

References and tables

[1] Alok A., Singh I.D., Singh S., et al. (2015) Curcumin – Pharmacological Actions And its Role in Oral Submucous Fibrosis: A Review. Journal of Clinical and Diagnostic Research, 9: 1-3.

[2] [Turmeric report \(PDF\)](#) on the Committee for Toxicity website.

[3] Monton,C., Charoenchai, L., Suksaeree, J. and Sueree, L. (2016) Quantitation of curcuminoid contents, dissolution profile, and volatile oil content of turmeric capsules produced at some secondary government hospitals Journal of Food and Drug Analysis, 24: 493-499.

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Figure 1: Curcuminoid structures

Table 1: Sample details

Sample code	LIMS number	Product	Type of product
TU01	S21-002317	Turmeric powder	Powder
TU02	S21-002318	Turmeric with black pepper	Supplement

Sample code	LIMS number	Product	Type of product
TU03	S21-002319	Turmeric tablets	Supplement
TU04	S21-002320	Ground Turmeric	Powder
TU05	S21-002321	Turmeric	Supplement
TU06	S21-002322	Turmeric and black pepper	Supplement
TU07	S21-002323	Organic turmeric	Supplement
TU08	S21-002324	Turmeric	Supplement
TU09	S21-002325	Organic ground Turmeric	Powder
TU010	S21-002326	Turmeric	Powder
TU011	S21-002327	Turmeric powder	Powder
TU012	S21-002328	Curcumin	Supplement
TU013	S21-002329	Turmeric	Supplement
TU014	S21-002330	Turmeric	Powder
TU015	S21-002331	Turmeric	Supplement
TU016	S21-002332	Organic Turmeric powder	Powder
TU017	S21-002333	Turmeric and black pepper	Supplement
TU018	S21-002334	Turmeric and piperine	Supplement
TU019	S21-002335	Turmeric whole	Ordered as fresh but actually whole
TU020	S21-002336	Turmeric and black pepper tablets	Supplement
TU021	S21-002337	Turmeric, ginger and black pepper tablets	Supplement
TU022	S21-002338	Turmeric	Powder
TU023	S21-002339	Ground Turmeric	Powder
TU024	S21-002340	Turmeric powder	Powder
TU025	S21-002341	Cod liver oil and Turmeric	Supplement
TU026	S21-002342	Turmeric	Fresh
TU027	S21-002343	Turmeric	Fresh
TU028	S21-002344	Turmeric	Fresh
TU029	S21-002345	Turmeric	Fresh
TU030	S21-002346	Turmeric with black pepper	Supplement

Table 2: Trace element concentrations

Sample code	TU01	TU02	TU03	TU04	TU05
Sample name	Turmeric powder	Turmeric with black pepper	Turmeric tablets	Ground turmeric	Turmeric
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	0.116	0.052	0.125	0.12	0.187
Beryllium	0.007	0.005	0.013	0.009	0.014
Boron	4	5	3	5	5
Sodium	271	784	1610	341	977
Magnesium	1960	1770	1130	1990	785
Aluminium	468	384	153	429	541
Silicon	800	800	500	900	1900
Phosphorus	2990	2210	1620	2580	1290
Sulfur	1300	1000	900	1200	900
Potassium	40700	34600	24300	40100	17300
Calcium	1900	1870	311000	1940	2500
Scandium	0.137	0.139	0.354	0.124	0.153

