

**Table S1 Information of Oolong tea samples in different regions**

Sample source	Sample number (representative samples for phytochemical components and sensory evaluation)	Oolong tea name
Southern Fujian, China	MN-1	Meizhan
	MN-2 (MN1)	Dangui
	MN-3 (MN2)	Dayewuyulong
	MN-4 (MN3)	Jinguanyin
	MN-5 (MN4)	Tieguanyin
	MN-6 (MN5)	Huangdan
	MN-7 (MN6)	Maoxie
	MN-8 (MN7)	Benshan
	MN-9	Baiyaqilan (refreshing fragrance)
	MN-10	Baiyaqilan (strong fragrance)
	MN-11	Zhaoan Baxian tea
	MN-12	Baxian tea (spring tea)
	MN-13	Baxian tea (spring tea)
	MN-14	Baxian tea (autumn tea)
	MN-15	Baxian tea (autumn tea)
	MN-16	Baxian tea (autumn tea)
	MN-17	Tieguanyin (second level)
	MN-18	Sezhong (second level)
	MN-19	Foshou (second level)
	MN-20	Shuixian (second level)
	MN-21	Tieguanyin (super level) Y300
	MN-22	Tieguanyin (first level) Y31
	MN-23	Tieguanyin (second level) Y302
	MN-24	Tieguanyin (third level) Y303
	MN-25	Tieguanyin (four level) Y304
	MN-26	Tieguanyin (first level) S101
	MN-27	Tieguanyin (second level) S102
	MN-28	Tieguanyin (third level) S103
	MN-29	Tieguanyin (four level) S104
Northern Fujian, China	MB-1	Rougui (Pucheng County)
	MB-2 (MB1)	Jinmudan (Pucheng County)
	MB-3 (MB2)	Dahongpao (Pucheng County)
	MB-4	Wuyi Rock tea (Kaiminxuan)
	MB-5	Wuyi Rock tea (Kaiminxuan)
	MB-6	Wuyi Rock tea (Kaiminxuan)
	MB-7	Wuyi Rock tea (Kaiminxuan)
	MB-8 (MB3)	Rougui (Wuyixing super level)
	MB-9 (MB4)	Rougui (Wuyixing first level)
	MB-10 (MB5)	Rougui (Wuyixing second level)

Western Fujian, China	MB-11 (MB6)	Shuixian (Wuyixing super level)
	MB-12 (MB7)	Shuixian (Wuyixing first level)
	MB-13 (MB8)	Shuixian (Wuyixing second level)
	MB-14	Dahongpao (Wuyixing super level)
	MB-15	Dahongpao (Wuyixing first level)
	MB-16	Dahongpao (Wuyixing second level)
	MB-17	Dahongpao
	MB-18	Dahongpao
	MB-19	Dahongpao
	MB-20	Dahongpao
	MB-21	Shuixian (woodiness)
	MB-22	Shuixian (woodiness)
	MB-23	Shuixian (woodiness)
	MB-24	Shuixian (woodiness)
	MB-25	Shuixian (moss smell)
	MB-26	Shuixian (moss smell)
	MB-27	Shuixian (moss smell)
	MB-28	Shuixian (moss smell)
	MB-29	Shuixian (zongye flavor)
	MB-30	Shuixian (zongye flavor)
	MB-31	Shuixian (zongye flavor)
	MB-32	Shuixian (zongye flavor)
	MB-33	Shuixian (zongye flavor)
	MB-34	Shuixian (zongye flavor)
	MB-35	Shuixian (zongye flavor)
	MB-36	Shuixian (zongye flavor)
	MX-1 (MX1)	Zhangping Shuixian
	MX-2	Cuiyu
	MX-3	Jinxuan
	MX-4	Sijichun
	MX-5	Ruanzhiwulong
	MX-6 (MX2)	Dongfangmeiren
	MX-7	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-8	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-9	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-10 (MX3)	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-11	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-12	Zhangping Oolong Tea (refreshing fragrance, super level )
	MX-13	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-14	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-15	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-16	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-17 (MX4)	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-18	Zhangping Oolong Tea (refreshing fragrance, first level )

