Supplementary Table 1. Percentages, physical and chemical characters of total methanolic *C. equisetifolia* bark extract and its successive fractions compared to total methanolic extract after incorporating Au-NPs.

Character	Plant Extracts					
	Total Methanolic	**Petroleum ether**	**CH_2Cl_2**	**EtOAc**	**BuOH**	**Au-Methanolic nano-extract**
Weight (gm)	45	1.5	1.2	1.4	19	22.5
Percentage (W/W%)	100%	3.3%	2.6%	3.1%	42.2%	50%
Physical characters:						
Color	Brownish Green	Yellow	Pale Green	Brown	Brown	Brown
Odour	No odor					
Condition	Solid	Oily	Semisolid	Solid	Solid	Solid
Chemical Constituents:						
Carbohydrates	+	-	-	+	+	+
Coumarins	-	-	+	-	-	-
Tannins	++	-	-	+	+	++
Flavonoids	+	-	-	+	+	+
Saponins	++	-	-	-	+	++
Sterol and/or Triterpenes	-	++	++	-	-	-
Alkaloids and/or nitrogenous bases	-	-	-	-	-	-
Anthraquinones	-	-	-	-	-	-
Cardiacglycosides	-	-	-	-	-	-
Volatile constituents	-	-	-	-	-	-

(-): Absent, (+): Present, (++): Appreciably present.

Supplementary Table *2*. Cytotoxic activity of total methanolic *C. equisetifolia* bark extract and its successive fractions against human liver cancer (HEPG-2).

Total methanolic						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.35	0.33	0.30	0.23	0.15	0.10
Viability %	100.00	93.71	86.75	65.78	42.80	29.74
IC_{50}% (µg/mL)				**44.34**		
Petroleum Ether						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.35	0.33	0.32	0.30	0.26	0.23
Viability %	100.00	93.90	91.99	87.04	75.69	65.78
IC_{50}% (µg/mL)				**214.30**		
Dichloromethane						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.45	0.43	0.40	0.37	0.28	0.27
Viability %	100.00	96.20	89.87	82.04	62.44	59.24
IC_{50}% (µg/mL)				**127.10**		
Ethyl Acetate						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.45	**0.34**	0.34	0.27	0.21	0.15
Viability %	100.00	75.04	75.34	60.36	46.94	33.08
IC_{50}% (µg/mL)				**42.09**		
Butanol						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.34	0.28	0.23	0.17	0.15	0.14
Viability %	100.00	82.66	66.80	48.58	44.76	41.43
IC_{50}% (µg/mL)				**39.19**		

Supplementary Table *3*. Cytotoxic activity of total methanolic *C. equisetifolia* bark extract and its successive fractions against human colon cancer (CACO-2).

Total methanolic						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.36	0.27	0.24	0.13	0.10	0.09
Viability %	100.00	74.18	65.66	36.63	27.47	25.09
IC_{50}% (µg/mL)				**19.54**		
Petroleum Ether						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.36	0.34	0.32	0.26	0.13	0.12
Viability %	100.00	95.80	90.11	74.07	36.85	33.30
IC_{50}% (µg/mL)				**46.52**		
Dichloromethane						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.36	0.35	0.34	0.33	0.29	0.27
Viability %	100.00	96.61	92.03	91.39	79.21	74.91
IC_{50}% (µg/mL)				**394.00**		
Ethyl Acetate						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.37	0.33	0.30	0.26	0.15	0.11
Viability %	100.00	88.81	80.57	68.49	39.75	28.92
IC_{50}% (µg/mL)				**41.80**		
Butanol						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.37	0.27	0.26	0.13	0.10	0.09
Viability %	100.00	73.77	70.99	34.83	25.69	24.35
IC_{50}% (µg/mL)				**19.90**		

Supplementary Table *4*. Cytotoxic activity of total methanolic *C. equisetifolia* bark extract before and after incorporating Au-NPs against human liver cancer (HEPG-2).

