Supporting Information

Designing of *in-situ* nanostructured MWCNT- Phloroglucinol modified webs for electrochemical-based dual screening of stress biomarkers

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Statement of the problem addressed/Originality of the approach: This work accounts for the selective sensing of stress biomarker *i.e.,* glutathione (GT) and hydrogen peroxide (H_2O_2) both in pH 7 buffer media. This work involves an eco-friendly approach for a Point-of-care testing of specific analytes in the presence of interferences.

Contribution of the work to create new knowledge in the field: This work incorporated the fabrication of a novel *in-situ* electrochemical platform involving transformation of a phyto-constituent *i.e.,* Phloroglucinol (benzene 1,3,5-triol) using Cyclic Voltammetric Technique in aqueous media on a GCE platform. This concept enables a sustainable approach using a glassy carbon modified multiwalled carbon nanotube-chitosan polymer based electrode (GCE/MWCNT-Chit@PG-Redox) based system.

Relevance of the work to advance research and impact to the field of food science and technology: This work is quite relevant for the development of a sustainable platform, which is eco-friendly and food-science-derived phloroglucinol-based sensor. Phloroglucinol, found in various plants, is an essential phenolic compound and a vital tannin.

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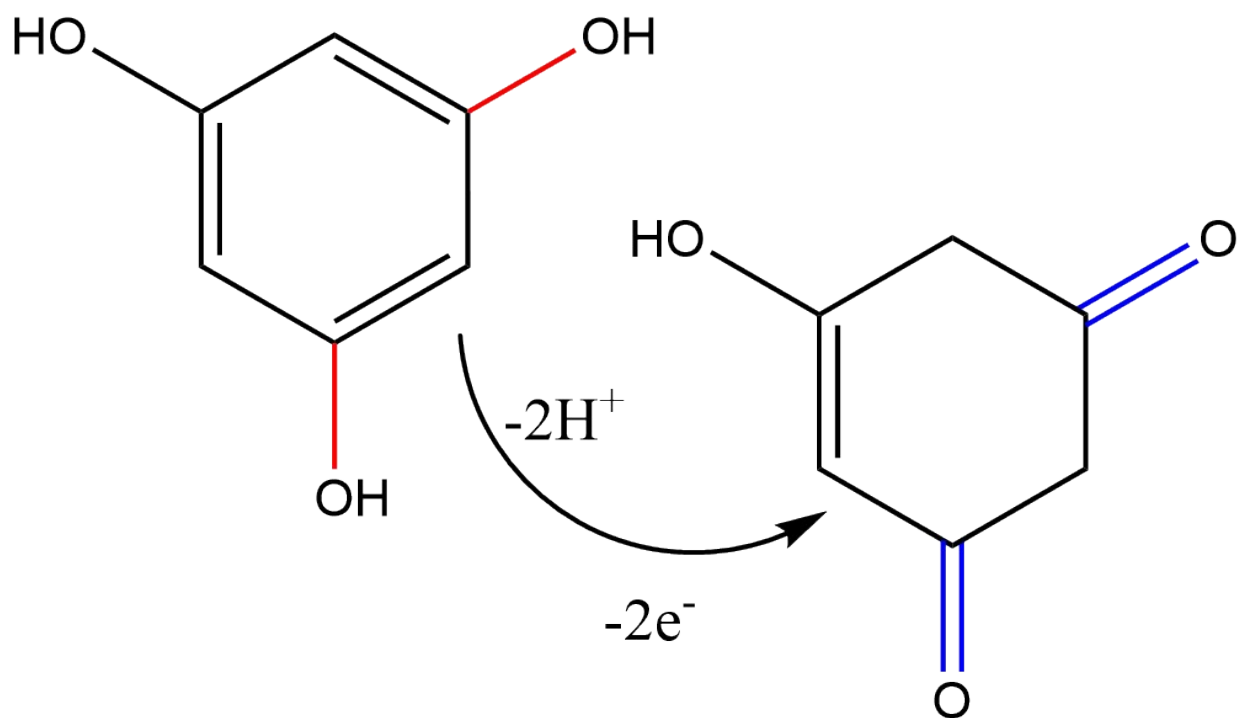
SF5: Real sample analysis