Guangdong, China	MX-19	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-20	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-21	Zhangping Oolong Tea (refreshing fragrance, first level )
	MX-22	Zhangping Oolong Tea (strong fragrance, super level )
	MX-23	Zhangping Oolong Tea (strong fragrance, super level )
	MX-24	Zhangping Oolong Tea (strong fragrance, super level )
	MX-25	Zhangping Oolong Tea (strong fragrance, super level )
	MX-26	Zhangping Oolong Tea (strong fragrance, super level )
	MX-27 (MX5)	Zhangping Oolong Tea (strong fragrance, first level )
	MX-28	Zhangping Oolong Tea (strong fragrance, first level )
	MX-29	Zhangping Oolong Tea (strong fragrance, first level )
	MX-30	Zhangping Oolong Tea (strong fragrance, first level )
	MX-31	Zhangping Oolong Tea (strong fragrance, first level )
	MX-32	Zhangping Oolong Tea (strong fragrance, second level )
	MX-33	Zhangping Oolong Tea (strong fragrance, second level )
	MX-34	Zhangping Oolong Tea (strong fragrance, second level )
	MX-35	Zhangping Oolong Tea (strong fragrance, second level )
	MX-36	Zhangping Oolong Tea (strong fragrance, second level )
	GD-1 (GD1)	Shuixian (super level)
	GD-2 (GD2)	Shuixian (first level)
	GD-3 (GD3)	Dancong (super level)
	GD-4 (GD4)	Dancong (first level)
	GD-5 (GD5)	Dancong (second level)
	GD-6	Guihuaxiang
	GD-7	Dachashu
	GD-8 (GD6)	Heimeiren
	GD-9	Baiyedancong 1 (super level)
	GD-10 (GD7)	Baiyedancong 2 (super level)
	GD-11	Baiyedancong 3 (super level)
	GD-12 (GD8)	Dancong Duck excrement fragrance 1
	GD-13	Dancong Duck excrement fragrance 2
	GD-14	Dancong Duck excrement fragrance 3
	GD-15	Baiyedancong
Taiwan, China	TW-1 (TW1)	Oolong Tea (refreshing fragrance)
	TW-2	Oolong Tea (refreshing fragrance)
	TW-3	Oolong Tea (refreshing fragrance)
	TW-4	Oolong Tea (refreshing fragrance)
	TW-5 (TW2)	Dongding Oolong Tea
	TW-6	Dongding Oolong Tea
	TW-7	Dongding Oolong Tea
	TW-8 (TW3)	Gaoshancha
	TW-9 (TW4)	Dongfangmeiren tea (Canned)
	TW-10 (TW5)	Dongfangmeiren tea (Bagged)
	TW-11	Dongding Oolong Tea

	TW-12 (TW6)	Baozhong Tea
	TW-13	Baozhong Tea
	TW-14	Baozhong Tea
	TW-15	Baozhong Tea
	TW-16	Baozhong Tea
Hubei, China	HB-1 (HB1)	Oolong Tea
	ZJ-1 (ZJ1)	Jinguanyin (refreshing fragrance)
	ZJ-2 (ZJ2)	Qilan
Zhejiang, China	ZJ-3 (ZJ3)	Meizhan
	ZJ-4 (ZJ4)	Shuixian
	ZJ-5 (ZJ5)	Rougui
	SC-1 (SC1)	Oolong Tea (refreshing fragrance, super level )
Sichuan, China	SC-2 (SC2)	Oolong Tea (refreshing fragrance, second level )
	SC-3 (SC3)	Tanbei Oolong Tea
	JP-1 (JP1)	Japanese market (Chunxun)
	JP-2 (JP2)	Japanese market (Flower)
	JP-3 (JP3)	Japanese market (Fangkou)
	JP-4 (JP4)	Japanese market (Shuang)
Japan	JP-5	Japanese market (Oolong Tea)
	JP-6 (JP5)	Japanese market (Granular Oolong tea)
	JP-7	Japanese market (Gongqichafang)
	JP-8	Japanese market (Xingyechun)
	JP-9	Japanese market (Muchun)
	LK-1 (LK1)	Sri Lanka (I. S.B. experts)
Sri Lanka	LK-2 (LK2)	Sri Lanka (Ceylon oolong tea)
	LK-3	Sri Lanka market
	LK-4	Sri Lanka market
	MM-1 (MM1)	Myanmar market (High mountain Oolong tea)
	MM-2 (MM2)	Myanmar market
Myanmar	MM-3 (MM3)	Myanmar market
	MM-4 (MM4)	Myanmar market (High mountain Oolong tea)
	MM-5 (MM5)	Myanmar market
	AUS-1 (AUS1)	Australian market (Dongdingwulong, black)
Australia	AUS-2 (AUS2)	Australian market (Oolong tea, strong fragrance)
	GER-1 (GER1)	German market (Oolong tea, Fancy Oolong)
	GER-2 (GER2)	German market (Oolong tea)
Germany	GER-3 (GER3)	German market (Oolong tea)
	GER-4 (GER4)	German market (Oolong tea)
	GER-5	German market (bag brewing Oolong tea)
	KR-1 (KR1)	Korean market (refreshing fragrance, Oolong tea)
Korea	KR-2 (KR2)	Korean market (refreshing fragrance, Oolong tea)
	THA-1 (THA1)	Thailand market (strong fragrance, Oolong tea)
Thailand	THA-2 (THA2)	Thailand market (strong fragrance, Oolong tea)
	THA-3 (THA3)	Thailand market (strong fragrance, Oolong tea)