Sample code	TU01	TU02	TU03	TU04	TU05
Titanium	39.9	25.5	281	31.6	9.5
Vanadium	1.79	1.55	0.88	1.44	0.77
Chromium	0.51	0.54	2.39	0.48	1.93
Manganese	42.9	31.4	62.8	62.2	89.9
Iron	317	261	283	259	228
Cobalt	0.294	0.212	0.109	0.21	0.163
Nickel	0.45	0.47	0.33	0.5	1.01
Copper	3.06	2.88	0.4	2.81	1.9
Zinc	9.1	7.1	5.2	9.4	7.4
Gallium	0.12	0.1	0.07	0.11	0.16
Germanium	0.02	0.02	0.04	0.02	0.03
Arsenic	0.035	0.017	0.102	0.036	0.448
Selenium	0.05	0.02	0.04	0.04	0.05
Rubidium	5.92	5.26	21.2	7.81	17.1
Strontium	9.3	11.8	85.8	11.9	17.2
Yttrium	0.174	0.128	0.699	0.139	0.313
Zirconium	0.26	0.2	0.75	0.24	0.23
Niobium	0.026	0.014	0.157	0.022	0.007
Molybdenum	0.11	0.08	0.1	0.15	0.13
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	0.007	0.006	0.047	0.007	0.012
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	0.013	0.009	0.219	0.037	0.055
Tin	0.01	0.024	0.024	0.011	0.036
Antimony	<0.002	0.003	0.003	0.002	<0.002
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	0.015	0.011	0.011	0.018	0.031
Barium	5.91	3.92	9.37	8.86	29
Lanthanum	0.123	0.057	0.364	0.177	0.366
Cerium	0.294	0.147	0.299	0.366	0.709
Praseodymium	0.035	0.019	0.057	0.043	0.085
Neodymium	0.156	0.09	0.238	0.177	0.328
Samarium	0.036	0.023	0.047	0.036	0.064
Europium	0.01	0.008	0.012	0.009	0.014
Gadolinium	0.036	0.025	0.057	0.043	0.085
Terbium	0.006	0.004	0.009	0.005	0.01
Dysprosium	0.034	0.026	0.057	0.029	0.057
Holmium	0.007	0.005	0.013	0.005	0.011
Erbium	0.018	0.014	0.04	0.015	0.031
Thulium	0.002	0.002	0.005	0.002	0.004
Ytterbium	0.014	0.011	0.031	0.011	0.025
Lutetium	0.002	0.002	0.005	0.002	0.004
Hafnium	0.009	0.006	0.015	0.007	0.007
Tantalum	0.001	0.001	0.009	0.001	<0.001
Tungsten	0.003	0.008	<0.002	0.004	0.069
Rhenium	<0.001	<0.001	<0.001	<0.001	0.001
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001

Sample code	TU01	TU02	TU03	TU04	TU05
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	0.009	0.005	0.009	0.009	0.014
Lead	0.071	0.033	0.094	0.116	0.26
Bismuth	<0.001	<0.001	0.004	<0.001	0.003
Thorium	0.036	0.013	0.03	0.058	0.137
Uranium	0.01	0.008	0.166	0.012	0.024

Table 2: Trace element concentrations (continued)

Sample code	TU06	TU07	TU08	TU09	TU10
Sample name	Turmeric and black pepper	Organic turmeric	Turmeric	Organic ground turmeric	Turmeric
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	0.211	0.203	0.135	0.185	0.247
Beryllium	0.015	0.012	0.007	0.014	0.03
Boron	6	5	4	4	5
Sodium	3010	479	794	398	49
Magnesium	1960	1600	1870	2300	1830
Aluminium	403	1210	514	655	1420
Silicon	700	2000	1700	1000	1600
Phosphorus	134000	3270	2380	2890	2890
Sulfur	1300	1200	1200	1400	1200
Potassium	45200	31900	26300	41300	48000
Calcium	203000	2030	1550	1870	1860
Scandium	0.29	0.25	0.148	0.134	0.198
Titanium	37	24.6	24.3	36.4	30
Vanadium	1.55	1.69	1.32	1.37	1.23
Chromium	0.86	0.36	1.94	1.3	2.11
Manganese	131	333	49.5	28.4	200
Iron	233	408	288	290	357
Cobalt	0.185	0.179	0.235	0.208	0.205
Nickel	0.59	0.32	1.01	0.64	1.34
Copper	0.83	3.12	2.36	2.98	3.15
Zinc	9.4	37.8	9.2	9.4	22
Gallium	0.13	0.22	0.13	0.17	0.32
Germanium	0.03	0.05	0.03	0.04	0.05
Arsenic	0.084	0.095	0.031	0.053	0.133
Selenium	0.06	0.05	0.06	0.06	0.09
Rubidium	32.1	27.7	4.46	9.36	32.8
Strontium	50.7	16.7	13.5	16	18.1
Yttrium	0.758	0.404	0.143	0.193	0.343
Zirconium	1.33	0.32	0.31	0.31	0.18
Niobium	0.06	0.014	0.021	0.046	0.08
Molybdenum	1.87	0.43	0.19	0.16	0.86
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005