Before incorporating Au-NPs						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.35	0.33	0.30	0.23	0.15	0.10
Viability %	100.00	93.71	86.75	65.78	42.80	29.74
IC_{50}% (µg/mL)				**44.34**		
After incorporating Au-NPs						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.46	0.46	0.401333	0.27	0.24	0.12
Viability %	100.00	99.21	86.55637	58.16	51.33	25.45
IC_{50}% (µg/mL)				**41.90**		

Supplementary Table *5*. Cytotoxic activity of total methanolic *C. equisetifolia* bark extract before and after incorporating Au-NPs against human colon cancer (CACO-2).

Before incorporating Au-NPs						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.36	0.27	0.24	0.13	0.10	0.09
Viability %	100.00	74.18	65.66	36.63	27.47	25.09
IC_{50}% (µg/mL)				**19.54**		
After incorporating Au-NPs						
Conc. (µg/mL)	**0.00**	**6.25**	**12.50**	**25.00**	**50.00**	**100.00**
Mean OD	0.51	0.20	0.13	0.11	0.09	0.07
Viability %	100.00	38.70	26.10	22.27	16.69	13.25
IC_{50}% (µg/mL)				**18.27**		

Supplementary Table 6. FT-IR measurements showing transmittance percent (Trans.%) and relative intensities (Int.%) of the bioactive compounds in total methanolic *C. equisetifolia* bark extract before and after incorporating Au-NPs.

Before incorporating Au-NPs			**After incorporating Au-NPs**		
Wave number (Cm^{-1})	**Trans. (%)**	**Int. (%)**	**Wave number (Cm^{-1})**	**Trans. (%)**	**Int. (%)**
409.09	66.95	3.57	410.57	65.89	3.09
415.29	64.39	3.44	425.37	65.38	3.07
424.55	65.22	3.48	438.55	66.94	3.14
434.11	65.83	3.51	448.06	63.58	2.98
439.41	65.42	3.49	467.71	62.79	2.95
445.51	66.35	3.54	490.6	62.17	2.92
457.29	65.23	3.48	502.35	63.08	2.96
468.12	64.19	3.43	516.22	63.36	2.97
482.45	69.59	3.72	525.74	63.80	2.99
489.86	67.67	3.61	579.71	65.59	3.08
500.83	65.78	3.51	778.71	74.17	3.48
547.21	69.85	3.73	823.53	74.06	3.47
564.27	70.34	3.76	941.2	73.01	3.42
578.55	70.47	3.76	1080.54	51.19	2.40
591.6	71.96	3.84	1196.09	73.56	3.45
606.35	72.16	3.85	1348.46	78.97	3.70
640.21	73.92	3.95	1437.18	81.29	3.81
669.83	75.41	4.03	**1521.03**	**91.68**	**4.30**
679.64	76.48	4.08	1610.59	85.47	4.01
773.3	78.113	4.17	1732.64	76.57	3.59
1053.3	72.655	3.88	**1973.22**	**97.93**	**4.59**
1202.63	80.55	4.30	**1983.42**	**97.18**	**4.56**
1440.04	**81.54**	**4.35**	**1997.98**	**94.91**	**4.45**
1518.24	**87.09**	**4.65**	**2005.73**	**98.00**	**4.60**
1603.94	80.49	4.30	**2081.09**	**98.51**	**4.62**
3207.13	**85.46**	**4.56**	2850.59	80.77	3.79
			2917.19	75.82	3.56
			3359.84	86.12	4.04

Trans.: Transmittance, **Int.:** Intensity

Supplementary Table 7a. Metabolites annotated in total methanolic *C. equisetifolia* bark extract before and after incorporating Au-NPs *via* HPLC-MS in negative ionization mode.