**Table S2 The frequency of use of descriptors in Oolong tea in different regions**

Sensory attributes	Descriptors	Number of samples using descriptions / piece	The frequency of use of descriptions in samples / %
Appearance	Tight and heavy	26	39.4
	Round and tight	19	28.8
	Bold	9	13.6
	Coarse and loose	9	13.6
	Heavy	7	10.6
	Short and broken	2	3
	Mixed	1	1.5
	Slightly tippy	1	1.5
	Pie	1	1.5
Infusion color	Orange red	35	53
	Honey yellow	23	34.8
	Golden yellow	3	4.5
	Dull red	2	3
	Auburn red	1	1.5
	Orange	1	1.5
	Honey green	1	1.5
	Flowery aroma	45	68.2
	Fruity aroma	26	39.4
Aroma	Clean and refreshing	26	39.4
	Roasted	21	31.8
	Honey aroma	2	3
	Sweet aroma	2	3
	Milky aroma	1	1.5
	Astringent	61	92.4
	Bitterness	53	80.3
	Umami	34	51.5
	Mellow and thick	29	43.9
Taste	Sweet after taste	28	42.4
	Heavy and thick	19	28.8
	Mellow	17	25.8
	Brisk and smooth	14	21.2
	Mellow and sweet after taste	5	7.6
	Coarse and astringent	2	3
	Clean and cool	1	1.5
	Stale taste	1	1.5

**Table S3 The quality characteristics of Oolong tea in different regions**

Region	Appearance	Infusion color	Aroma	Taste
GD	Tight and heavy, more	Orange red, light	Strong and lasting	Heavy and thick, superior sweet after

	tight and heavy or approach tight and heavy	orange red or deep orange red	flowery aroma or show flowery aroma, honey aroma	taste, superior bitter-astringency
MN	Heavy, tight and heavy, more heavy or more tight and heavy	Orange red, honey yellow or honey green	Clean and refreshing, flowery aroma	Mellow or mellow and thick, fresh and brisk, superior sweet after taste, inferior bitter-astringency
MB	More bold or approach tight and heavy	Orange red or deep orange red	Flowery aroma, fruity aroma, roasted	Heavy and thick, inferior astringent, superior sweet after taste
MX	Round and tight or pie	Honey yellow	Clean and refreshing with flowery aroma	Mellow and sweet after taste, fresh and brisk, more superior astringent, superior sweet after taste
TW	Round and tight	Honey yellow or orange red	Flowery and fruity aroma or roasted	Mellow or mellow and sweet after taste, brisk and smooth, superior sweet after taste
HB	Round and tight	Golden yellow	Clean and refreshing	More mellow and thick, litter astringent
ZJ	Tight and heavy, more tight and heavy or bold	Honey yellow, orange red or auburn red	Flowery and fruity aroma, roasted	Mellow and thick, brisk and smooth ,or heavy and thick, litter astringent
SC	Round and tight or tight and heavy	Golden yellow or orange red	Clean and refreshing, flowery and fruity aroma, roasted	More heavy and thick or approach mellow and thick, more superior astringent
JP	More tight and heavy, approach tight and heavy or more coarse and loose	Honey yellow, orange red or orange	Clean and refreshing, flowery aroma	More mellow and thick, more brisk and smooth, superior umami, inferior bitter-astringency
MM	Round and tight	Honey yellow	Clean and refreshing with flowery aroma	Mellow and thick, brisk and smooth, inferior bitter-astringency
LK	More coarse and loose	Orange red	Roasted with sweet aroma	Approach mellow and thick, coarse and astringent, clean and cool, inferior umami
GER	Round and tight,short and broken or mixed, some slightly tippy	Orange red, honey yellow	Clean and refreshing, honey aroma, flowery and fruity aroma	Mellow, more mellow and thick or approach mellow and thick
AUS	Tight and heavy, more tight	Honey yellow or orange red	Flowery and fruity aroma or roasted	Approach mellow and thick
KR	Approach tight and heavy or less tight and heavy	Orange red or honey yellow	Flowery and fruity aroma	Mellow and thick or more mellow and thick
THA	Coarse and loose	Dull red	Roasted	Approach mellow and thick, more superior bitter, coarse and astringent

Notes: MN, southern Fujian, China; MB, northern Fujian, China; MX, western Fujian, China; GD, Guangdong, China; TW, Taiwan, China; HB, Hubei, China; ZJ, Zhejiang, China; SC, Sichuan, China; JP, Japan; LK, Sri Lanka; MM, Myanmar; AUS, Australia; GER, Germany; KR, Korea; THA, Thailand.

