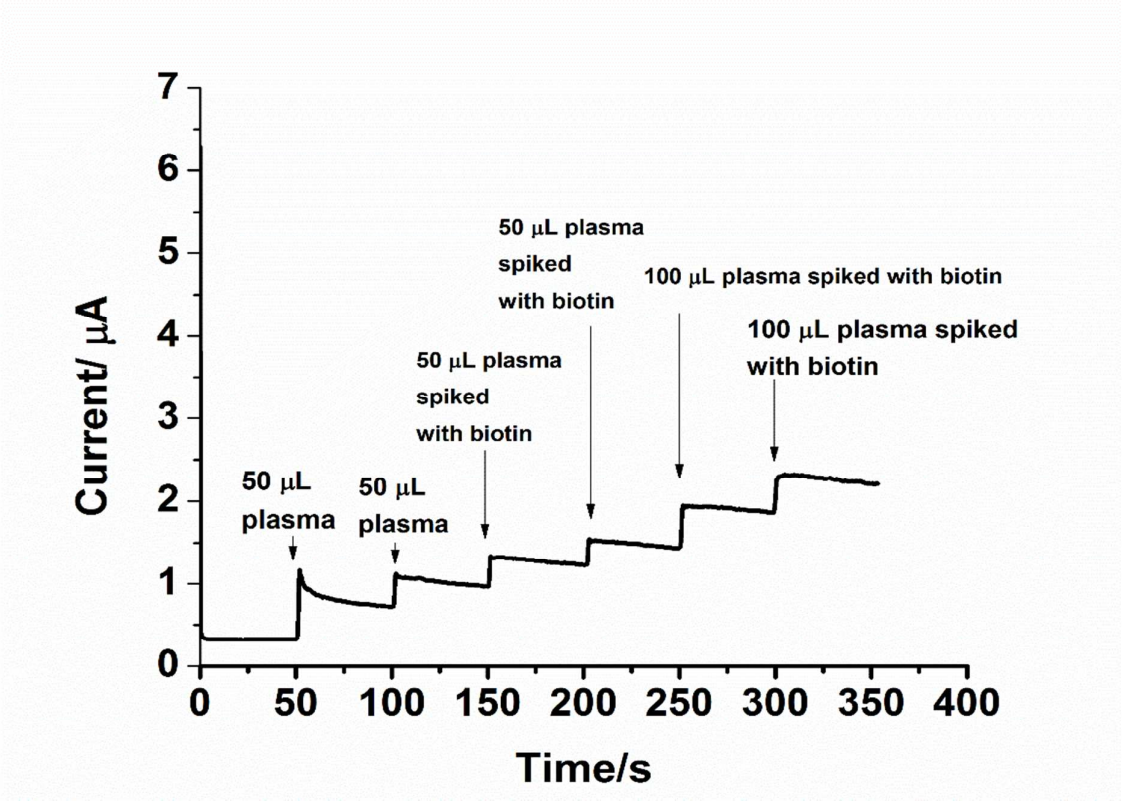


Figure S4. The *i-t* curve of the blood plasma and the biotin spiked blood plasma.

