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Application of bismuth (III) oxide decorated graphene nanoribbons for enzymatic glucose biosensing

Slađana Đurđić¹, Vesna Vukojević², Filip Vlahović³, Miloš Ognjanović⁴, Ľubomir Švorc⁵, Kurt Kalcher⁶, Jelena Mutić¹, Dalibor M. Stanković⁴

¹Faculty of Chemistry, University of Belgrade, Studentski trg 12-16, 11000 Belgrade, Serbia

²Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Njegoseva 12, 11000 Belgrade, Serbia

³Innovation center of the Faculty of Chemistry, University of Belgrade, POB 51, 118, 11158 Belgrade, Serbia

⁴The Vinca Institute of Nuclear Sciences, University of Belgrade, POB 522, 11001 Belgrade, Serbia

⁵Institute of Analytical Chemistry, Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava, Radlinského 9, Bratislava, SK-812 37, Slovak Republic

⁶Institute of Chemistry-Analytical Chemistry, Karl-Franzens University Graz, A-8010 Graz, Austria

Supplementary material



Figure S1. Effect of different pH of 0.1 M phosphate buffer



Figure S2. A) Cyclic voltammograms of SPCE/GNR/Bi₂O₃ in 0.1 M PBS (pH=7.40) containing 2.5 mM H₂O₂ at different scan rates (10 mV – 200 mV). B) Plots of the catholic (I_{pc}) and anodic (I_{pa}) peak current vs. the square root of the scan rate ($V^{1/2}$).



Figure S3. A) Chronoamperometric responses of SPCE/GNR/Bi₂O₃ upon successive addition of H_2O_2 in 0.1 M PBS (pH=7.40) at different working potentials (+0.2 V to +0.7 V). B) Plots of the current intensity *vs*. the concentration of H_2O_2 for working potentials +0.4 V, +0.5 V, +0.6 V and

+0.7 V.



Figure S4. Influence of different interfering compounds during the quantification of H₂O₂ with SPCE/GNR/Bi₂O₃ (A) and glucose with SPCE/GNR/Bi₂O₃/GO_x/Naf/ biosensor (B).

| Aliquot | Declared | Found | Recovery |
|---------|-----------|-----------|----------|
| (mL) | value (%) | value (%) | (%) |
| 1.0 | 32.6 | 32.1 | 98.5 |
| 2.0 | 32.6 | 31.0 | 95.0 |
| 3.0 | 32.6 | 32.4 | 99.4 |
| 4.0 | 32.6 | 32.0 | 98.2 |
| 5.0 | 32.6 | 31.9 | 97.8 |

Table S1. Glucose content obtained by analysing the different aliquots of the honey sample

Table S2. Glucose concentration (mM) in blood serum and urine samples determined with

developed biosensor

| | Blood serum samples | Urine samples |
|-------------|---------------------|-----------------------|
| Volunteer 1 | 3.81 | <lod*< td=""></lod*<> |
| Volunteer 2 | 4.23 | <lod< td=""></lod<> |
| Volunteer 3 | 5.76 | <lod< td=""></lod<> |

*LOD – limit of detection

Table S3. Comparison of spiked samples and obtained glucose content in urine samples with

proposed method

| Spiked (mM) | Found (mM) | Recovery (%) |
|----------------|---------------|-----------------|
| 0.32 | 0.30 | 93.8 |
| 0.48 | 0.46 | 95.8 |
| 1.04 | 0.99 | 95.2 |
| 1.68 | 1.70 | 98.8 |