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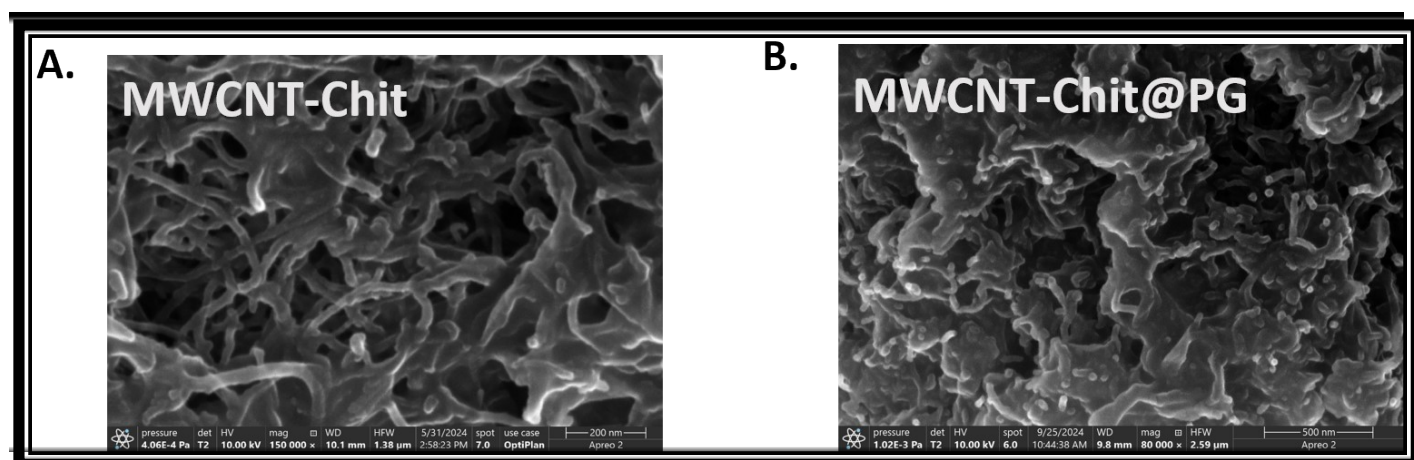
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ST1: Tables for real sample analysis (GT)
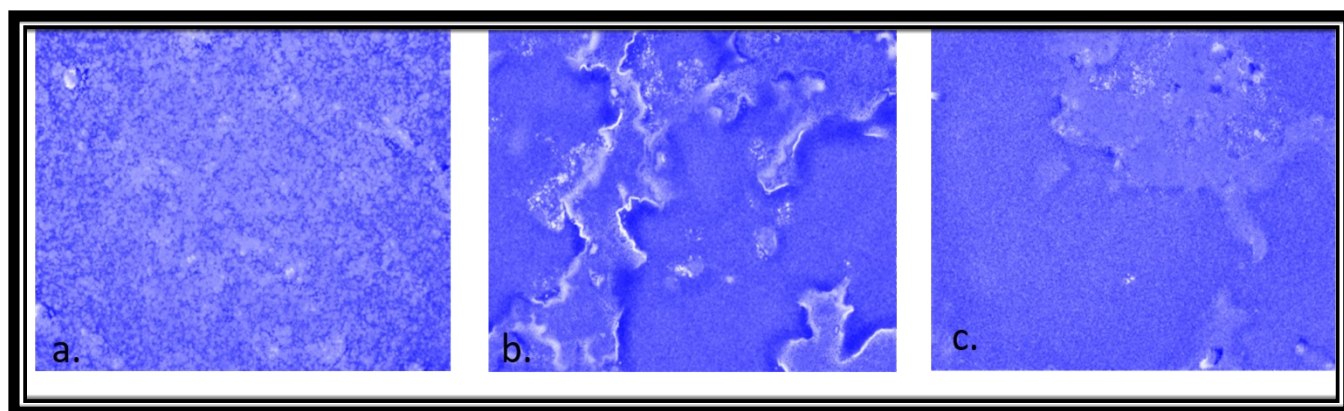
ST1: Tables for real sample analysis (H_2O_2)