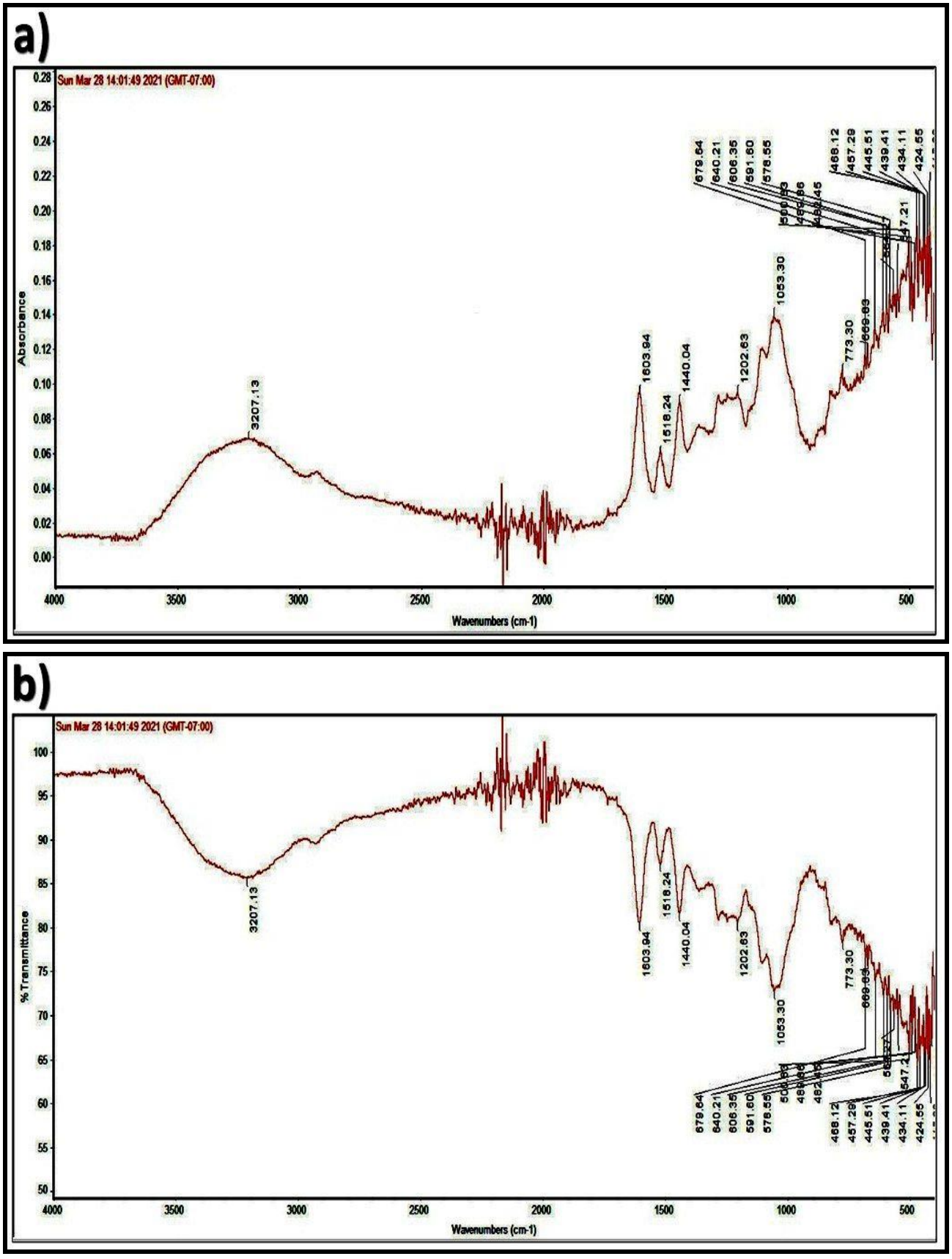
Peak No.	R_t (min)	Mol. ion $[M-H]^-$	Error (ppm)	Molecular Formula	MS/MS fragments	Tentative Identification	Class	TME	Au-TME
1	1.123	191.0548	1.1	$C_7H_{11}O_6^-$	191, 173 [(M-H)-H_2O], 127 [(M-H)-2H_2O-CO], 111, 93, 87, 85	Quinic acid	Acid	+	+
2	1.174	133.014	6.5	$C_4H_5O_5^-$	133, 115 [(M-H)-H_2O], 71 [115-COO^-], 59	Malic acid	Acid	+	+
3	1.248	169.0153	2.13	$C_7H_5O_5^-$	169, 125[(M-H)- COO^-], 107[(M-H)-COO^--H_2O], 79	Gallic acid	Phenolic acid derivatives	+	-
4	1.374	153.0171	0.3	$C_7H_5O_4^-$	153, 109[(M-H)-COO^-], 94	Dihydroxy benzoic acid (Protocatechuic acid)	Phenolic acid derivatives	+	-
5	1.436	179.0558	4.4	$C_6H_{11}O_6^-$	179, 161 [(M-H)- HO], 89[(M-H)- 90], 71, 59 [(M-H)- 120]	Hexose	Sugar	+	+
6	1.908	197.0484	3.9	$C_9H_9O_5^-$	197, 182 [(M-H)- CH_3], 153 [(M-H)$_2$- COO^-], 137, 125, 113, 85	Hydroxy dimethoxy benzoic acid	Phenolic acid derivatives	+	-
7	2.386	609.1211	2.4	$C_{30}H_{25}O_{14}^-$	609, 591, 541, 473, 441 [RDA], 423 [441-H_2O], 305 [QM fragmentation]	Prodelphendin B	Condensed tannin	+	-
8	2.972	305.0661	1.8	$C_{15}H_{13}O_7^-$	305, 287 [(M-H)-H_2O], 261 [(M-H)-C_2H_4O], 219 ($C_{12}H_{11}O_4$), 179 [(M-H)-126]ring B fission, 167, 137, 125 [ring B]	Gallocatechin	Flavanol	+	+
