



Supporting Information

for

Simultaneous electrochemical determination of uric acid and hypoxanthine at a TiO₂/graphene quantum dot-modified electrode

Vu Ngoc Hoang, Dang Thi Ngoc Hoa, Nguyen Quang Man, Le Vu Truong Son, Le Van Thanh Son, Vo Thang Nguyen, Le Thi Hong Phong, Ly Hoang Diem, Kieu Chan Ly, Ho Sy Thang and Dinh Quang Khieu

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Additional figures and tables

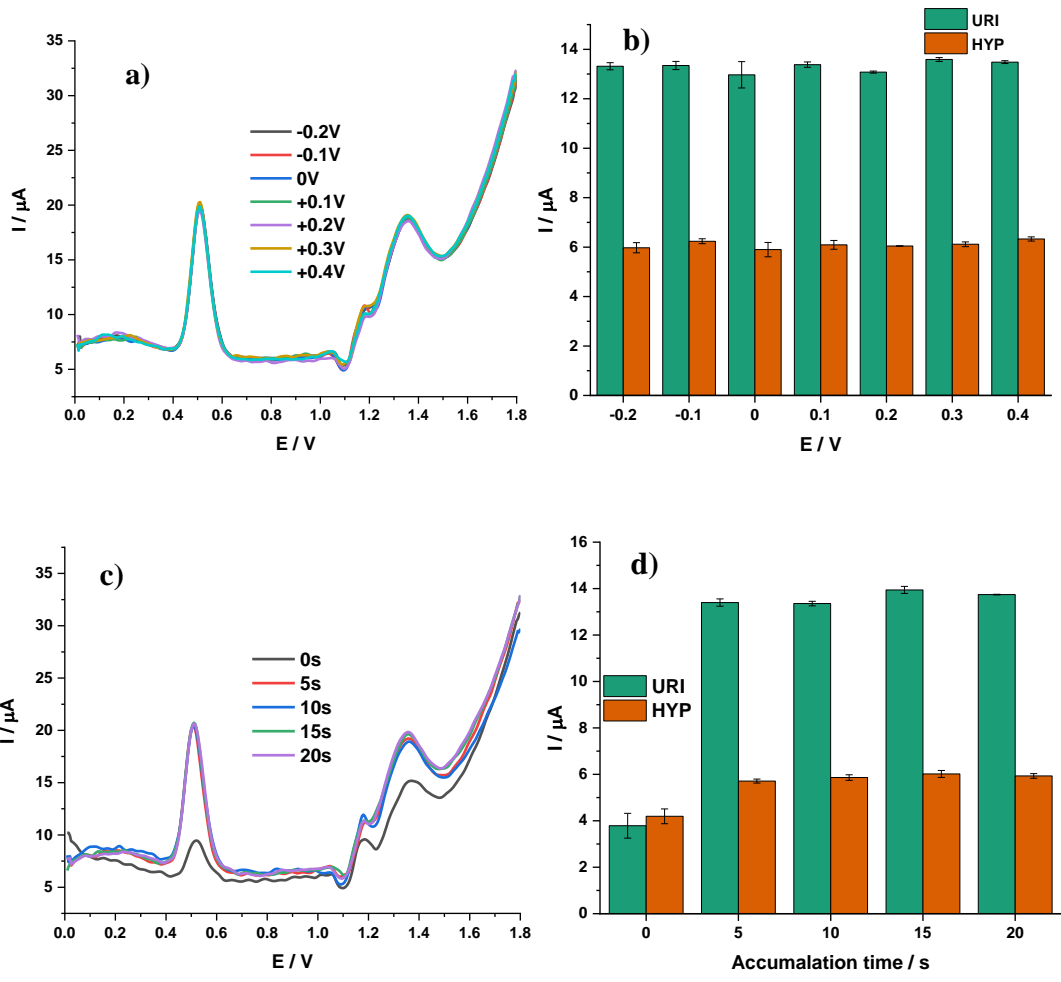


Figure S1: a) DPV curves of URI and HYP ($C_{\text{URI}} = C_{\text{HYP}} = 25 \mu\text{M}$) in 0.05 M BRS (pH 3) at (1:4)TiO₂/GQD/GCE at various accumulation potentials (in the range from -0.2 V to +0.4 V) and b) the dependence of peak current, I_p on accumulation potential; c) DPV curves of URI and HYP ($C_{\text{URI}} = C_{\text{HYP}} = 25 \mu\text{M}$) in 0.05 M BRS (pH 3) at (1:4)TiO₂/GQD/GCE with various accumulation time (in the range from 0 to 20 s) at accumulation potential of -0.1V and d) the dependence of I_p on accumulation time.