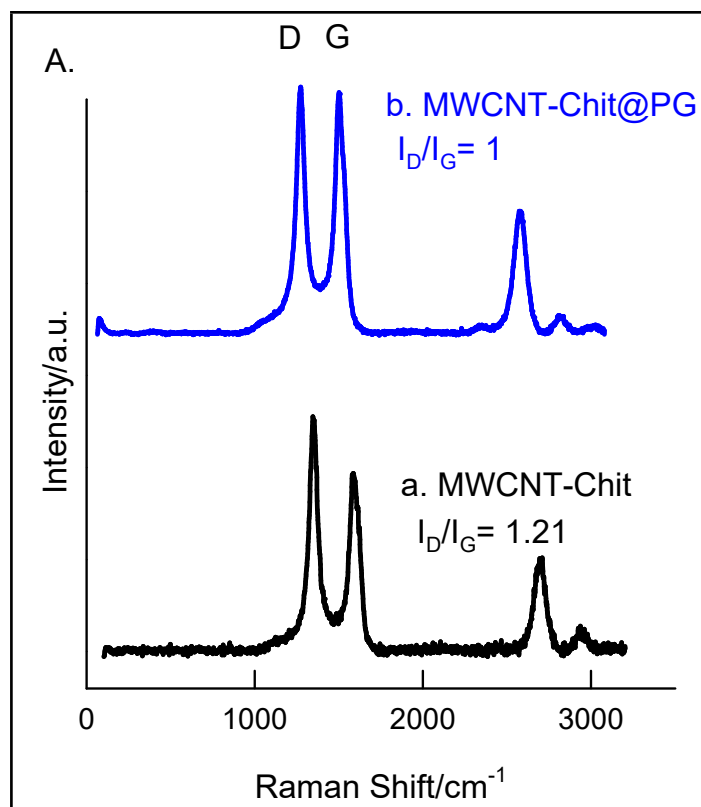# List of Supplementary Schemes, Figures and Tables

Supplementary Scheme. S1 Schematic representation for the organic transformation of phloroglucinol under electrochemical treatment in pH 7 aqueous buffer media.
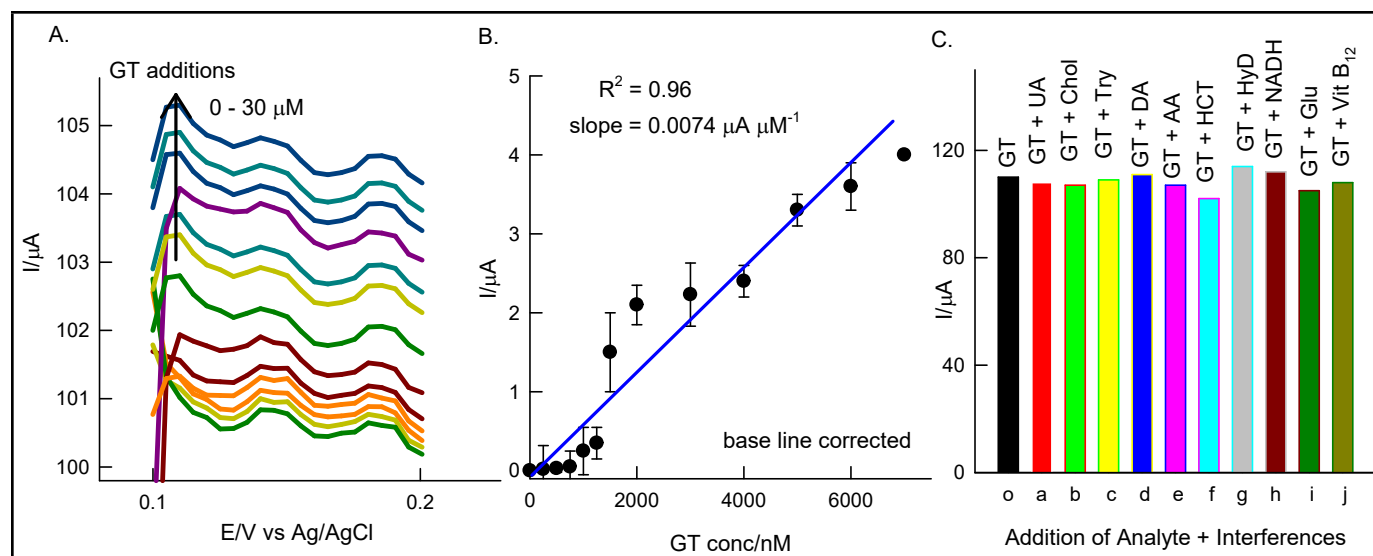
Supplementary Figure. SF1 Scanning electron microscopic images for the MWCNT-Chit (a.) and MWCNT-Chit@PG-redox (b.).