9	3.261	137.0236	2.0	$C_7H_5O_3^-$	137, 119[(M-H)-H_2O], 93[(M-H)-COO-]	Hydroxy benzoic acid	Phenolic acid	+	-
10	3.404	593.1286	0.6	$C_{30}H_{25}O_{13}^-$	593, 467 [(M-H)-126], 425 [(M-H)-168], 407 [425-H_2O], 303[(M-H)-(epi)catechin], 289 [(epi)catechin], 177	Prodelphendin B3	Condensed tannin	+	-
11	4.243	305.0674	5.9	$C_{15}H_{13}O_7^-$	305, 261 [(M-H)-C_2H_4O], 219 ($C_{12}H_{11}O_4$), 179 [(M-H)-126]ring B fission, 167, 137, 125 [ring B]	Epigallocatechin	Flavanol	+	-
12	4.518	300.9961	6.0	$C_{14}H_5O_8^-$	300.9984,283[(M-H)-H_2O], 257 [(M-H)-COOH], 185[(M − H) − 2CO_2 − CO]	Ellagic acid	Phenolic acid derivatives	+	-
13	4.521	577.1353	4.3	$C_{30}H_{25}O_{12}^-$	577, 451.0990[(M-H)-126], 425.0879 [(M-H)-152], 407.0741[(M-H)-152-H_2O], 289.0705[(M-H)-152-136], 287.0560, 125.0238	Procyanidin (Dimer B type)	Condensed tannin	+	+
14	4.839	289.071	1.1	$C_{15}H_{13}O_6^-$	289.0710, 245.0818 [(M-H)-C_2H_4O], 205, 203.0713, 179.0346, 125.0240, 109.0294	Catechin	Flavanol	+	+
15	5.095	183.029	0.9	$C_8H_7O_5^-$	183, 168[(M-H)-CH_3], 140, 124 [(M-H)-$COOCH_3$],111	Methyl gallate (Gallicin)	Phenolic acid derivatives	+	+
16	5.647	289.0699	2.8	$C_{15}H_{13}O_6^-$	289.0710, 245.0818 [(M-H)-C_2H_4O], 205, 203.0713, 187, 179.0346, 137, 125.0240, 109.0294	Epicatechin	Flavanol	+	+