Sample code	TU06	TU07	TU08	TU09	TU10
Palladium	0.03	0.012	0.007	0.01	0.012
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	0.037	0.221	0.017	0.015	0.086
Tin	0.155	0.032	0.012	0.022	0.042
Antimony	0.017	0.005	0.002	0.003	0.01
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	0.015	0.09	0.011	0.024	0.086
Barium	14.7	49.8	8.37	9.09	33.2
Lanthanum	0.329	0.246	0.196	0.372	0.618
Cerium	0.56	0.455	0.44	0.769	1.19
Praseodymium	0.084	0.062	0.048	0.084	0.134
Neodymium	0.358	0.269	0.189	0.316	0.513
Samarium	0.081	0.061	0.036	0.059	0.095
Europium	0.019	0.022	0.009	0.013	0.022
Gadolinium	0.088	0.067	0.034	0.054	0.086
Terbium	0.015	0.011	0.005	0.008	0.012
Dysprosium	0.093	0.067	0.029	0.04	0.064
Holmium	0.019	0.013	0.006	0.007	0.012
Erbium	0.058	0.04	0.016	0.021	0.033
Thulium	0.008	0.005	0.002	0.003	0.004
Ytterbium	0.049	0.034	0.013	0.016	0.026
Lutetium	0.008	0.005	0.002	0.002	0.004
Hafnium	0.04	0.011	0.01	0.009	0.01
Tantalum	<0.001	<0.001	<0.001	0.003	0.005
Tungsten	0.027	0.018	0.016	0.009	0.039
Rhenium	<0.001	<0.001	<0.001	<0.001	<0.001
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	0.017	0.104	0.014	0.013	0.041
Lead	0.097	0.288	0.092	0.203	2.25
Bismuth	<0.001	0.002	<0.001	0.001	0.008
Thorium	0.097	0.043	0.061	0.17	0.237
Uranium	0.57	0.012	0.014	0.032	0.037

Table 2: Trace element concentrations (continued)

Sample code	TU11	TU12	TU13	TU14	TU15
Sample name	Turmeric powder	Curcumin	Turmeric	Turmeric	Turmeric
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	0.132	<0.005	<0.005	0.09	0.32
Beryllium	0.007	0.02	<0.001	0.006	0.016
Boron	5	42	<1	4	5
Sodium	421	447	78500	285	536
Magnesium	2550	1450	10	1770	1080

Sample code	TU11	TU12	TU13	TU14	TU15
Aluminium	587	10.2	<0.5	306	98.1
Silicon	1700	1200	<100	700	400
Phosphorus	3510	20200	<10	2840	82300
Sulfur	1600	<500	<500	1300	<500
Potassium	42200	<20	50	38100	1140
Calcium	2310	28500	46	1570	323000
Scandium	0.202	0.074	<0.005	0.092	0.387
Titanium	58.8	4	<0.1	27.6	12.3
Vanadium	2.61	0.11	0.04	1.19	0.81
Chromium	0.74	0.12	<0.05	0.33	1.17
Manganese	105	1.7	0.2	39.3	31.7
Iron	456	251	<1	193	65
Cobalt	0.439	0.03	<0.005	0.22	0.042
Nickel	0.62	0.08	<0.05	0.41	0.17
Copper	4.46	114	0.05	2.62	0.18
Zinc	21.6	0.4	15.8	8.6	1.7
Gallium	0.16	0.01	<0.01	0.08	0.07
Germanium	0.03	0.02	<0.01	0.02	0.04
Arsenic	0.039	0.01	<0.005	0.034	0.286
Selenium	0.06	<0.01	<0.01	0.05	0.06
Rubidium	5.44	<0.02	0.06	6.78	0.57
Strontium	10.5	13.8	0.37	8.4	76.6
Yttrium	0.213	0.172	<0.001	0.112	4.12
Zirconium	0.32	0.25	<0.01	0.22	0.43
Niobium	0.034	0.01	<0.002	0.02	0.025
Molybdenum	0.11	0.03	<0.02	0.11	0.03
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	0.007	0.009	<0.005	0.015	0.107
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	0.032	<0.005	<0.005	0.015	0.107
Tin	0.014	0.022	<0.005	0.015	0.107
Antimony	0.004	0.017	<0.002	<0.002	0.24
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	0.016	<0.001	<0.001	0.015	0.008
Barium	7.05	0.69	0.09	6.13	1.94
Lanthanum	0.144	0.112	<0.001	0.098	1.28
Cerium	0.334	0.149	<0.001	0.216	0.471
Praseodymium	0.043	0.022	<0.001	0.027	0.153
Neodymium	0.188	0.089	<0.001	0.109	0.653
Samarium	0.042	0.017	<0.001	0.024	0.116
Europium	0.012	0.005	<0.001	0.007	0.029
Gadolinium	0.044	0.02	<0.001	0.025	0.177
Terbium	0.007	0.003	<0.001	0.004	0.027
Dysprosium	0.042	0.018	<0.001	0.004	0.027
Holmium	0.008	0.004	<0.001	0.004	0.047
Erbium	0.022	0.012	<0.001	0.002	0.019
Thulium	0.003	0.002	<0.001	0.002	0.019
Ytterbium	0.019	0.014	<0.001	0.009	0.107

