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J. Serb. Chem. Soc. **00(0)** S1-S6 (2024) *Supplementary material*

SUPPLEMENTARY MATERIAL TO

Sustainable synthesis of samarium molybdate nanoparticles: a simple electrochemical tool for detection of environmental pollutant Metol

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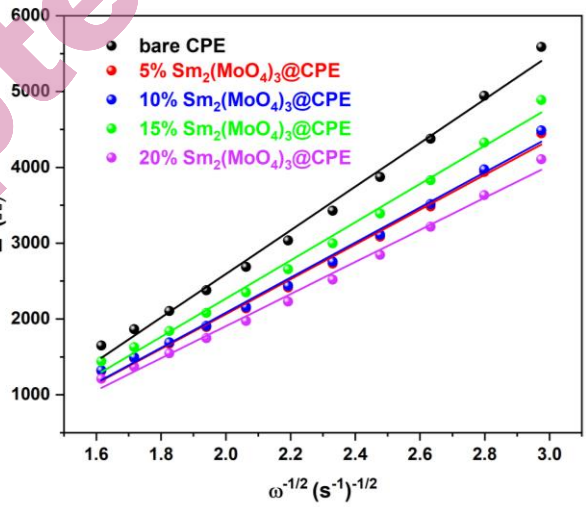

Figure S1. Dependence of real Z' part of the impedance on the angular frequency for bare CPE, and 5, 10, 15, and 20% $Sm_2(MoO_4)_3$ modified CPE

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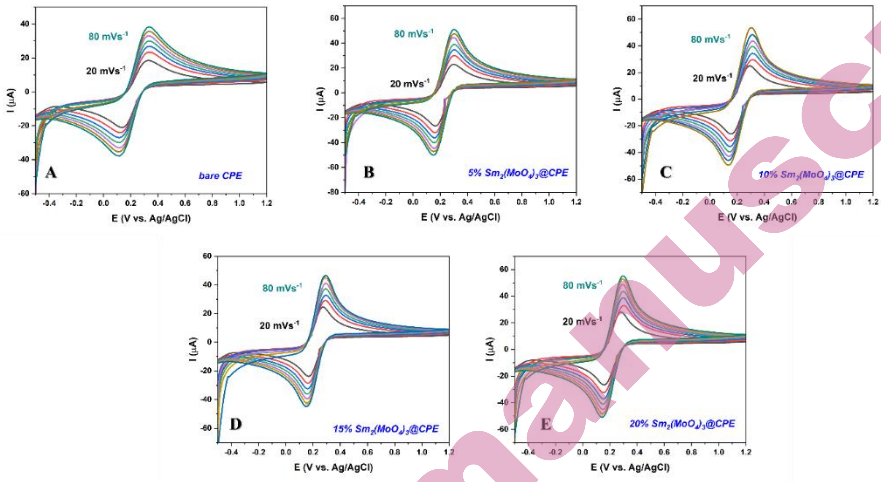

Figure S2. CV curves of (A) bare CPE; (B) 5% $Sm_2(MoO_4)_3$ modified CPE; (C) 10% $Sm_2(MoO_4)_3$ modified CPE; (D) 15% $Sm_2(MoO_4)_3$ modified CPE; (E) 20% $Sm_2(MoO_4)_3$ modified CPE in 5 mM $[Fe(CN)_6]^{3-/4-}$ and 0.1M KCl solution at different scan rates in a range from 20 to 80 mVs^{-1}.