R_t: Retention time; **TME**: Total methanolic extract; **Au-TME**: Gold total methanol nano-extract. + and – denote presence or absence of the metabolite in the tested samples.

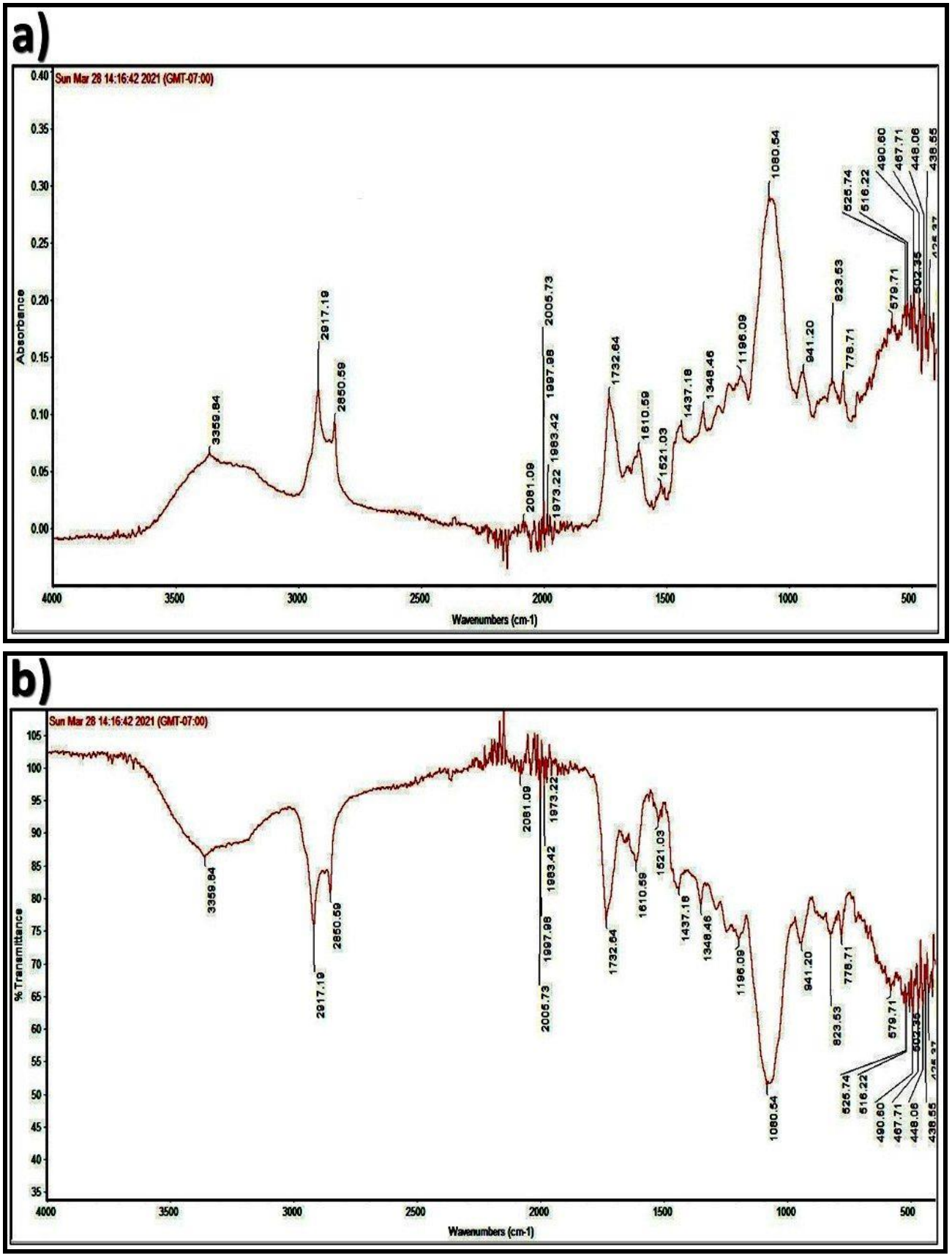
Supplementary Table 7b (Cont.) Metabolites annotated in total methanolic *C. equisetifolia* bark extract before and after incorporating Au-NPs *via* HPLC-MS in negative ionization mode.