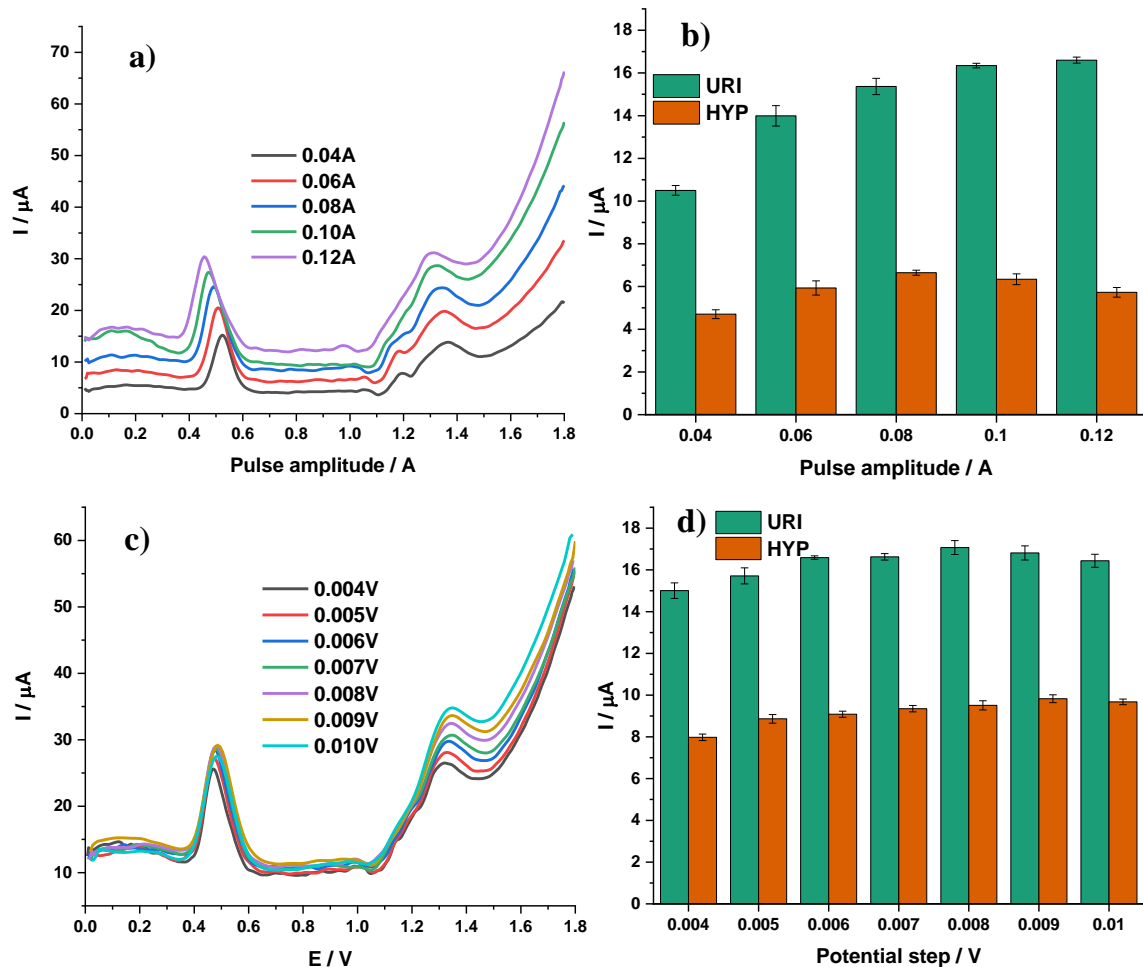


Figure S2: a) DPV curves of URI and HYP ($C_{\text{URI}} = C_{\text{HYP}} = 25 \mu\text{M}$) at (1:4)TiO₂/GQD/GCE in BRS 0.05 M (pH 3) with various pulse amplitudes (0.04 to 0.12A) at the -0.1 V accumulation potential and 15 s accumulation time and b) the dependence of peak currents on pulse amplitude; c) DPV curves of URI and HYP ($C_{\text{URI}} = C_{\text{HYP}} = 25 \mu\text{M}$) at (1:4)TiO₂/GQD/GCE in BRS 0.05 M (pH 3) with various potential from 0.004 to 0.010 V at -0.1 V accumulation potential, 15 s accumulation time and 0.10 A pulse amplitude and d) the dependence of peak currents on potential step.

