SUPPORTING INFORMATION

Pin-based flow injection electroanalysis

Estefanía C. Rama, Agustín Costa-García, M. Teresa Fernández-Abedul*

Departamento de Química Física y Analítica, Universidad de Oviedo, Julián Clavería 8, 33006, Oviedo (Spain)

*e-mail: mtfernandeza@uniovi.es

Contents

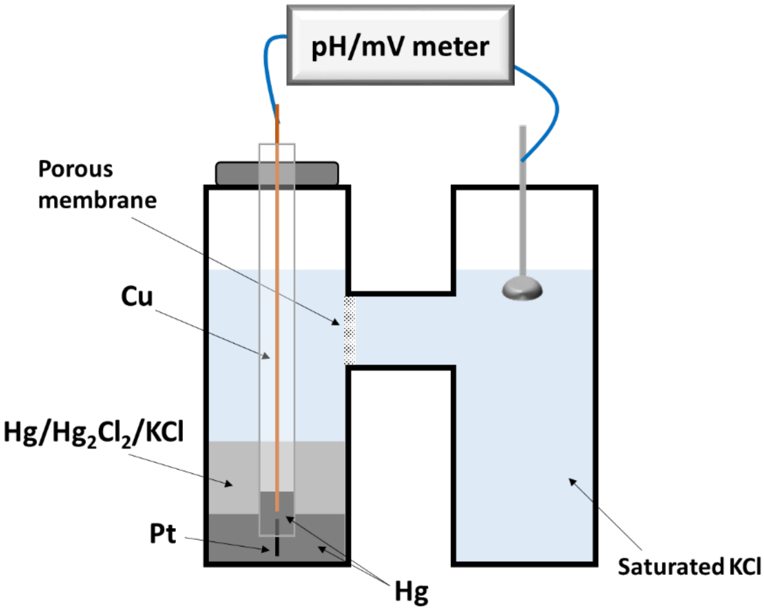

Figure S1. Scheme of the saturated calomel electrode.

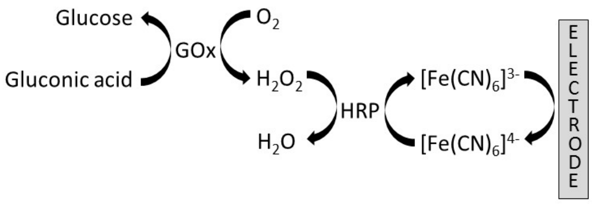

Figure S2. Scheme of the enzymatic reactions involved in glucose determination.

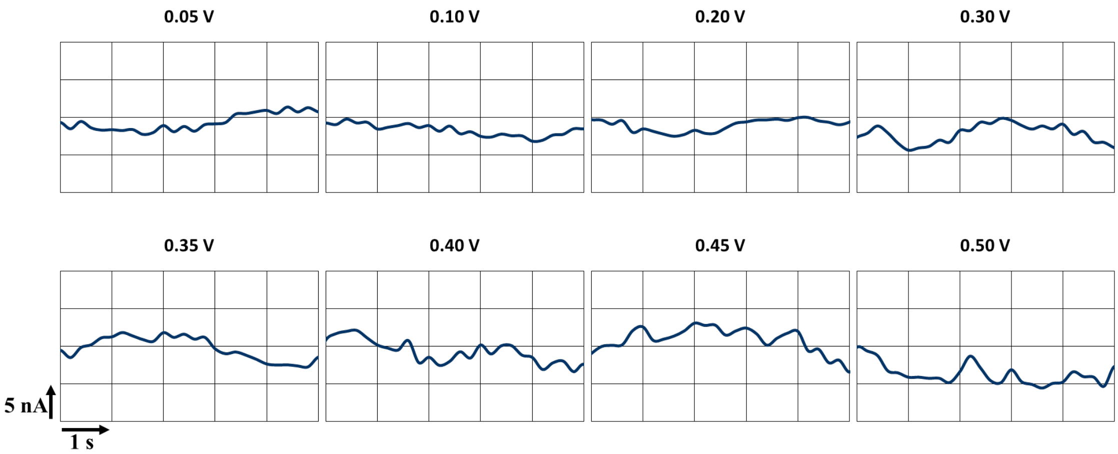

Figure S3. Baseline for different detection potentials *vs*. stainless-steel pseudoreference electrode.

COST ANALYSIS

Table S1 shows a brief analysis of cost for each three-pin system. Excluding labour and capital expenses, and the cost of the conventional instrumentation of a FIA system, the cost of preparing the final system is $0.28. To note, each system is able to perform more than 300 measurements. Moreover, the prices here considered were supplied in research quantities, but all of the materials and reagents are cheaper if they are purchased in bigger quantities.

Table S1. Cost of fabrication for each three-pin analytical system.