Peak No.	R_t (min)	Mol. ion $[M-H]^-$	Error (ppm)	Molecular Formula	MS/MS fragments	Tentative Identification	Class	TME	Au-TME
17	5.846	865.1941	3.9	$C_{45}H_{37}O_{18}^-$	865, 739, 713, 695, 577, 575, 543, 425, 413, 407,	Procyanidin C type (Trimer B type)	Condensed tannin	+	+
18	6.462	433.1137	1.8	$C_{21}H_{21}O_{10}^-$	433, 327, 313, 271[(M-H)-hexose], 259, 151, 125	Naringenin *O*-hexoside	Flavonoid	+	-
19	6.504	863.1807	1.3	$C_{45}H_{35}O_{18}^-$	863, 711 [(M-H)-152], 575 [711-136], 289	Procyanidin (Trimer A type)	Condensed tannin	+	-
20	6.88	575.1167	2.9	$C_{30}H_{23}O_{12}^-$	575, 531, 463, 449, 423, 395, 355, 287, 219, 125	Procyanidin (Dimer A type)	Condensed tannin	+	+
21	7.043	167.0344	2.8	$C_8H_7O_4^-$	167, 152 [(M-H)- CH_3], 123 [(M-H)- COO^-], 108 [(M-H)- CH_3-COO^-]	Hydroxy methoxy benzoic acid	Phenolic acid derivatives	+	+
22	7.275	435.13	3.3	$C_{21}H_{23}O_{10}^-$	435, 417 [(M-H)-H_2O], 345 [(M-H)-90], 315 [(M-H)-120], 273 [Phloretin], 209	Phloretin c-glucoside (Nothofagin)	Chalcone	+	+
23	8.905	193.0504	4.6	$C_{10}H_9O_4^-$	193, 178 [(M-H)-CH_3], 161 [(M-H)-OCH_3], 149 [(M-H)-COO^-], 133	Methoxy hydroxy cinnamic acid (Ferulic acid)	Phenolic acid derivatives	+	-
24	9.488	285.0397	1.1	$C_{15}H_9O_6^-$	285, 257 [(M-H)- CO], 241[(M-H)- COO^-], 217 [(M-H)- C_3O_2], 199 [(M-H)- C_2H_2O-COO^-], 151 [^{1,3} A], 133 [^{1,3} B]	Luteolin	Flavonoid	+	-
25	9.69	301.0365	7.4	$C_{15}H_9O_7^-$	301, 283[(M-H)-H_2O],255[(M+H)- H_2O-CO], 179, 151	Quercetin	Flavonoid	+	-
26	10.258	271.0616	5.5	$C_{15}H_{11}O_5^-$	271, 253 [(M-H)-H_2O], 227 [(M-H)-COO^-], 177, 151, 119	Naringenin	Flavonoid	+	+
27	10.499	301.0713	2.1	$C_{16}H_{13}O_6^-$	301, 283 [(M-H)-H_2O], 268, 257 [(M-H)-COO^-], 241, 151	Hesperetin	Flavonoid	+	-
28	10.537	269.0448	1.3	$C_{15}H_9O_5^-$	269, 241, 225, 201, 159, 151, 149, 117	Apigenin	Flavonoid	+	+
29	10.685	273.0753	1.8	$C_{15}H_{13}O_5^-$	273, 167 [(M-H)-106], 151, 125	Phloretin	Chalcone	+	+
30	10.923	313.1465	4.7	$C_{18}H_{33}O_4^-$	313, 295[(M-H)-H_2O], 277 [(M-H)-2(H_2O)], 267 [295-CO], 183 [$C_{11}H_{19}O_2$]	Dihydroxy octadecenoic acid	Fatty acid	+	+
31	11.904	315.2533	3.1	$C_{16}H_{12}O_7^-$	315, 300 [(M-H)- CH_3], 299, 188, 112	Isorhamnetin	Flavonoid	+	+
32	18.447	255.2407	1.2	$C_{16}H_{31}O_2^-$	255, 211 [(M-H)-COO^-], 187 [(M-H)-68], 103	Hexadecanoic acid (palmitic acid)	Fatty acid	+	-
33	25.554	269.2497	8.3	$C_{17}H_{33}O_2^-$	253, 225 [(M-H)-COO^-]	Heptadecanoic acid (margaric acid)	Fatty acid	+	-