Table S1: Effect of some interferences on peak current of URI and HYP.

| 1. NH₄Cl | | | | | | | |
|---|----------------|----------------|---------------|---|----------------|----------------|---------------|
| C_{NH4Cl}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{NH4Cl}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 11.66 | 2.53 | 0.00 | 0 | 8.11 | 2.41 | 0.00 |
| 10 | 11.91 | 2.34 | 2.17 | 10 | 8.34 | 2.01 | 2.88 |
| 40 | 11.75 | 1.19 | 0.77 | 40 | 8.24 | 2.14 | 1.58 |
| 60 | 11.52 | 1.82 | -1.18 | 60 | 8.12 | 2.48 | 0.20 |
| 80 | 11.53 | 1.85 | -1.16 | 80 | 8.11 | 1.02 | 0.04 |
| 100 | 11.17 | 1.29 | -4.25 | 100 | 7.88 | 1.25 | -2.86 |
| 2. KCl | | | | | | | |
| C_{KCl}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{KCl}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 11.10 | 1.82 | 0.00 | 0 | 7.88 | 1.25 | 0.00 |
| 10 | 11.32 | 4.62 | 1.98 | 10 | 7.86 | 0.81 | -0.25 |
| 40 | 11.40 | 3.35 | 2.70 | 40 | 7.81 | 1.00 | -0.89 |
| 60 | 11.35 | 1.68 | 2.21 | 60 | 7.81 | 2.90 | -0.83 |
| 80 | 11.02 | 1.89 | -0.72 | 80 | 7.99 | 0.29 | 1.50 |
| 100 | 10.96 | 4.32 | -1.31 | 100 | 7.79 | 1.82 | -1.08 |
| 3. Na₂SO₄ | | | | | | | |
| C_{Na2SO4}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{Na2SO4}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 11.19 | 3.95 | 0.00 | 0 | 7.79 | 2.94 | 0.00 |
| 10 | 11.02 | 1.66 | -1.52 | 10 | 7.89 | 1.10 | 1.28 |
| 40 | 10.80 | 2.16 | -3.49 | 40 | 7.68 | 2.09 | -1.45 |
| 60 | 11.07 | 1.61 | -1.04 | 60 | 7.89 | 1.59 | 1.24 |
| 80 | 10.90 | 1.20 | -2.64 | 80 | 7.67 | 1.97 | -1.54 |
| 100 | 10.65 | 3.62 | -4.80 | 100 | 7.55 | 1.03 | -3.05 |
| 4. NH₄NO₃ | | | | | | | |
| C_{NH4NO3}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{NH4NO3}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 10.58 | 4.18 | 0.00 | 0 | 7.59 | 1.19 | 0.00 |
| 10 | 10.54 | 2.12 | -0.38 | 10 | 7.61 | 2.17 | 0.30 |
| 40 | 10.49 | 2.68 | -0.85 | 40 | 7.45 | 1.12 | -1.78 |

| | | | | | | | |
|---|----------------|----------------|---------------|---|----------------|----------------|---------------|
| 60 | 10.45 | 3.86 | -1.16 | 60 | 7.51 | 0.67 | -1.09 |
| 80 | 10.37 | 4.68 | -1.94 | 80 | 7.41 | 2.29 | -2.30 |
| 100 | 10.37 | 4.57 | -1.91 | 100 | 7.44 | 2.11 | -1.94 |
| 5. CaCl₂ | | | | | | | |
| C_{CaCl₂}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{CaCl₂}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 10.15 | 2.63 | 0.00 | 0 | 7.43 | 1.93 | 0.00 |
| 10 | 10.34 | 2.54 | 1.82 | 10 | 7.50 | 1.47 | 0.94 |
| 40 | 10.40 | 1.71 | 2.46 | 40 | 7.40 | 0.72 | -0.40 |
| 60 | 10.12 | 2.88 | -0.32 | 60 | 7.14 | 1.90 | -3.84 |
| 80 | 9.99 | 0.26 | -1.58 | 80 | 7.32 | 0.76 | -1.45 |
| 100 | 10.25 | 0.95 | 1.02 | 100 | 7.15 | 1.19 | -3.74 |
| 6. ZnCl₂ | | | | | | | |
| C_{ZnCl₂}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{ZnCl₂}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 10.25 | 1.02 | 0.00 | 0 | 7.25 | 1.08 | 0.00 |
| 10 | 9.96 | 3.20 | -2.84 | 10 | 7.21 | 1.40 | -0.63 |
| 40 | 9.86 | 2.98 | -3.81 | 40 | 7.06 | 1.91 | -2.70 |
| 60 | 10.14 | 1.12 | -1.07 | 60 | 7.12 | 0.86 | -1.87 |
| 80 | 9.91 | 2.80 | -3.29 | 80 | 7.22 | 1.53 | -0.49 |
| 100 | 10.00 | 7.35 | -2.42 | 100 | 6.93 | 3.56 | -4.40 |
| 7. Glucose | | | | | | | |
| C_{GLC}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{GLC}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 10.00 | 7.37 | 0.00 | 0 | 6.97 | 2.91 | 0.00 |
| 10 | 9.74 | 2.73 | -2.55 | 10 | 6.93 | 2.38 | -0.54 |
| 40 | 9.72 | 3.45 | -2.78 | 40 | 7.07 | 1.10 | 1.48 |
| 60 | 9.78 | 1.90 | -2.18 | 60 | 6.85 | 1.55 | -1.69 |
| 80 | 9.53 | 1.86 | -4.63 | 80 | 6.89 | 2.12 | -1.18 |
| 100 | 9.56 | 4.38 | -4.40 | 100 | 6.87 | 1.42 | -1.40 |
| 8. Glutamic acid | | | | | | | |
| C_{GLA}/C_{URI} | Ip (μA) | RSD (%) | Re (%) | C_{GLA}/C_{HYP} | Ip (μA) | RSD (%) | Re (%) |
| 0 | 9.50 | 4.06 | 0.00 | 0 | 6.63 | 3.02 | 0.00 |