**Table S4 Contents of phytochemical components in Oolong tea from different regions (mean  $\pm$  SD)**

Number	Water extract/%	Free amino acids/%	Theanine/%	Tea polyphenols/%	Caffeine/%	EGC/%	C/%
GD1	49.36 $\pm$ 1.07	1.30 $\pm$ 0.06	0.84 $\pm$ 0.06	20.75 $\pm$ 1.11	3.06 $\pm$ 0.08	1.42 $\pm$ 0.08	0.03 $\pm$ 0.00
GD2	50.55 $\pm$ 1.18	1.43 $\pm$ 0.06	1.03 $\pm$ 0.06	19.97 $\pm$ 0.78	3.87 $\pm$ 0.12	1.78 $\pm$ 0.12	0.05 $\pm$ 0.01
GD3	50.89 $\pm$ 1.32	1.25 $\pm$ 0.02	1.02 $\pm$ 0.05	23.18 $\pm$ 0.66	4.22 $\pm$ 0.10	1.89 $\pm$ 0.10	0.06 $\pm$ 0.02
GD4	48.99 $\pm$ 1.10	1.25 $\pm$ 0.11	1.25 $\pm$ 0.05	21.97 $\pm$ 0.49	4.36 $\pm$ 0.18	1.27 $\pm$ 0.18	0.05 $\pm$ 0.01
GD5	48.10 $\pm$ 1.07	1.26 $\pm$ 0.11	0.83 $\pm$ 0.04	19.57 $\pm$ 0.69	3.30 $\pm$ 0.26	1.30 $\pm$ 0.26	0.05 $\pm$ 0.01
GD6	37.39 $\pm$ 1.16	0.69 $\pm$ 0.04	0.28 $\pm$ 0.08	8.52 $\pm$ 0.45	2.77 $\pm$ 0.60	0.28 $\pm$ 0.06	0.03 $\pm$ 0.00
GD7	48.67 $\pm$ 0.25	0.92 $\pm$ 0.01	0.54 $\pm$ 0.05	20.50 $\pm$ 1.42	2.98 $\pm$ 0.20	1.64 $\pm$ 0.02	0.05 $\pm$ 0.01
GD8	48.13 $\pm$ 0.42	0.87 $\pm$ 0.03	0.35 $\pm$ 0.06	23.17 $\pm$ 0.68	3.62 $\pm$ 0.21	1.65 $\pm$ 0.21	0.05 $\pm$ 0.00
MN1	47.27 $\pm$ 0.73	1.39 $\pm$ 0.06	0.86 $\pm$ 0.05	14.83 $\pm$ 0.70	2.45 $\pm$ 0.10	3.45 $\pm$ 0.11	0.05 $\pm$ 0.00
MN2	41.05 $\pm$ 0.94	1.19 $\pm$ 0.16	0.43 $\pm$ 0.07	16.20 $\pm$ 0.67	1.50 $\pm$ 0.11	3.84 $\pm$ 0.11	0.07 $\pm$ 0.00
MN3	43.78 $\pm$ 0.40	1.69 $\pm$ 0.05	0.96 $\pm$ 0.05	16.35 $\pm$ 1.59	2.19 $\pm$ 0.10	3.28 $\pm$ 0.11	0.05 $\pm$ 0.00
MN4	43.17 $\pm$ 0.28	1.02 $\pm$ 0.05	0.24 $\pm$ 0.04	13.7 $\pm$ 0.82	1.60 $\pm$ 0.13	3.78 $\pm$ 0.13	0.04 $\pm$ 0.01
MN5	44.65 $\pm$ 0.69	1.50 $\pm$ 0.14	0.59 $\pm$ 0.01	15.49 $\pm$ 0.82	2.06 $\pm$ 0.06	2.54 $\pm$ 0.06	0.04 $\pm$ 0.01
MN6	44.88 $\pm$ 1.62	1.12 $\pm$ 0.08	0.25 $\pm$ 0.05	14.72 $\pm$ 0.57	1.81 $\pm$ 0.16	3.10 $\pm$ 0.16	0.04 $\pm$ 0.01
MN7	44.60 $\pm$ 1.68	1.50 $\pm$ 0.15	0.74 $\pm$ 0.02	14.35 $\pm$ 1.29	2.23 $\pm$ 0.15	4.00 $\pm$ 0.15	0.03 $\pm$ 0.01
MB1	43.25 $\pm$ 1.24	1.45 $\pm$ 0.16	0.69 $\pm$ 0.06	15.08 $\pm$ 0.41	3.05 $\pm$ 0.15	1.79 $\pm$ 0.15	0.06 $\pm$ 0.01
MB2	40.62 $\pm$ 1.82	0.80 $\pm$ 0.01	0.51 $\pm$ 0.03	13.41 $\pm$ 0.75	3.06 $\pm$ 0.14	1.81 $\pm$ 0.14	0.03 $\pm$ 0.00
MB3	41.85 $\pm$ 1.74	0.81 $\pm$ 0.07	0.10 $\pm$ 0.03	13.76 $\pm$ 0.49	2.81 $\pm$ 0.18	1.92 $\pm$ 0.18	0.03 $\pm$ 0.00
MB4	41.80 $\pm$ 1.83	0.62 $\pm$ 0.05	0.36 $\pm$ 0.04	14.04 $\pm$ 0.55	3.24 $\pm$ 0.15	2.10 $\pm$ 0.15	0.02 $\pm$ 0.00