Sample code	TU11	TU12	TU13	TU14	TU15
Lutetium	0.003	0.003	<0.001	0.001	0.016
Hafnium	0.011	0.008	<0.001	0.007	0.01
Tantalum	0.002	<0.001	<0.001	0.001	<0.001
Tungsten	0.003	0.031	<0.002	0.003	0.012
Rhenium	<0.001	<0.001	<0.001	<0.001	0.007
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	0.019	<0.005	<0.005	0.009	<0.005
Lead	0.638	0.023	<0.005	0.231	0.111
Bismuth	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	0.041	0.01	<0.001	0.031	0.024
Uranium	0.011	0.028	<0.001	0.008	0.237

Table 2: Trace element concentrations (continued)

Sample code	TU16	TU17	TU18	TU19	TU20
Sample name	Organic turmeric powder	Turmeric and black pepper	Turmeric and piperine	Turmeric whole	Turmeric and black pepper tablets
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	0.243	0.021	0.134	0.106	<0.005
Beryllium	0.014	0.124	0.009	0.006	<0.001
Boron	6	31	4	4	32
Sodium	1030	27	728	148	204
Magnesium	2810	584	1670	1750	375
Aluminium	1220	10.3	363	314	10.5
Silicon	1800	<100	900	500	1300
Phosphorus	3010	58200	2820	3220	30
Sulfur	1600	<500	1300	1200	<500
Potassium	46500	<20	29000	36200	<20
Calcium	3170	83500	1620	1380	16
Scandium	0.426	0.188	0.084	0.093	0.034
Titanium	82.8	4.8	10.8	19.6	0.9
Vanadium	5.95	0.55	0.65	1.11	0.01
Chromium	0.21	0.21	0.52	0.32	0.09
Manganese	48.2	10.1	70	37	0.2
Iron	906	23	154	182	2
Cobalt	0.617	0.015	0.156	0.226	<0.005
Nickel	1.07	<0.05	0.41	0.39	<0.05
Copper	5.38	0.18	2.37	2.44	0.05
Zinc	18.1	0.3	14.7	7.5	<0.2
Gallium	0.31	0.02	0.1	0.08	<0.01
Germanium	0.07	0.02	0.02	0.03	<0.01
Arsenic	0.068	0.015	0.052	0.047	<0.005
Selenium	0.06	0.03	0.11	0.02	<0.01
Rubidium	7.65	<0.02	13.8	4.91	<0.02

