

Electronic supplementary information

**PROBING THE ANTIOXIDANT ACTIVITY OF
 Δ^9 - TETRAHYDROCANNABINOL AND CANNABIDIOL
IN CANNABIS SATIVA EXTRACTS**

*Ana Carolina Mendes Hacke¹, Dhésmon Lima¹, Fernanda de Costa², Ketaki Deshmukh²,
Nan Li², Ari M. Chow³, Jacqueline Aparecida Marques¹, Romaiiana Picada Pereira¹,
Kagan Kerman^{3*}*

*¹Departamento de Química, Universidade Estadual de Ponta Grossa, Av. General Carlos
Cavalcanti, 4748, 84030-900, Ponta Grossa, PR, Brazil*

*²Lupos (Canada) Biotechnology Inc., 215 Morrish Road, Toronto, ON, M1C 1E9,
Canada*

*³Department of Physical and Environmental Sciences, University of Toronto
Scarborough, 1265 Military Trail, Toronto, ON, M1C 1A4, Canada*

**Corresponding author: kagan.kerman@utoronto.ca*

1 Supplementary figures

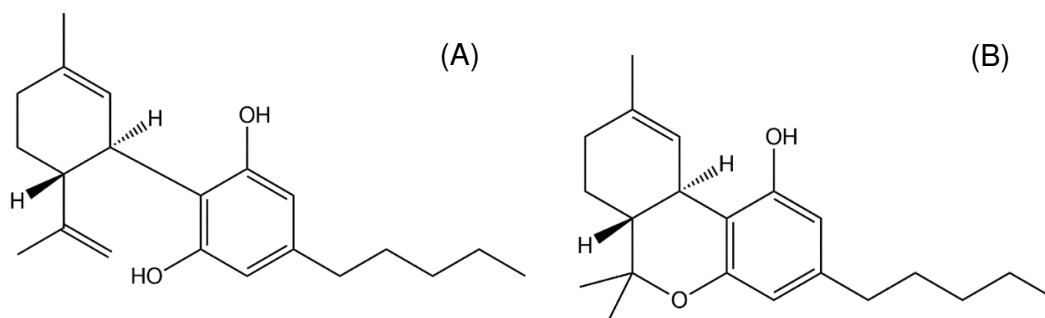


Fig S1. Chemical structures of (A) CBD and (B) THC.

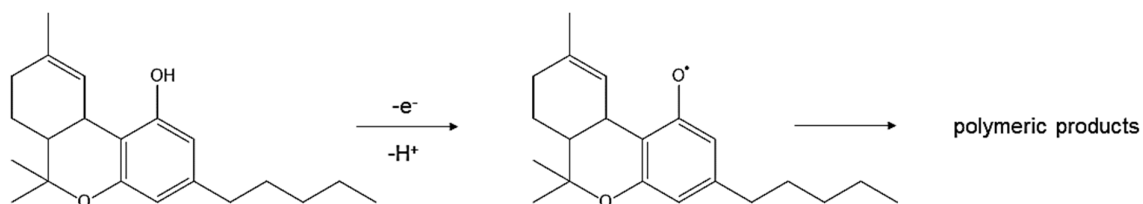


Fig S2. Oxidation mechanism of Δ^9 -THC.