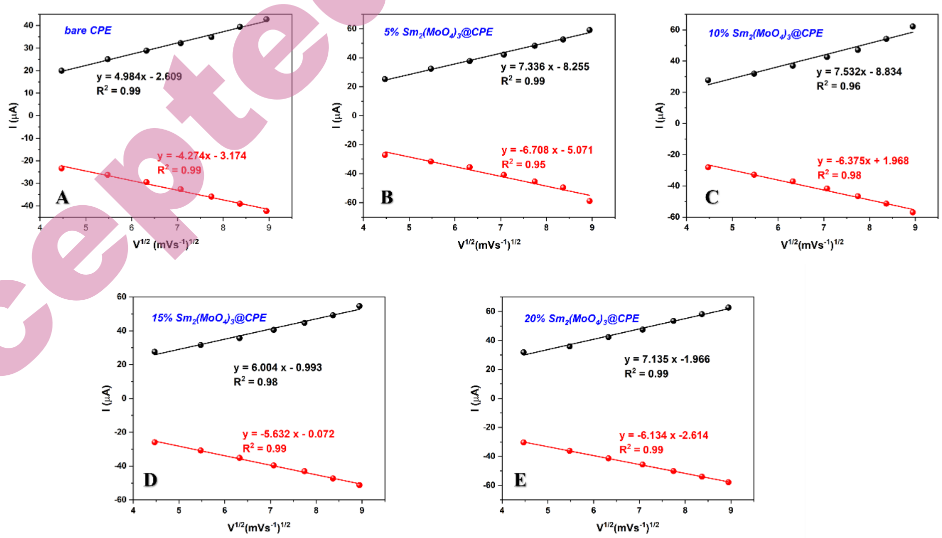

Figure S3. Dependence of redox peak currents on the square root of the scan rate in 5 mM $[Fe(CN)_6]^{3-/4-}$ and 0.1M KCl solution over (A) bare CPE; (B) 5% $Sm_2(MoO_4)_3$ modified CPE; (C) 10% $Sm_2(MoO_4)_3$ modified CPE; (D) 15% $Sm_2(MoO_4)_3$ modified CPE; (E) 20% $Sm_2(MoO_4)_3$ modified CPE.

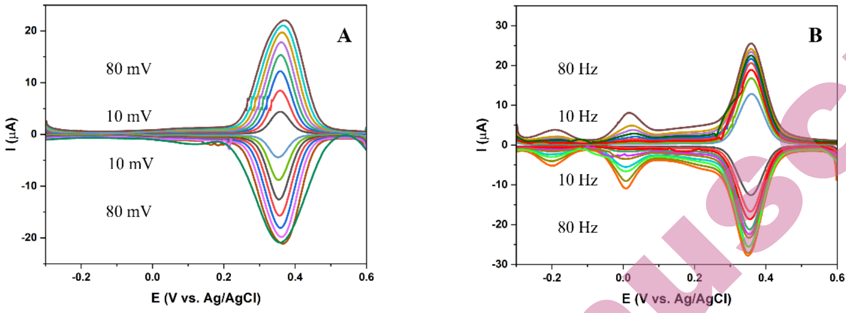

Figure S4. Optimization of working parameters: (A) Amplitude; (B) Frequency for SWV method.

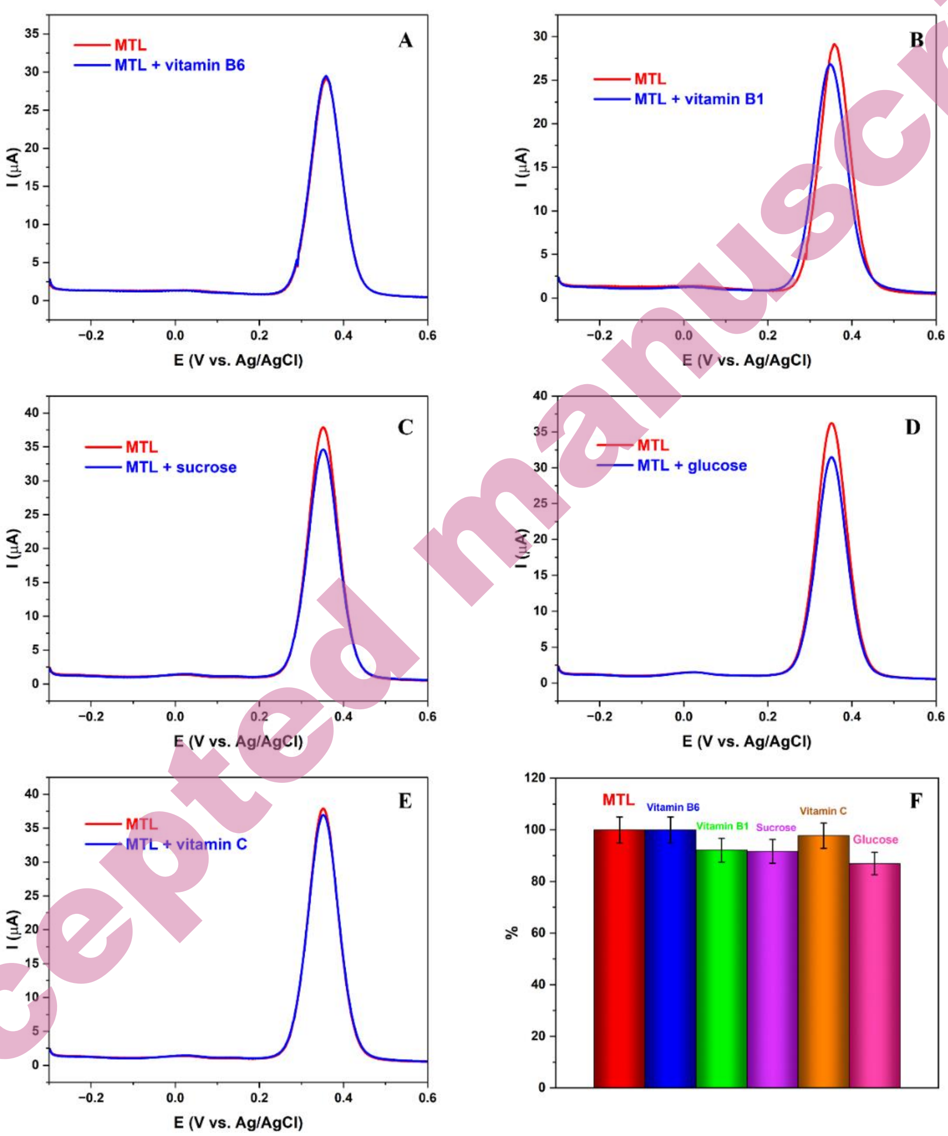

Figure S5. SWV measurements of MTL in the presence of potential interfering species: (A) Vitamin B6; (B) Vitamin B1; (C) Sucrose; (D) Glucose; (E) Vitamin C; (F) Comparison of current peaks between MTL and potential interfering species.