| | | | | | | | |
|--|----------------|----------------|---------------|--|----------------|----------------|---------------|
| 10 | 9.53 | 1.71 | 0.32 | 10 | 6.77 | 1.56 | 2.11 |
| 40 | 9.59 | 1.85 | 1.02 | 40 | 6.84 | 1.33 | 3.12 |
| 60 | 9.44 | 1.47 | -0.57 | 60 | 6.85 | 4.09 | 3.32 |
| 80 | 9.44 | 3.60 | -0.60 | 80 | 6.71 | 1.82 | 1.21 |
| 100 | 9.36 | 2.49 | -1.49 | 100 | 6.62 | 2.05 | -0.11 |
| 9. Urea | | | | | | | |
| C_{URE}/C_{URI} | Ip (µA) | RSD (%) | Re (%) | C_{URE}/C_{HYP} | Ip (µA) | RSD (%) | Re (%) |
| 0 | 9.38 | 2.31 | 0.00 | 0 | 6.62 | 2.05 | 0.00 |
| 10 | 9.30 | 2.48 | -0.82 | 10 | 6.56 | 1.67 | -0.99 |
| 40 | 9.28 | 2.75 | -1.05 | 40 | 6.64 | 0.67 | 0.19 |
| 60 | 9.12 | 1.04 | -2.75 | 60 | 6.47 | 4.17 | -2.30 |
| 80 | 9.36 | 1.74 | -0.21 | 80 | 6.52 | 3.50 | -1.59 |
| 100 | 9.23 | 0.91 | -1.55 | 100 | 6.40 | 1.46 | -3.40 |
| 10. L-cysteine | | | | | | | |
| CLCY/C_{URI} | Ip (µA) | RSD (%) | Re (%) | CLCY/C_{HYP} | Ip (µA) | RSD (%) | Re (%) |
| 0 | 9.24 | 0.85 | 0.00 | 0 | 6.38 | 0.66 | 0.00 |
| 10 | 9.49 | 1.56 | 2.76 | 10 | 6.49 | 3.83 | 1.71 |
| 40 | 9.07 | 1.95 | -1.82 | 40 | 6.69 | 2.12 | 4.90 |
| 60 | 8.95 | 2.52 | -3.14 | 60 | 7.15 | 1.92 | 12.15 |
| 80 | 9.02 | 4.01 | -2.29 | 80 | 6.99 | 1.19 | 9.55 |
| 100 | 8.83 | 3.74 | -4.41 | 100 | 7.23 | 1.99 | 13.37 |
| 11. Xanthine | | | | | | | |
| C_{XTE}/C_{URI} | Ip (µA) | RSD (%) | Re (%) | C_{XTE}/C_{HYP} | Ip (µA) | RSD (%) | Re (%) |
| 0 | 8.58 | 3.37 | 0.00 | 0 | 6.32 | 1.43 | 0.00 |
| 10 | 8.30 | 1.35 | -3.25 | 10 | 6.35 | 4.98 | 0.47 |
| 40 | 8.19 | 2.12 | -4.57 | 40 | 6.18 | 4.21 | -2.21 |
| 60 | 8.16 | 2.77 | -4.92 | 60 | 6.17 | 2.43 | -2.26 |
| 80 | 7.50 | 5.86 | -12.57 | 80 | 6.01 | 2.02 | -4.82 |
| 100 | 7.26 | 8.60 | -15.41 | 100 | 6.04 | 1.73 | -4.35 |