Supplementary Figure. SF2 Optical Profilometry 2D images of screen printed carbon electrode (SPCE) (a), MWCNT-Chit (b) and MWCNT-Chit@PG (c) prepared in a SPCE surface.
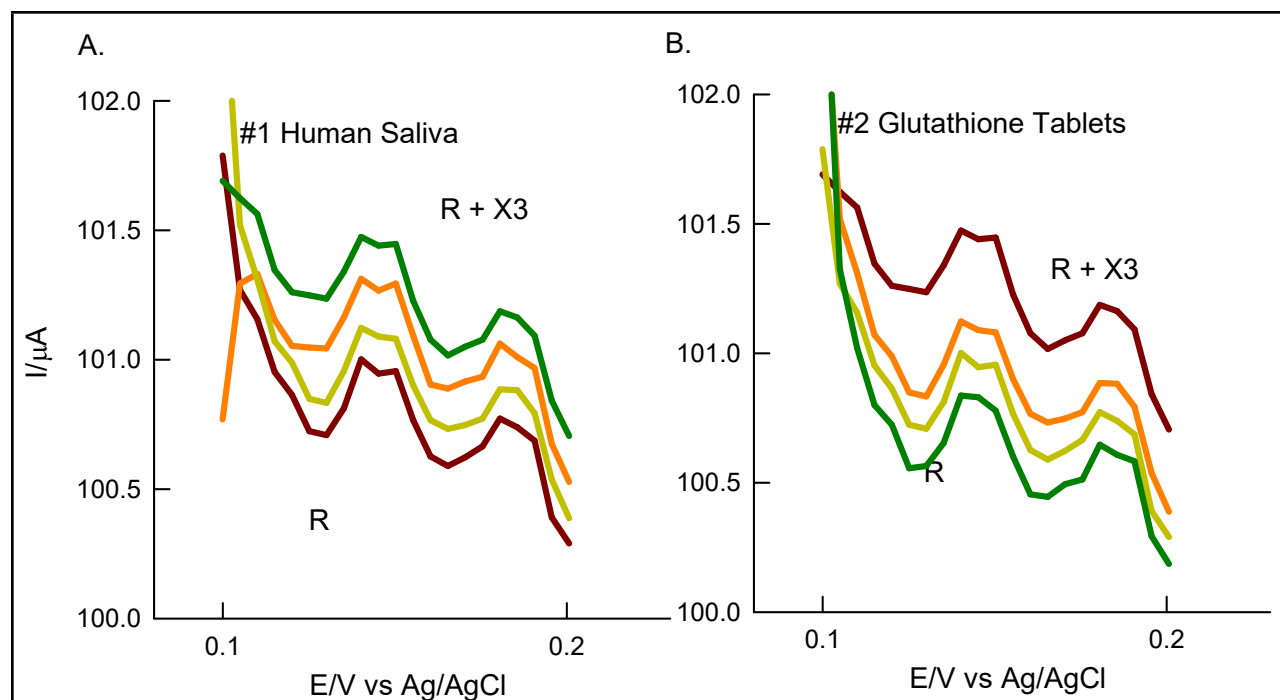
Supplementary Figure. SF3 Raman spectroscopic response of SPCE/MWCNT-Chit (curve a) and SPCE/MWCNT-Chit@PG (curve b). Note: SPCE= Screen printed carbon electrodes.
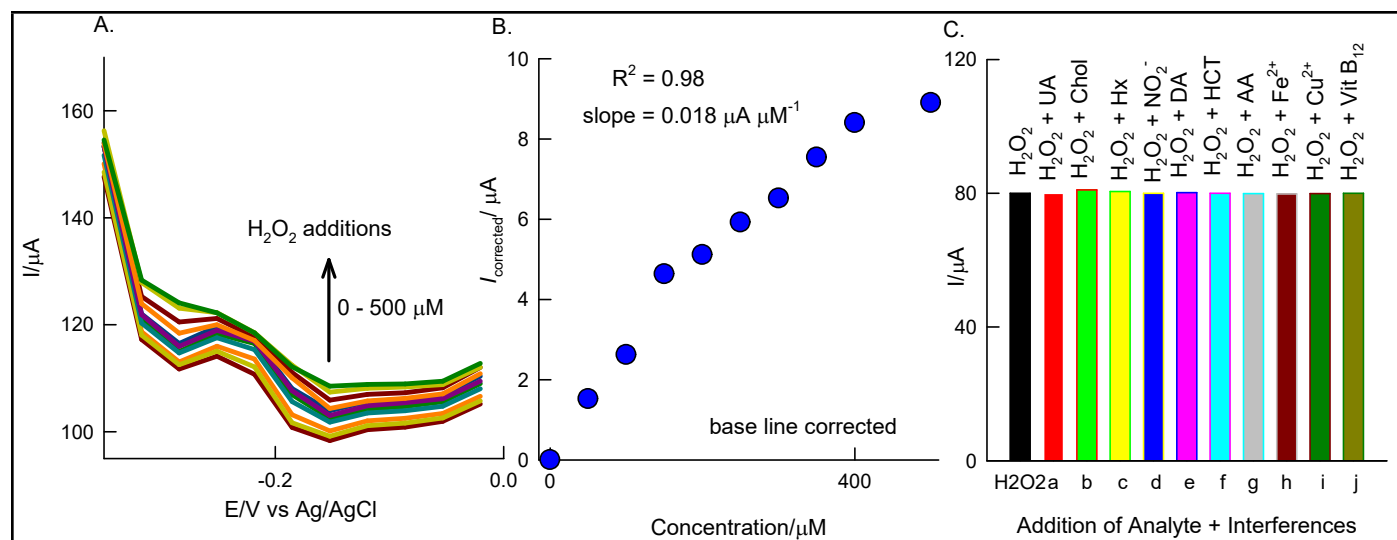
Supplementary Figure. SF4 (A) Differential pulse voltammetric (DPV) signals of GCE/MWCNT-Chit@PG-Redox platform using GT concentration range in buffer media Note: Optimal DPV conditions are: initial potential= 0 V; final potential= 0.2 V; increment potential= 0.004 V; amplitude= 0.05 V; pulse width= 0.06 s; pulse period= 0.5 s. (B) Respective calibration graph for DPV concentration effect with their error bars after triplicate analysis. (C) Effect of interfering chemicals along with glutathione (GT) (hydrodynamic conditions) in buffer media.