MB5	40.59 $\pm$ 1.61	0.57 $\pm$ 0.02	0.43 $\pm$ 0.09	14.39 $\pm$ 0.58	2.86 $\pm$ 0.16	1.30 $\pm$ 0.16	0.03 $\pm$ 0.01
MB6	40.67 $\pm$ 1.53	0.80 $\pm$ 0.06	0.20 $\pm$ 0.00	14.30 $\pm$ 0.73	2.28 $\pm$ 0.15	2.55 $\pm$ 0.15	0.02 $\pm$ 0.00
MB7	40.20 $\pm$ 1.30	0.60 $\pm$ 0.03	0.05 $\pm$ 0.01	13.11 $\pm$ 0.63	2.41 $\pm$ 0.17	1.39 $\pm$ 0.17	0.03 $\pm$ 0.00
MB8	38.13 $\pm$ 0.74	0.56 $\pm$ 0.03	0.04 $\pm$ 0.00	13.39 $\pm$ 0.77	3.03 $\pm$ 0.15	1.38 $\pm$ 0.15	0.05 $\pm$ 0.00
MX1	43.83 $\pm$ 0.56	2.59 $\pm$ 0.24	1.41 $\pm$ 0.16	11.87 $\pm$ 0.71	1.92 $\pm$ 0.14	3.46 $\pm$ 0.14	0.05 $\pm$ 0.00
MX2	44.26 $\pm$ 0.87	2.84 $\pm$ 0.19	1.44 $\pm$ 0.09	12.54 $\pm$ 0.51	2.50 $\pm$ 0.21	3.27 $\pm$ 0.21	0.05 $\pm$ 0.00
MX3	43.44 $\pm$ 0.91	2.77 $\pm$ 0.15	1.83 $\pm$ 0.12	10.66 $\pm$ 0.54	1.55 $\pm$ 0.25	1.38 $\pm$ 0.25	0.04 $\pm$ 0.00
MX4	43.17 $\pm$ 0.57	2.47 $\pm$ 0.11	1.37 $\pm$ 0.16	9.74 $\pm$ 0.52	1.97 $\pm$ 0.20	3.39 $\pm$ 0.20	0.04 $\pm$ 0.01
MX5	49.29 $\pm$ 0.68	1.00 $\pm$ 0.09	0.21 $\pm$ 0.02	19.28 $\pm$ 0.51	2.17 $\pm$ 0.26	4.58 $\pm$ 1.26	0.05 $\pm$ 0.02
TW1	40.51 $\pm$ 0.96	2.04 $\pm$ 0.16	0.29 $\pm$ 0.03	11.76 $\pm$ 0.61	2.23 $\pm$ 0.23	3.08 $\pm$ 1.23	0.04 $\pm$ 0.00
TW2	43.02 $\pm$ 1.17	1.85 $\pm$ 0.09	0.74 $\pm$ 0.10	12.80 $\pm$ 2.17	2.58 $\pm$ 0.23	2.78 $\pm$ 0.23	0.04 $\pm$ 0.00
TW3	40.57 $\pm$ 1.36	1.29 $\pm$ 0.12	0.34 $\pm$ 0.07	14.88 $\pm$ 1.11	2.04 $\pm$ 0.24	3.43 $\pm$ 0.24	0.05 $\pm$ 0.01
TW4	41.39 $\pm$ 1.99	2.14 $\pm$ 0.16	0.54 $\pm$ 0.10	13.46 $\pm$ 0.60	2.62 $\pm$ 0.19	4.45 $\pm$ 1.19	0.07 $\pm$ 0.02
TW5	40.05 $\pm$ 1.79	3.89 $\pm$ 0.12	0.57 $\pm$ 0.21	13.58 $\pm$ 1.19	2.15 $\pm$ 0.15	4.27 $\pm$ 0.15	0.05 $\pm$ 0.01
TW6	42.00 $\pm$ 2.20	3.41 $\pm$ 0.13	0.73 $\pm$ 0.12	13.21 $\pm$ 1.84	2.54 $\pm$ 0.11	4.86 $\pm$ 1.11	0.07 $\pm$ 0.01
HB	45.00 $\pm$ 2.19	4.28 $\pm$ 0.10	2.44 $\pm$ 0.16	12.38 $\pm$ 0.70	2.24 $\pm$ 0.09	3.45 $\pm$ 0.09	0.04 $\pm$ 0.00
ZJ1	43.39 $\pm$ 1.38	2.35 $\pm$ 0.07	1.32 $\pm$ 0.41	14.75 $\pm$ 1.64	1.68 $\pm$ 0.16	2.77 $\pm$ 0.16	0.03 $\pm$ 0.01
ZJ2	42.35 $\pm$ 1.74	0.65 $\pm$ 0.10	0.34 $\pm$ 0.14	10.86 $\pm$ 1.06	1.78 $\pm$ 0.09	1.17 $\pm$ 0.09	0.03 $\pm$ 0.00
ZJ3	39.49 $\pm$ 2.12	0.47 $\pm$ 0.01	0.10 $\pm$ 0.01	9.38 $\pm$ 1.55	1.75 $\pm$ 0.12	0.66 $\pm$ 0.12	0.03 $\pm$ 0.00
ZJ4	43.65 $\pm$ 1.91	0.81 $\pm$ 0.02	0.23 $\pm$ 0.03	14.65 $\pm$ 2.04	2.84 $\pm$ 0.16	2.81 $\pm$ 0.16	0.04 $\pm$ 0.00
ZJ5	44.90 $\pm$ 1.25	1.29 $\pm$ 0.16	0.57 $\pm$ 0.12	15.68 $\pm$ 0.89	3.10 $\pm$ 0.12	1.75 $\pm$ 0.12	0.03 $\pm$ 0.00