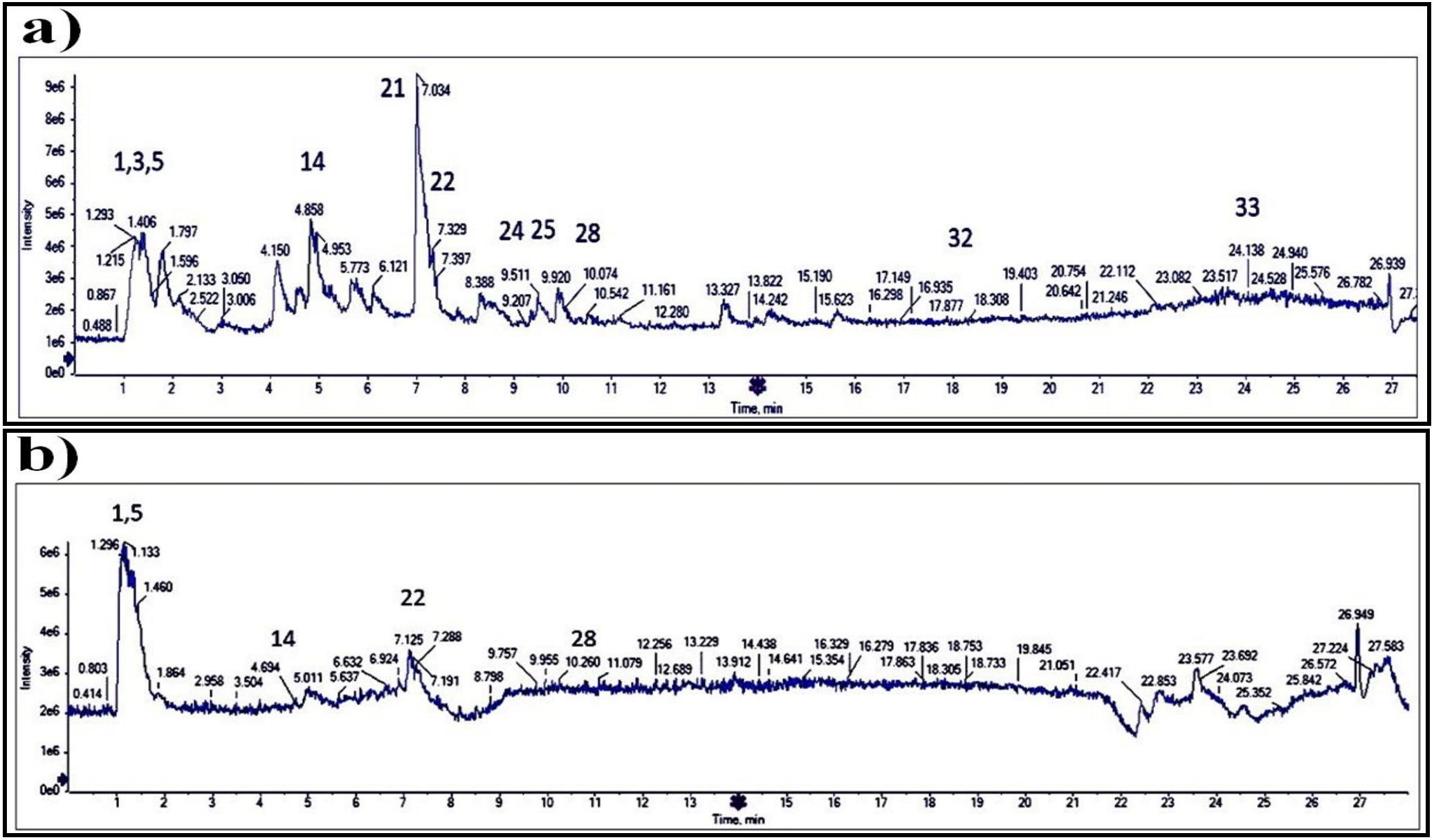
R_t: Retention time; **TME**: Total methanolic extract; **Au-TME**: Gold total methanol nano-extract. + and – denote presence or absence of the metabolite in the tested samples.



Supplementary Figure 1. FT-IR spectrum showing **a)** absorbance and **b)** transmittance of the bioactive compounds in total methanolic *C. equisetifolia* bark extract before incorporating Au-NPs.



Supplementary Figure 2. FT-IR spectrum showing **a)** absorbance and **b)** transmittance of the bioactive compounds in total methanolic *C. equisetifolia* bark extract after incorporating Au-NPs.



Supplementary Figure 3. HPLC-MS total ion chromatograms of total methanolic *C. equisetifolia* bark extract **a)** before and **b)** after incorporating Au-NPs in negative ionization mode. Peak numbers follow that listed in Table 15 for identification of the metabolites using HPLC-MS.