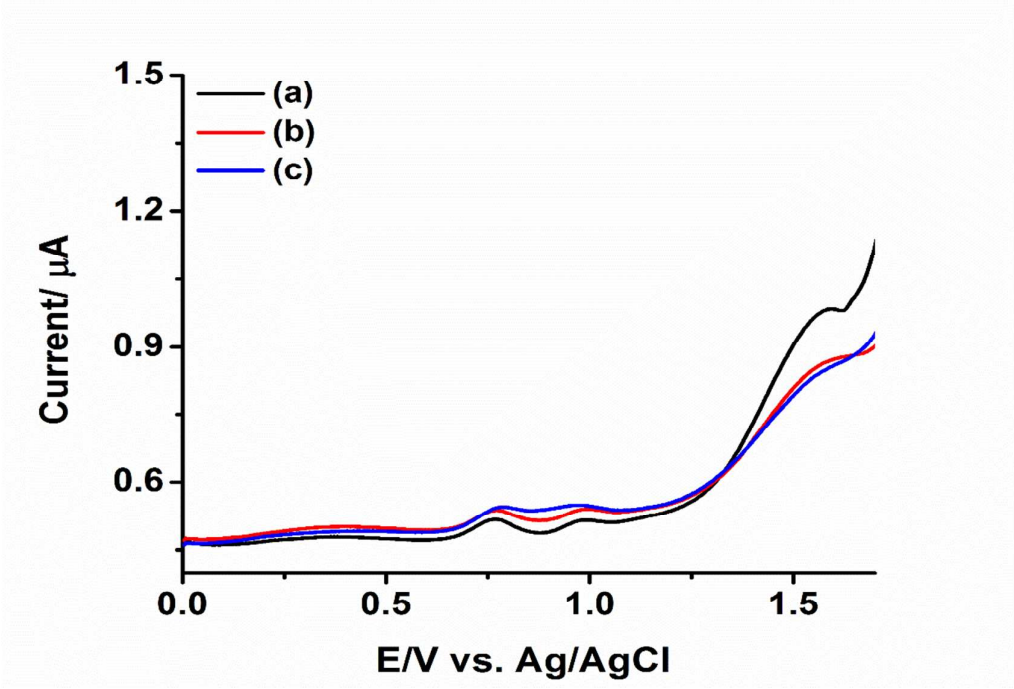


Figure S5. DPVs obtained of a blank and spiked plasma sample with a uric acid standard. (a) 200 µL blank plasma; (b) 200 µL uric acid spiked plasma and (c) 400 µL uric acid spiked plasma.

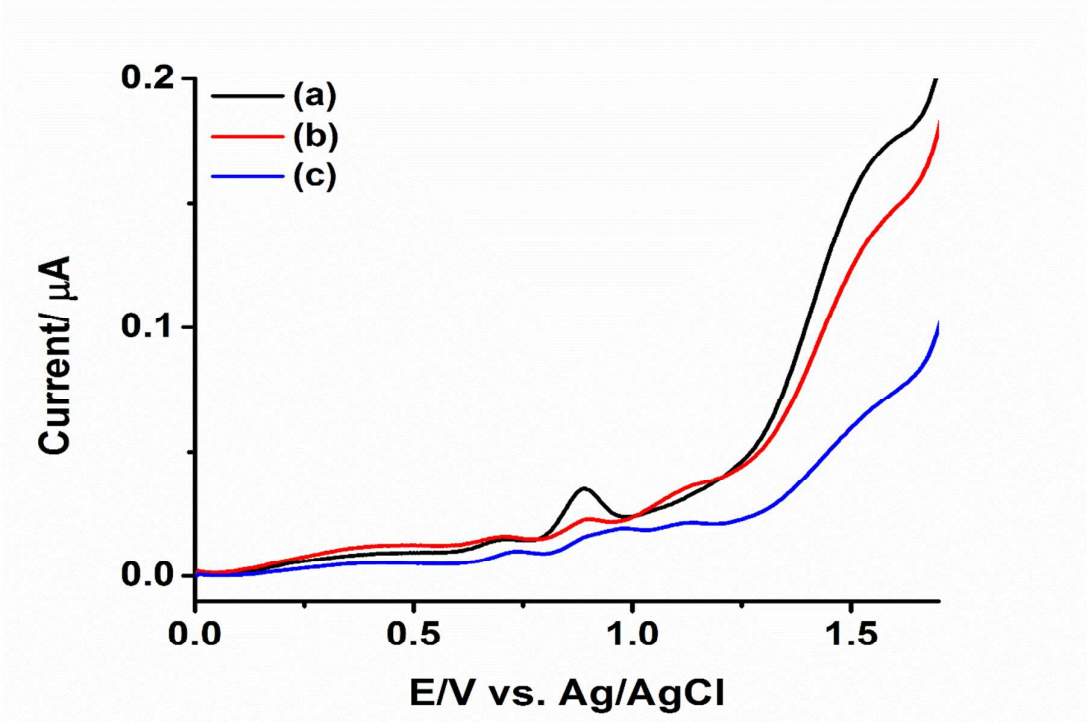


Figure S6. DPVs obtained of a blank and spiked plasma sample with a tyrosine standard. (a) 200 µL blank plasma; (b) 200 µL tyrosine spiked plasma and (c) 400 µL tyrosine spiked plasma.