Supplementary Figure. SF5 (A) Differential pulse voltammetric (DPV) signals of GCE/MWCNT-Chit@PG-Redox platform using real samples (#1 Human Saliva, #2 Glutathione Tablets using standard addition approach with successive additions of GT dissolved in buffer media after 1:1 dilution). Note: Optimal DPV conditions are: initial potential= 0 V; final potential= 0.2 V; increment potential= 0.004 V; amplitude= 0.05 V; pulse width= 0.06 s; pulse period= 0.5 s.

Supplementary Figure. SF6 (A) Differential pulse voltammetric signals GCE/MWCNT-Chit@PG-Redox platform on successive additions of hydrogen peroxide (H_2O_2) dissolved in pH 7 PBS. (B) Plots of i_{pa} vs. analyte additions (base line corrected). (C) Effect of interfering chemicals along with hydrogen peroxide (H_2O_2) (hydrodynamic conditions) in buffer media. Note: Optimal DPV conditions are: initial potential= 0.4 V; final potential= 0 V; increment potential= 0.004 V; amplitude= 0.05 V; pulse width= 0.06 s; pulse period= 0.5 s.
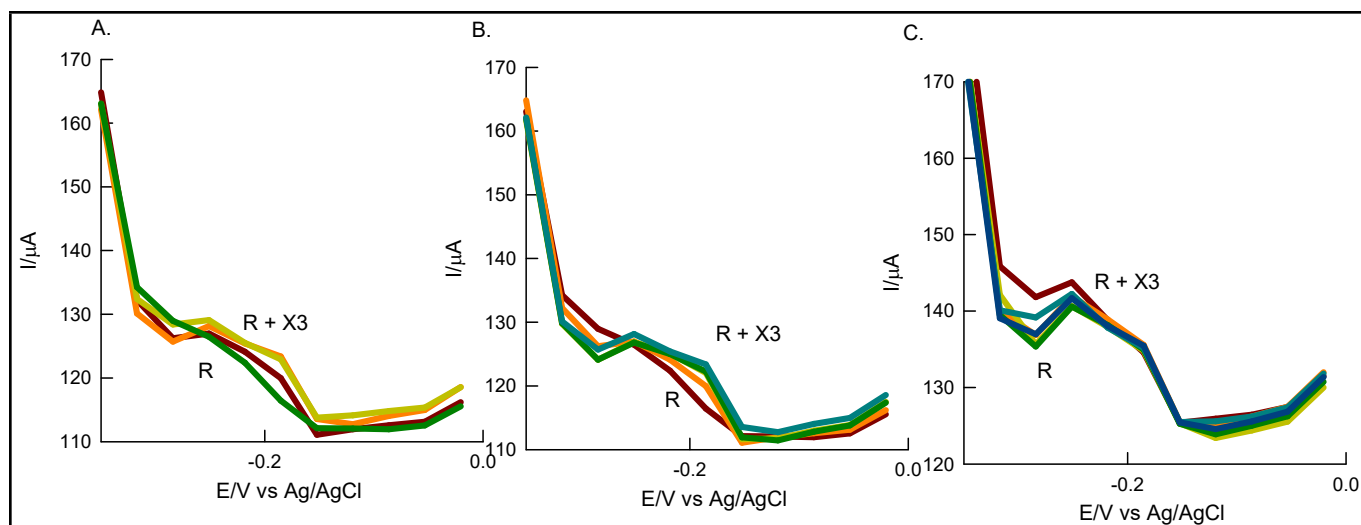
Supplementary Figure. SF7 Differential pulse voltammetric (DPV) signals of GCE/MWCNT-Chit@PG-Redox platform using real samples (#1 Orange juice (packaged), #2 Orange juice (real), #3 Milk sample) using standard addition approach with successive additions of hydrogen peroxide (H_2O_2) dissolved in buffer media after 1:1 dilution. DPV parameters as SF4.

Supplementary Table ST1 Detection of glutathione (GT) added and found in various real samples (#1 Human Saliva, #2 Glutathione Tablets using standard addition approach with successive additions of GT dissolved in buffer media after 1:1 dilution with buffer

S. No.	Sample	Analyte	Spiked Value (nM)	Found Value (nM)	Recovery Percentage (%)
1.	Human Saliva	R	-		
		R +X1	150	170	120
		R+X2	300	300	100
		R+X3	500	680	134
2.	Glutathione Tablet	R	-		
		R +X1	150	180	120
		R+X2	300	300	100
		R+X3	700	690	98.7

Supplementary Table ST2 Detection of hydrogen peroxide (H_2O_2) added and found in various real samples (#1 Orange juice (packaged), #2 Orange juice (real), #3 Milk samples) after 1:1 dilution with buffer

S. No.	Sample	Analyte	Spiked Value (μM)	Found Value (μM)	Recovery Percentage (%)
1.	Orange juice (packaged) #1	R	-		
		R +X1	50	45	90
		R+X2	100	88.5	88.5
		R+X3	250	245	98
2.	Orange juice (real) #2	R	-		
		R +X1	100	110	110
		R+X2	150	170	113
		R+X3	200	205	102.5
3.	Milk samples #3	R	-		
		R +X1	50	43.25	86.5
		R+X2	100	91	91
		R+X3	150	110	73.5