Sample code	TU16	TU17	TU18	TU19	TU20
Strontium	14.5	26.9	14.3	7.98	0.09
Yttrium	0.371	1.53	0.168	0.122	0.008
Zirconium	0.34	0.12	0.11	0.16	0.4
Niobium	0.027	0.004	0.021	0.016	0.002
Molybdenum	0.08	0.02	0.12	0.07	0.02
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	0.011	0.038	0.009	0.005	<0.005
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	0.02	<0.005	0.065	0.014	<0.005
Tin	0.023	0.009	0.026	0.008	<0.005
Antimony	0.003	0.187	0.004	0.002	0.016
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	0.03	<0.001	0.031	0.02	<0.001
Barium	6.14	0.25	27.7	5.97	0.11
Lanthanum	0.227	0.204	0.23	0.102	0.012
Cerium	0.563	0.396	0.474	0.265	0.029
Praseodymium	0.069	0.066	0.052	0.029	0.003
Neodymium	0.305	0.324	0.203	0.125	0.009
Samarium	0.073	0.104	0.04	0.03	0.002
Europium	0.02	0.024	0.011	0.009	<0.001
Gadolinium	0.075	0.151	0.037	0.032	0.002
Terbium	0.013	0.028	0.005	0.005	<0.001
Dysprosium	0.074	0.185	0.028	0.028	0.001
Holmium	0.014	0.038	0.005	0.005	<0.001
Erbium	0.041	0.109	0.016	0.005	<0.001
Thulium	0.006	0.014	0.002	0.002	<0.001
Ytterbium	0.033	0.082	0.012	0.012	<0.001
Lutetium	0.005	0.012	0.002	0.002	<0.001
Hafnium	0.011	0.003	0.005	0.006	0.01
Tantalum	0.002	<0.001	0.001	0.001	<0.001
Tungsten	0.003	0.035	0.005	0.002	0.003
Rhenium	<0.001	<0.001	<0.001	<0.001	<0.001
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	0.019	<0.005	0.017	0.007	<0.005
Lead	0.159	0.03	0.152	0.072	0.012
Bismuth	0.002	<0.001	0.001	0.001	<0.001
Thorium	0.066	0.006	0.057	0.032	0.007
Uranium	0.02	0.113	0.017	0.009	0.001

Table 2: Trace element concentrations (continued)

Sample code	TU21	TU22	TU23	TU24	TU25
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Sample name	Turmeric, ginger and black pepper tablets	Turmeric	Ground turmeric	Turmeric powder	Cold liver oil and turmeric
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	<0.005	0.088	0.064	0.175	0.006
Beryllium	<0.001	0.005	0.005	0.01	0.002
Boron	<1	4	5	5	<1
Sodium	52	586	515	332	1340
Magnesium	435	1660	2060	2870	198
Aluminium	2.1	319	436	785	8.7
Silicon	<100	600	1000	1300	1200
Phosphorus	<10	2160	3240	2860	<10
Sulfur	<500	1200	1400	1300	<500
Potassium	<20	31900	39300	42500	<20
Calcium	13	1370	1950	3060	35
Scandium	<0.005	0.089	0.144	0.267	0.03
Titanium	0.2	30.8	30.4	64.1	2.6
Vanadium	<0.01	1.18	1.65	2.97	0.05
Chromium	0.14	1.4	0.36	1.18	0.12
Manganese	<0.1	25.1	30.4	71.2	0.1
Iron	2	198	280	551	4
Cobalt	<0.005	0.196	0.209	0.455	<0.005
Nickel	0.1	0.88	0.39	0.95	<0.05
Copper	<0.05	3	3.23	4.56	0.75
Zinc	0.2	9.5	8.7	11.3	0.6
Gallium	<0.01	0.08	0.12	0.2	<0.01
Germanium	<0.01	0.02	0.03	0.04	<0.01
Arsenic	<0.005	0.093	0.02	0.052	<0.005
Selenium	<0.01	0.04	0.04	0.04	<0.01
Rubidium	<0.02	3.39	5.59	5.55	<0.02
Strontium	0.03	8.51	14.8	13.5	0.15
Yttrium	<0.001	0.095	0.144	0.285	0.016
Zirconium	<0.01	0.23	0.24	0.47	0.28
Niobium	0.004	0.022	0.016	0.039	0.002
Molybdenum	0.16	0.28	0.11	0.1	0.0002
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	<0.005	<0.005	0.009	0.01	<0.005
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	<0.005	0.013	0.011	0.019	<0.005
Tin	0.02	0.007	0.007	0.018	<0.005
Antimony	<0.002	0.002	<0.002	0.006	<0.002
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	<0.001	0.01	0.008	0.021	<0.001
Barium	0.04	5.85	7.36	6.39	0.71
Lanthanum	0.001	0.106	0.101	0.159	0.019
Cerium	0.002	0.249	0.244	0.378	0.039
Praseodymium	<0.001	0.03	0.03	0.049	0.005
Neodymium	<0.001	0.12	0.129	0.225	0.016
Samarium	<0.001	0.024	0.03	0.054	0.003
Europium	<0.001	0.006	0.009	0.016	<0.001