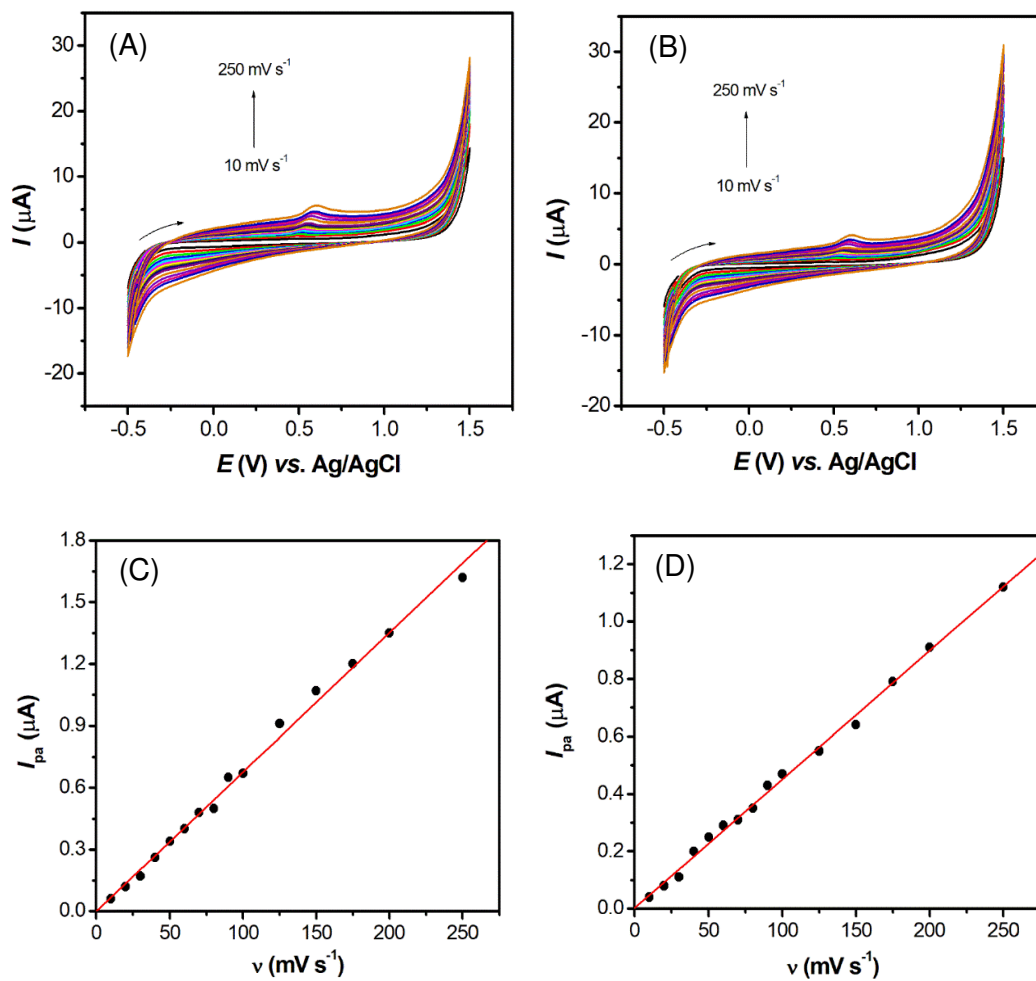


Fig. S3 – Cyclic voltammograms obtained at different scan rates (10 mV s^{-1} to 250 mV s^{-1}) at a bare GCE in the presence of 18 μM of (A) CBD and (B) THC (supporting electrolyte: BR buffer solution at pH 7.0 containing 30% methanol), and I_{pa} vs. scan rate plots for (C) CBD and (D) THC.

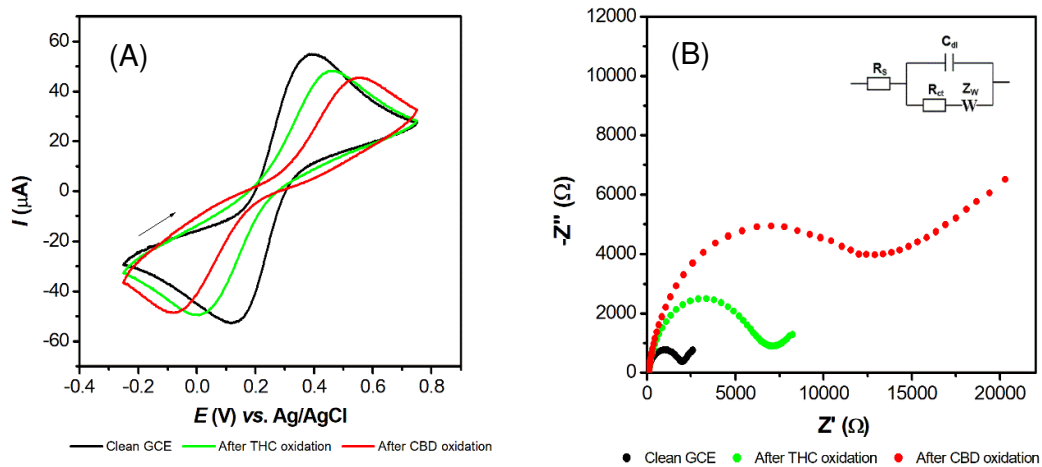


Fig. S4 – (A) Cyclic voltammograms (scan rate = 50 mV s^{-1}) and (B) electrochemical impedance spectra (Nyquist diagrams) obtained for the GCE before and after CBD and THC oxidation (frequency range = 10 kHz to 100 mHz; amplitude = 10 mV; supporting electrolyte: 0.1 M KCl solution containing 5 mM $\text{K}_4[\text{Fe}(\text{CN})_6]/\text{K}_3[\text{Fe}(\text{CN})_6]$). The inset in B shows the Randles equivalent circuit used for the fitting of the impedance data.

2 Supplementary tables

Table S1 – Pearson’s correlation between total polyphenol content (TPC), total flavonoid content (TFC), and antioxidant activity of *C. sativa* extracts obtained by spectrophotometric and electrochemical measurements.

	TPC	TFC	DPPH	ABTS	HOCl	DPV
TPC	1	-0.2074	-0.7724	-0.8180	-0.5221	-0.6793
TFC		1	-0.1914	0.3751	0.2004	0.2443
DPPH			1	0.7327	-0.0042	0.7629
ABTS				1	0.3540	0.9064
HOCl					1	0.2165
DPV						1

Table S2 – Pearson’s correlation between spectrophotometric and electrochemical measurements used to the determination of antioxidant activity of CBD:THC ratios.

	DPPH	ABTS	HOCl	DPV
DPPH	1	-0.4294	0.2730	-0.2934
ABTS		1	0.6492	0.8994
HOCl			1	0.7734
DPV				1

Table S3 – Electrochemical parameters obtained by EIS at GCE surface before and after CBD and THC oxidation.

	R_s (Ω)	R_p (Ω)	C (μF)	W ($\mu Mho s^{1/2}$)
Bare GCE	110.3 ± 2.3	1562.4 ± 45.7	5.1 ± 0.50	1.0 ± 0.08
GCE after THC oxidation	115.7 ± 6.3	5515.7 ± 36.6	1.4 ± 0.04	507.7 ± 7.80
GCE after CBD oxidation	118.2 ± 2.7	9477.4 ± 66.9	1.2 ± 0.05	110.3 ± 6.80

Table S4 – Electrochemical parameters obtained by CV at GCE surface before and after CBD and THC oxidation.

	I_{pa} (μA)	I_{pc} (μA)	ΔE_p (mV)
Bare GCE	50.8 ± 1.3	46.3 ± 1.2	256.7 ± 5.3
GCE CBD	25.8 ± 1.0	24.9 ± 0.4	466.7 ± 5.7
GCE THC	35.9 ± 0.9	32.8 ± 0.9	436.7 ± 5.8