Item	Cost	Cost for system / $
Pins	$3.5 / 400 pins	< 0.027
Carbon ink	$32 / 50 g	< 0.049
DMF	$96 / L	< 0.006
Isopropyl alcohol	$100 / L	< 0.015
Tubing	< $30 / 10 m	< 0.18
Total cost for system with three pins		< 0.28

CYCLIC VOLTAMMOGRAM OF FERROCYANIDE

In order to determine anodic and cathodic peak potentials (*vs*. a stainless-steel pseudoreference electrode) for the ferro/ferri system and to set the most adequate potential for recording the fiagrams for glucose determination in the FIA system, a cyclic voltammogram was recorded in a 1.0 mM ferrocyanide solution in 0.1 M phosphate buffer of pH 7.0 (Figure S4). This was made using an electrochemical cell constructed by drilling the pins in a transparency sheet as is detailed in our previous work of pin-based biosensors[24]. The cyclic voltammogram (i-E curve) was recorded by dropping a 70-μL aliquot of a ferrocyanide solution covering all the three pins. The potential was scanned between -0.2 and 0.7 V at 50 $mV \cdot s^{-1}$. A well-defined process is observed with a formal potential of 213 mV.

A -0.1 V potential was chosen for recording the analytical signal in the FIA system since this potential is low enough to assure the electrochemical reduction of ferricyanide.

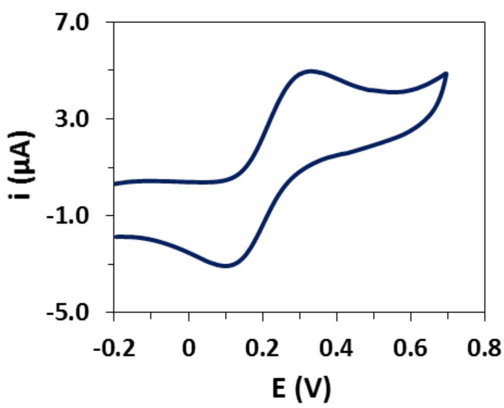

Figure S4. Cyclic voltammogram recorded in a 1 mM ferrocyanide solution in 0.1 M phosphate buffer pH 7.0 at a scan rate of 50 $mV \cdot s^{-1}$ in an electrochemical cell that uses a pin coated with carbon ink as working electrode and two bare pins as counter and reference electrodes.

ZOOMED FIAGRAMS

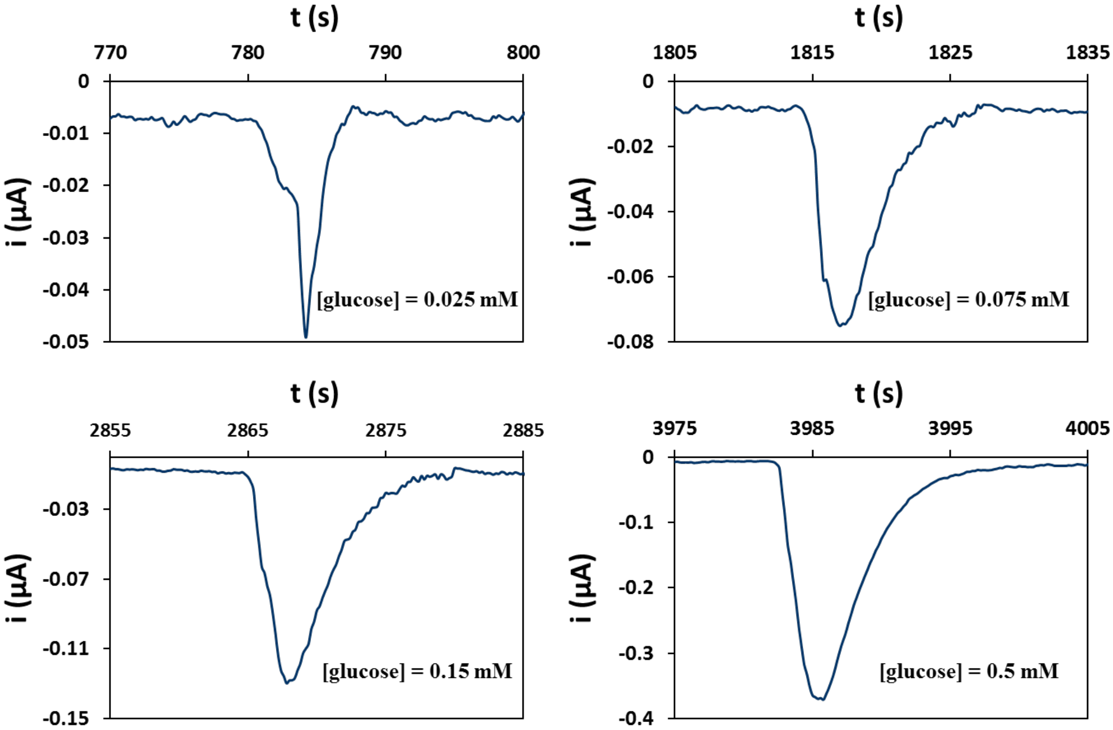

Figure S5. Zoomed fiagrams (i *vs*. t) recorded for different concentrations of glucose (0.025, 0.075, 0.150 and 0.500 mM) applying a potential of -0.1 V *vs*. a stainless-steel pseudoreference electrode and a 1.5 $mL \cdot min^{-1}$ of flow rate.