Gadolinium	<0.001	0.027	0.031	0.056	0.003
Terbium	<0.001	0.004	0.005	0.009	<0.001
Dysprosium	<0.001	0.02	0.029	0.055	0.002
Holmium	<0.001	0.005	0.006	0.011	<0.001
Erbium	<0.001	0.011	0.016	0.03	0.002
Thulium	<0.001	0.001	0.002	0.004	<0.001
Ytterbium	<0.001	0.008	0.013	0.024	0.002
Lutetium	<0.001	0.001	0.002	0.003	<0.001
Hafnium	<0.001	0.007	0.009	0.013	0.0004
Tantalum	<0.001	0.002	<0.001	0.002	<0.001
Tungsten	0.035	0.003	0.002	0.003	0.003
Rhenium	<0.001	<0.001	<0.001	<0.001	<0.001
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	<0.005	<0.005	0.008	0.013	<0.005
Lead	<0.005	0.066	0.05	0.151	0.024
Bismuth	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	<0.001	0.03035	0.018	0.043	0.005
Uranium	<0.001	0.013	0.009	0.014	0.004

Table 2: Trace element concentrations (continued)

Sample code	TU26	TU27	TU28	TU29	TU30
Sample name	Turmeric	Turmeric	Turmeric	Turmeric	Turmeric with black pepper
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Lithium	0.01	0.007	0.016	0.007	0.005
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	1	<1	<1	<1	28
Sodium	42	10	20	6	147
Magnesium	411	242	162	243	287
Aluminium	63.6	18.4	28.4	19.7	9.2
Silicon	200	<100	<100	<100	1100
Phosphorus	910	360	210	370	30
Sulfur	<500	<500	<500	<500	<500
Potassium	8850	5740	4460	5750	<20
Calcium	432	236	262	262	21
Scandium	0.024	<0.005	0.007	<0.005	0.028
Titanium	11.1	0.8	1.8	0.8	1.1
Vanadium	0.39	0.02	0.05	0.02	<0.01
Chromium	0.08	<0.05	<0.05	<0.05	<0.05
Manganese	8	1.9	7.9	7.9	<0.1
Iron	49	6	9	6	1
Cobalt	0.033	0.006	0.007	0.007	<0.005
Nickel	0.08	<0.05	<0.05	<0.05	<0.05

