**Supplementary material**

# Colorimetric sensor based on cotton thread for the quantification of ascorbic acid using Prussian Blue and digital image detection

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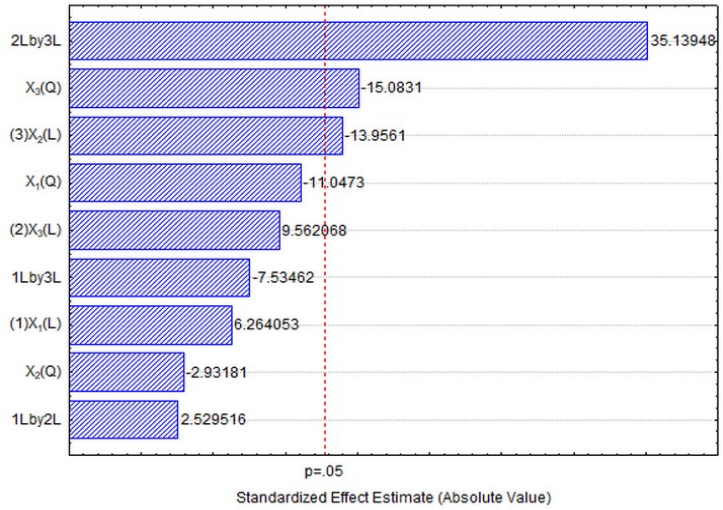


**Fig. S1.** Pareto chart of main effects for the central composite design. The red vertical line on the chart represents the p-value for the confidence level of 95%.

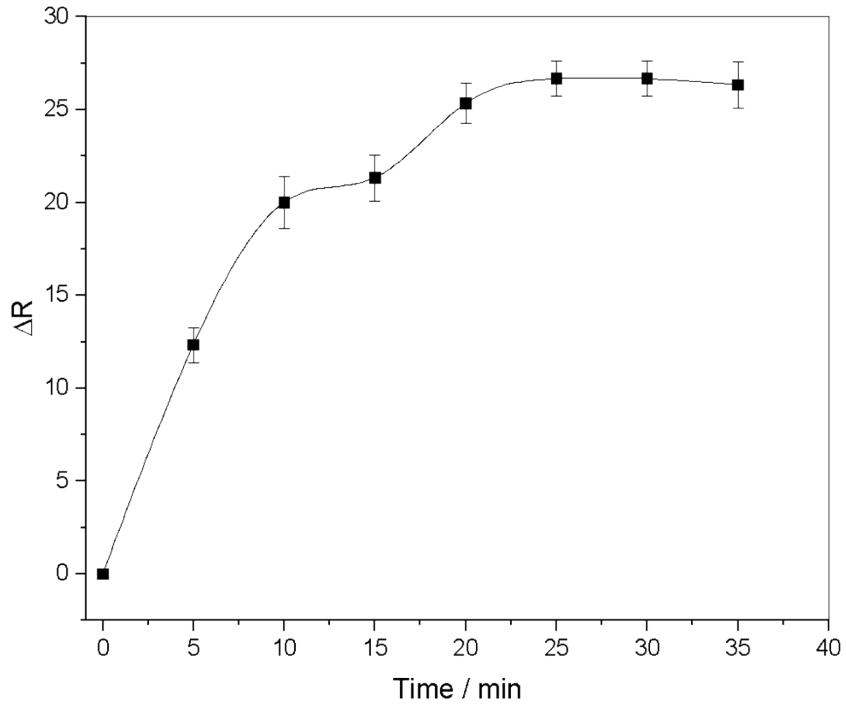


**Fig. S2**. Evaluation of the reaction time on the detection of L-AA (3 mg $L^{-1}$). Experimental conditions: µTAD functionalized with $K_4[Fe(CN)_6]$ (0.7 µL, 1.0 mmol $L^{-1}$) and Fe(III) (0.6 µL, 0.8 mmol $L^{-1}$).

**Thermogravimetric analysis**

The thermal stability of the sensor was evaluated through TG (black) and DTG (blue) curves, illustrated in Fig. S3. As evidenced, the thermal analysis of the developed sensor, conducted under an inert atmosphere, highlights its remarkable thermal stability up to a temperature of 270 ºC. In the first stage, the mass loss of approximately 5% was attributed to the volatilization of water molecules adsorbed in the cotton fiber. In a second stage (270 – 390 ºC), the decomposition of the organic material, mainly by production of $CO_2$ was observed. This loss of mass was due to the matrix of cotton fibers of the µTAD leading to a maximum mass loss of 83%. This result demonstrates the good thermal stability of the proposed sensor.

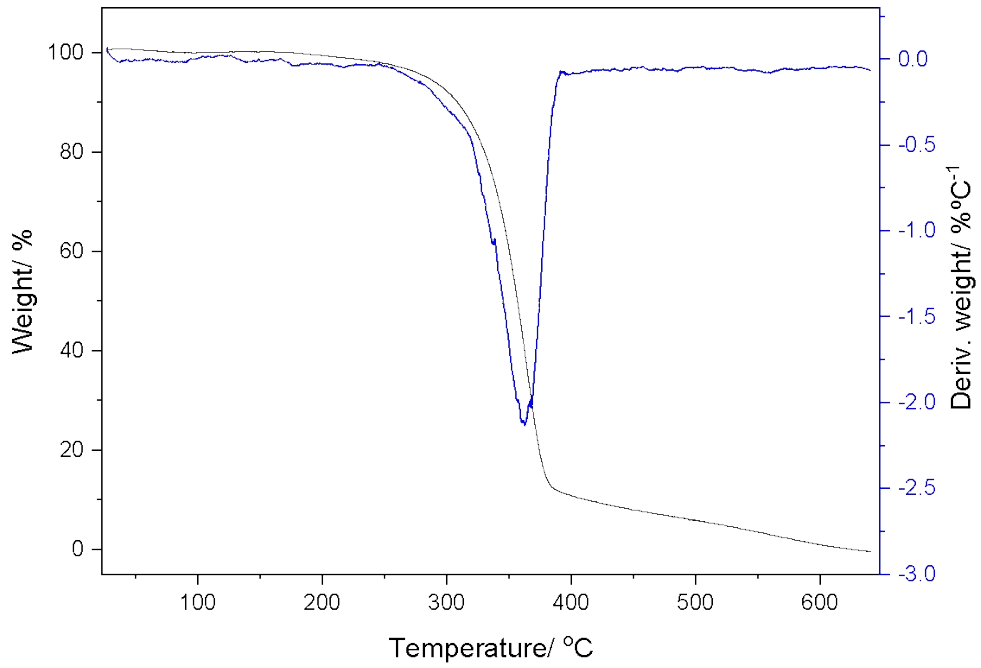


**Fig. S3.** TG/DTG curves related to the thermal decomposition of the designed µTAD. Experimental conditions: µTAD functionalized with $K_4[Fe(CN)_6]$ (0.7 µL, 1.0 mmol $L^{-1}$) and Fe(III) (0.6 µL, 0.8 mmol $L^{-1}$).

**Table S1.** Principles used by the metric system of the AGREEN analytical calculator.

| Principles | Criterion |
|---|---|
| 1 | Sample handling |
| 2 | Minimum sample size and number |
| 3 | In situ analysis |
| 4 | Low-energy operations and reduced reagent count |
| 5 | Automated and miniaturized method |
| 6 | No derivatization |
| 7 | Low generation of analytical waste |
| 8 | Multi-analytical or multi-parameter method |
| 9 | Minimal energy use |
| 10 | Reagents obtained from renewable sources |
| 11 | No toxic reagents |
| 12 | Increased operator safety |