SC1	44.44±1.64	3.94±0.41	2.03±0.11	14.46±1.73	2.82±0.13	3.72±0.13	0.03±0.00
SC2	43.21±1.87	3.49±0.14	1.85±0.09	12.17±1.04	2.79±0.10	3.37±0.11	0.03±0.00
SC3	42.18±1.15	1.05±0.09	0.25±0.08	11.12±0.59	2.10±0.07	1.97±0.07	0.03±0.00
JP1	45.88±1.16	1.82±0.03	0.61±0.34	18.62±0.75	2.93±0.10	3.94±0.11	0.11±0.03
JP2	50.59±1.73	3.03±0.12	1.82±0.21	21.51±0.6	3.52±0.21	4.20±0.21	0.08±0.03
JP3	49.19±1.48	2.17±0.10	1.03±0.26	15.64±0.77	2.93±0.12	3.86±0.12	0.04±0.01
JP4	45.49±1.13	1.11±0.09	0.43±0.21	14.56±0.72	2.76±0.16	2.06±0.16	0.02±0.01
JP5	45.82±1.71	2.58±0.08	0.73±0.23	12.69±0.78	3.06±0.41	1.82±0.41	0.21±0.08
MM1	46.03±1.38	1.99±0.34	1.02±0.02	16.88±0.67	2.20±0.14	3.57±0.14	0.05±0.00
MM2	45.79±1.43	5.39±0.21	3.60±0.21	14.61±1.25	2.32±0.09	3.58±0.09	0.06±0.00
MM3	47.15±1.45	5.13±0.26	3.58±0.19	15.03±0.92	2.45±0.03	3.64±0.03	0.05±0.01
MM4	46.91±1.52	4.87±0.21	3.54±0.25	14.31±0.89	2.30±0.12	3.56±0.12	0.05±0.00
MM5	46.45±1.68	5.16±0.23	3.34±0.23	13.62±1.13	2.23±0.10	2.88±0.11	0.03±0.00
LK1	45.74±1.10	0.86±0.12	0.52±0.09	11.96±0.47	3.17±0.09	0.68±0.09	0.07±0.00
LK2	52.67±1.31	0.70±0.01	0.34±0.07	16.79±0.41	2.93±0.08	1.70±0.08	0.05±0.00
AUS1	43.11±1.05	0.99±0.19	0.94±0.08	15.61±0.39	1.51±0.34	1.53±0.34	0.06±0.00
AUS2	39.40±1.38	0.67±0.25	0.78±0.09	11.85±1.11	1.99±0.21	1.32±0.21	0.06±0.00
GER1	43.77±1.13	1.60±0.23	0.36±0.02	12.51±1.05	2.90±0.26	0.67±0.03	0.08±0.02
GER2	47.08±1.17	1.30±0.29	0.98±0.05	15.59±0.56	1.91±0.21	2.63±0.21	0.08±0.03
GER3	50.04±1.36	1.55±0.27	1.34±0.25	12.66±0.54	3.02±0.23	0.37±0.01	0.07±0.02
GER4	42.10±1.99	1.50±0.28	1.08±0.03	10.88±0.51	2.38±0.12	0.19±0.01	0.04±0.02
KR1	40.75±1.79	2.94±0.19	0.83±0.08	9.43±0.48	2.07±0.21	1.24±0.05	0.04±0.00
KR2	43.74±2.20	2.25±0.32	0.82±0.09	11.26±0.53	1.85±0.19	3.08±0.23	0.05±0.00
THA1	49.59±0.42	1.60±0.25	0.56±0.05	16.85±0.70	2.44±0.25	1.99±0.29	0.08±0.01
THA2	47.13±0.73	1.11±0.28	0.59±0.02	14.76±0.53	2.51±0.23	0.82±0.07	0.09±0.00
THA3	36.59±0.94	0.41±0.19	0.06±0.00	6.78±0.98	1.45±0.09	0.32±0.08	0.03±0.00