Sample code	TU26	TU27	TU28	TU29	TU30
Copper	0.64	0.36	0.17	0.36	0.09
Zinc	2.1	1.9	1.3	1.8	0.2
Gallium	0.02	<0.01	<0.01	<0.01	<0.01
Germanium	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	<0.005	<0.005	0.007	<0.005	<0.005
Selenium	<0.01	0.03	<0.01	0.02	<0.01
Rubidium	2.01	3.28	0.66	3.52	0.03
Strontium	1.9	0.5	3.42	0.53	0.1
Yttrium	0.024	0.009	0.01	0.01	0.003
Zirconium	0.1	0.02	0.02	0.02	0.18
Niobium	0.007	0.002	0.006	0.004	<0.002
Molybdenum	0.03	0.14	0.15	0.17	<0.02
Ruthenium	<0.001	<0.001	<0.001	<0.001	<0.001
Rhodium	<0.005	<0.005	<0.005	<0.005	<0.005
Palladium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	<0.005	<0.005	0.01	<0.005	<0.005
Tin	0.007	<0.005	0.01	<0.005	<0.005
Antimony	<0.002	<0.002	<0.002	<0.002	0.002
Tellurium	<0.01	<0.01	<0.01	<0.01	<0.01
Caesium	0.002	0.008	0.003	0.006	<0.001
Barium	1.13	1.88	3.98	2.08	0.09
Lanthanum	0.015	0.015	0.018	0.02	0.004
Cerium	0.035	0.028	0.038	0.037	0.008
Praseodymium	0.005	0.003	0.004	0.004	<0.001
Neodymium	0.02	0.014	0.018	0.017	0.003
Samarium	0.005	0.002	0.003	0.003	<0.001
Europium	0.002	<0.001	0.001	<0.001	<0.001
Gadolinium	0.006	0.002	0.003	0.003	<0.001
Terbium	<0.001	<0.001	<0.001	<0.001	<0.001
Dysprosium	0.005	0.002	0.002	0.002	<0.001
Holmium	0.001	<0.001	<0.001	<0.001	<0.001
Erbium	0.003	<0.001	0.001	0.001	0.001
Thulium	<0.001	<0.001	<0.001	<0.001	<0.001
Ytterbium	0.002	<0.001	<0.001	<0.001	<0.001
Lutetium	<0.001	<0.001	<0.001	<0.001	<0.001
Hafnium	0.004	<0.001	<0.001	<0.001	0.0004
Tantalum	<0.001	<0.001	<0.001	<0.001	<0.001
Tungsten	<0.002	0.005	<0.002	0.002	<0.002
Rhenium	<0.001	<0.001	<0.001	<0.001	<0.001
Osmium	<0.005	<0.005	<0.005	<0.005	<0.005
Iridium	<0.001	<0.001	<0.001	<0.001	<0.001
Platinum	<0.001	<0.001	<0.001	<0.001	<0.001
Gold	<0.002	<0.002	<0.002	<0.002	<0.002
Mercury	<0.005	<0.005	<0.005	<0.005	<0.005
Thallium	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	0.011	0.018	0.018	0.018	0.008
Bismuth	<0.001	<0.001	<0.001	<0.001	<0.001
Thorium	0.003	0.006	0.005	0.006	0.003

Sample code	TU26	TU27	TU28	TU29	TU30
Uranium	0.002	<0.001	0.003	0.001	0.002

Table 3: Curcuminoid concentrations

Sample code	Product	Average mass per tablet/capsule (g)	Curcumin Concentration (mg/kg): A	Curcumin Concentration (mg/kg): B	DMC Concentration (mg/kg): A	DMC Concentration (mg/kg): B	BDMC Concentration (mg/kg): A	BDMC Concentration (mg/kg): A	Total Curcuminoids Concentration (mg/kg): A	Total Curcuminoids Concentration (mg/kg): B
TU01	Turmeric powder	NA	11,734	15,244	5,610	6,797	4,181	5,920	21,525	27,960
TU02	Turmeric with black pepper	0.60	9,027	10,139	3,806	4,131	3,055	3,500	15,888	17,770
TU03	Turmeric tablets	0.42	14,033	14,094	2,792	3,153	<LOQ	<LOQ	16,825	17,247
TU04	Ground Turmeric	NA	7,401	7,220	2,911	2,613	2,384	2,252	12,697	12,084
TU05	Turmeric	0.62	98,476	101,898	29,088	31,088	8,905	9,251	136,469	142,237
TU06	Turmeric and black pepper	0.35	24,630	22,962	4,804	5,092	<LOQ	<LOQ	29,434	28,054
TU07	Organic Turmeric	0.46	22,085	25,256	9,826	11,153	8,503	9,953	40,415	46,362
TU08	Turmeric	0.53	80,671	81,022	23,871	24,744	8,309	8,472	112,850	114,238
TU09	Organic turmeric powder	NA	14,154	13,688	6,066	5,790	4,126	4,120	24,346	23,598
TU010	Turmeric	NA	19,430	20,852	8,981	11,245	8,159	9,693	36,570	41,790
TU011	Turmeric powder	NA	13,060	14,870	6,261	6,929	5,135	5,798	24,455	27,598
TU12	Curcumin	1.00	438,679	466,572	31,578	34,215	5,590	6,566	475,847	507,309
TU13	Turmeric	3.96	35,686	38,380	9,732	7,759	2,275	2,365	47,875	48,504
TU14	Turmeric	NA	13,777	15,542	6,544	8,524	4,783	6,501	25,104	30,567
TU15	Turmeric	1.57	69,805	66,148	20,086	16,064	4,781	4,356	94,672	86,568
TU16	Organic Turmeric powder	NA	9,991	22,962	4,548	5,092	4,932	<LOQ	19,471	28,054
TU17	Turmeric and black pepper	0.15	286,110	258,679	13,279	12,958	3,324	3,014	302,712	274,651
TU18	Turmeric and piperine	0.61	11,670	11,075	4,625	4,195	4,556	4,660	20,851	19,930
TU19	Turmeric whole	NA	17,717	16,420	9,182	8,598	6,517	6,312	33,416	31,330
TU20	Turmeric and black pepper tablets	0.25	58,081	59,475	<LOQ	<LOQ	<LOQ	<LOQ	58,801	59,745
TU21	Turmeric, ginger and black pepper tablets	0.34	25,735	24,505	6,870	6,967	3,519	3,284	36,124	34,756
TU22	Turmeric	NA	7,196	7,201	2,424	2,738	2,504	2,589	12,125	12,528
TU23	Ground turmeric	NA	16,554	15,931	6,925	6,483	5,925	5,554	29,404	27,967
TU24	Turmeric powder	NA	13,688	14,050	5,558	5,880	4,978	5,069	24,224	24,998
TU25	Cod liver oil and turmeric	0.72	78,678	88,601	24,446	29,199	11,862	12,253	114,986	130,324
TU26	Turmeric (dry weight basis)	NA	24,271	23,195	11,530	10,165	9,353	9,361	45,155	42,270
TU26	Turmeric	NA	4,662	4,455	2,215	1,952	1,796	1,798	8,673	8,205

