Supplementary Information

An electrochemical microfluidic sensor based on Cu₂O-GNP nanocomposite integrated hydrogel for nitrite detection in food samples

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Figure S1: EDS spectrum with area of Cu₂O-GNP nanocomposite.

Element	Weight %	Atomic %
СК	50.4	62.4
ОК	37.3	34.7
Cu K	12.3	2.9
Total	100	100

Table S1. Elemental analysis of EDS spectra of Cu_2O -GNP nanocompsoite .



Figure S2: FTIR spectra of Cu₂O, GNP, and Cu₂O-GNP nanocomposite.



Figure S3: Depicts the percentage swelling ratios of bare hydrogel and Cu₂O-GNP hydrogel, together with corresponding photographs.



Figure S4: DPV plots of with and without NO_2^- (5 μ M) in the solution containing 2 mM $K_3Fe(CN)_6$ and 0.1 M PBS (pH 7.0) at a scan rate of 50 mVs⁻¹.



Figure S5: Nyquist plots of bare/SPCE, hydrogel/SPCE, and Cu₂O-GNP hydrogel/SPCE at a scan rate of 50 mVs^{-1}



Figure S6: The slope obtained from the plot of log scan rate vs. anodic potential of Cu_2O -GNP hydrogel/SPCE.



Figure S7. (A) Effect of pH on the CV response for 5 μ M NO₂⁻ using Cu₂O-GNP hydrogel/SPCE at a scan rate of 50 mVs⁻¹ and (**B**) plot of pH vs. current response.



Figure S8: (A) CV of reproducibility plots of Cu₂O-GNP hydrogel/SPCE for NO_2^- (70 μ M) detection and **(B)** A bar graph indicates the current response on different electrodes.



Figure S9: (A) CV of repeatability plots of Cu₂O-GNP hydrogel/SPCE for NO_2^- (70 μ M) detection and **(B)** A bar graph indicates the current response.



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Figure S10: (A) CV of repeatability plots of Cu₂O-GNP hydrogel/SPCE for NO_2^- (70 μ M) detection and (B) A bar graph indicates the current response with respect to time.