**Continued table S4 Contents of phytochemical components in Oolong tea from different regions (mean ± SD)**

Number	EC/%	EGCG/%	ECG/%	Simple catechins/%	Ester catechins/%	Total catechins/%
GD1	0.52±0.03	5.54±0.80	1.03±0.03	1.98±0.52	6.56±0.12	8.54±0.87
GD2	0.48±0.01	6.86±0.84	1.35±0.07	2.31±0.50	8.22±1.10	10.52±1.23
GD3	0.52±0.04	7.52±0.74	1.26±0.01	2.48±0.43	8.78±1.18	11.26±1.24
GD4	0.46±0.02	7.34±0.89	1.11±0.01	1.78±0.46	8.46±1.26	10.24±2.38
GD5	0.58±0.04	5.94±0.98	1.28±0.04	1.93±0.63	7.22±1.6	9.15±0.14
GD6	0.23±0.06	0.20±0.00	0.17±0.04	0.54±0.59	0.36±0.02	0.90±0.26
GD7	0.73±0.08	5.51±0.95	1.26±0.08	2.42±0.83	6.77±0.21	9.19±0.14
GD8	0.62±0.09	6.44±1.06	1.21±0.05	2.32±0.60	7.65±1.14	9.97±0.14
MN1	0.81±0.07	3.99±0.86	0.61±0.06	4.31±0.58	4.60±0.61	8.91±0.21
MN2	0.84±0.06	3.67±0.98	0.52±0.05	4.74±0.63	4.19±0.16	8.94±1.64
MN3	0.79±0.06	3.14±0.84	0.46±0.07	4.11±0.56	3.60±0.13	7.71±1.66
MN4	1.12±0.12	4.06±1.02	0.84±0.05	4.94±1.09	4.90±0.06	9.84±1.55
MN5	0.82±0.03	2.83±0.90	0.53±0.04	3.39±0.92	3.36±1.16	6.75±1.35
MN6	0.82±0.06	3.36±0.84	0.52±0.01	3.96±1.15	3.88±0.75	7.84±1.06