Samplecode	Product	Average mass per tablet/capsule (g)	Curcumin Concentration (mg/kg): A	Curcumin Concentration (mg/kg): B	DMC Concentration (mg/kg): A	DMC Concentration (mg/kg): B	BDMC Concentration (mg/kg): A	BDMC Concentration (mg/kg): A	Total Curcuminoids Concentration (mg/kg): A	Total Curcuminoids Concentration (mg/kg): B
TU27	Turmeric	NA	16,278	18,492	11,112	12,614	5,819	7,130	33,209	38,237
TU27	Turmeric (dry weight basis)	NA	2,059	2,339	1,405	1,595	736	902	4,200	4,835
TU28	Turmeric (dry weight basis)	NA	36,591	49,527	19,796	27,391	18,008	25,817	74,395	102,735
TU28	Turmeric	NA	2,749	3,721	1,487	2,058	1,353	1,940	5,589	7,718
TU29	Turmeric (dry weight basis)	NA	15,352	15,228	10,255	10,718	5,606	5,817	31,213	31,763
TU29	Turmeric	NA	1,993	1,977	1,332	1,392	728	755	4,053	4,124
TU30	Turmeric with black pepper	0.25	46,584	44,378	<LOQ	<LOQ	<LOQ	<LOQ	46,584	44,378
Control	Ground Ginger	NA	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ	<LOQ

Table 4: Piperine concentrations

Sample number	Product	Average mass per tablet/capsule (grams)	Piperine Concentration (mg/kg): A	Piperine Concentration (mg/kg): B
TU02	Turmeric with black pepper	0.60	1,170	1,130
TU03	Turmeric tablets	0.42	<LOQ	<LOQ
TU05	Turmeric	0.62	3,277	4,022
TU06	Turmeric with black pepper	0.35	92,131	89,469
TU07	Organic Turmeric	0.46	<LOQ	<LOQ
TU08	Turmeric	0.53	<LOQ	<LOQ
TU12	Curcumin	1.00	16,776	19,558
TU13	Turmeric	3.96	<LOQ	<LOQ
TU15	Turmeric	1.57	7,837	7,270
TU17	Turmeric with black pepper herbal extract	0.15	164,103	199,609
TU18	Turmeric and piperine	0.61	653	457
TU20	Turmeric with black pepper tablets	0.25	31,629	38,423
TU21	Turmeric, ginger and black pepper tablets	0.34	34,457	33,129
TU25	Cod liver oil and Turmeric	0.34	<LOQ	<LOQ
TU30	Turmeric with black pepper	0.34	140,509	138,428
Control	Ground ginger	Not applicable	<LOQ	<LOQ

Limit of quantification: Piperine = 107 mg/kg.