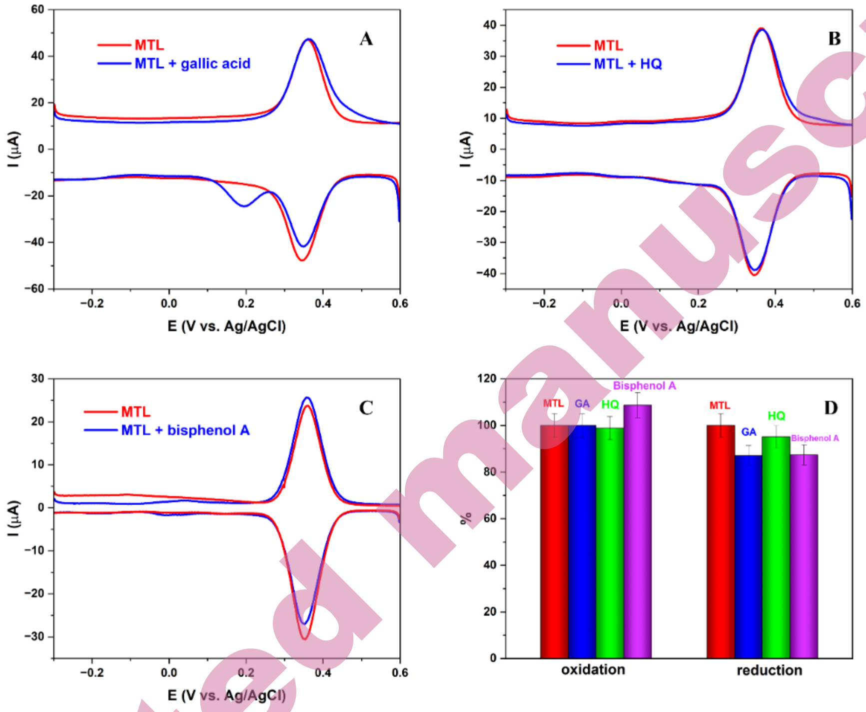

Figure S6. SWV measurements of MTL in the presence of other phenolic compounds (Selectivity study): (A) Gallic acid; (B) Hydroquinone – HQ; (C) Bisphenol A; (D) Comparison of redox current peaks between MTL and other phenolic compounds.

Table S1. Calculated values of electroactive surface area of electrodes (A); resistance (Rct), Warburg coefficient (σ), and diffusion-coefficient (D) for bare CPE and 5,10,15, and 20% modified electrodes.

Electrode	A (cm^2)	Rct (Ω)	σ (Ω cm^2 $s^{-1/2}$)	D (cm^2/s)
bare CPE	0.0151	3647.97	2880.27	7.49E-07
5% $Sm_2(MoO_4)_3$	0.0223	313.52	2294.30	5.41E-07
10% $Sm_2(MoO_4)_3$	0.0229	430.07	2314.12	5.04E-07
15% $Sm_2(MoO_4)_3$	0.0182	285.53	2520.75	6.73E-07
20% $Sm_2(MoO_4)_3$	0.0217	367.12	2117.21	6.71E-07

Table S2. Comparison table of electrochemical MTL developed sensor $Sm_2(MoO_4)_3$/CPE vs previous results

Working electrode	Techniq ue	pH	Linear range (μM)	LOD (μM)	Sensitivity (μA•$μM^{-1}$•cm^{-2})	Ref.
MOF@COF	DPV	7	0.1-200	0.03	/	13
Fe@C/CB/SPCE	DPV	7	0.01-27; 27 -142	0.003	12.948	35
CoMn2O4@RGO/ SPCE	DPV	7	0.01-137.65	0.05	3.77	2
MoS_2/SPCE	DPV	7	0.2-1211	0.01	/	8
$CuCo_2O_4$/GCE	DPV	7	0.02–1000	0.006	/	6
GdM/RGO/GCE	DPV	7	0.01-1792	0.0039	1.34	36
Co-Pi/PTAA/CFP	DPV	7	0.06-0.8	0.002	/	37
$Sm_2(MoO_4)_3$/CPE	SWV	3	0.1-100; 100-300	0.047	80.63	This work