MN7	1.38±0.01	3.13±0.93	0.72±0.05	5.40±0.64	3.85±0.95	9.25±2.39
MB1	1.18±0.08	3.47±0.67	1.09±0.20	3.03±0.58	4.56±0.84	7.59±0.97
MB2	1.19±0.05	3.50±0.98	1.09±0.06	3.03±0.63	4.59±0.58	7.62±1.14
MB3	0.71±0.09	2.17±0.93	0.46±0.23	2.65±0.60	2.62±0.45	5.28±1.48
MB4	0.74±0.09	3.57±1.03	0.73±0.23	2.86±0.59	4.30±0.96	7.16±1.89
MB5	0.59±0.07	2.76±0.77	0.65±0.24	1.92±0.08	3.41±0.75	5.34±1.55
MB6	0.47±0.09	3.22±0.12	0.79±0.19	3.05±0.62	4.01±0.87	7.06±1.49
MB7	0.56±0.06	2.26±0.21	0.60±0.15	1.97±0.61	2.86±0.85	4.83±0.62
MB8	0.59±0.07	2.60±0.19	0.76±0.11	2.02±0.60	3.36±0.94	5.38±1.84
MX1	0.73±0.06	3.15±0.25	0.41±0.09	4.24±0.74	3.56±0.61	7.80±1.48
MX2	0.86±0.07	3.76±0.23	0.51±0.16	4.18±0.56	4.27±0.25	8.45±1.05
MX3	0.55±0.08	3.32±0.29	0.51±0.09	1.97±0.87	3.83±0.27	5.80±1.26
MX4	0.71±0.18	2.36±0.27	0.29±0.02	4.14±0.91	2.65±0.26	6.79±0.59
MX5	1.89±0.01	5.00±0.28	1.32±0.16	6.52±0.57	6.32±1.23	12.84±2.71
TW1	0.75±0.07	3.06±0.19	0.42±0.12	3.86±0.68	3.47±0.23	7.34±1.68
TW2	0.83±0.09	3.21±0.32	0.48±0.13	3.65±0.96	3.69±0.24	7.34±1.26
TW3	0.94±0.01	3.98±0.25	0.53±0.10	4.42±0.73	4.51±0.19	8.94±1.57
TW4	1.02±0.14	3.63±0.25	0.65±0.07	5.54±0.74	4.28±0.15	9.83±1.25
TW5	1.01±0.02	4.01±0.30	0.58±0.10	5.33±0.58	4.59±0.11	9.92±1.35
TW6	1.26±0.07	4.35±0.28	0.60±0.21	6.19±0.75	4.94±0.89	11.13±1.33
HB	0.90±0.06	2.86±0.19	0.40±0.12	4.39±0.74	3.26±0.86	7.65±1.98
ZJ1	0.62±0.05	2.96±0.25	0.42±0.16	3.41±0.61	3.38±0.99	6.8±1.02
ZJ2	0.39±0.04	2.46±0.22	0.42±0.01	1.59±0.75	2.88±0.12	4.47±0.96
ZJ3	0.26±0.04	1.02±0.27	0.23±0.04	0.95±0.57	1.25±0.16	2.20±0.27
ZJ4	1.18±0.23	3.93±0.23	0.94±0.09	4.03±0.71	4.87±1.12	8.89±1.82
ZJ5	0.72±0.03	3.39±0.24	0.69±0.03	2.50±0.6	4.08±1.13	6.57±1.24
SC1	0.87±0.04	3.05±0.38	0.44±0.12	4.63±0.6	3.49±0.18	8.12±1.31
SC2	0.80±0.08	2.86±0.14	0.41±0.10	4.20±0.58	3.27±0.77	7.47±1.40
SC3	0.45±0.02	1.82±0.26	0.3±0.09	2.45±0.57	2.12±0.61	4.57±1.26
JP1	1.29±0.06	5.86±0.14	0.97±0.08	5.34±0.68	6.84±1.21	12.18±2.35
JP2	1.76±0.14	5.12±0.57	1.39±0.34	6.04±0.63	6.51±1.12	12.55±2.26
JP3	1.31±0.07	3.92±0.19	0.68±0.21	5.21±0.57	4.60±0.16	9.81±0.92
JP4	1.51±0.06	2.48±0.56	1.00±0.26	3.59±0.19	3.48±0.41	7.08±1.34
JP5	0.80±0.01	2.18±0.47	0.59±0.21	2.83±0.56	2.77±0.14	5.60±0.99
MM1	1.00±0.03	3.94±0.61	0.59±0.23	4.62±0.47	4.54±0.69	9.16±1.07
MM2	0.98±0.01	3.23±0.75	0.43±0.12	4.62±0.61	3.66±0.63	8.28±1.59
MM3	0.94±0.06	3.20±0.68	0.43±0.21	4.63±0.75	3.64±0.12	8.26±1.33
MM4	0.93±0.01	2.93±0.77	0.39±0.19	4.54±0.68	3.32±0.19	7.85±1.27
MM5	0.75±0.03	2.55±0.86	0.35±0.25	3.66±0.77	2.89±0.89	6.56±1.17
LK1	0.27±0.02	0.92±0.41	0.50±0.23	1.01±0.86	1.42±0.08	2.43±0.27
LK2	0.86±0.08	3.08±1.05	0.99±0.29	2.61±0.41	4.07±0.34	6.68±1.35
AUS1	0.77±0.09	2.22±0.82	0.58±0.27	2.36±1.05	2.80±0.21	5.16±1.03
AUS2	0.46±0.09	1.72±0.35	0.45±0.28	1.84±0.62	2.17±0.26	4.01±1.12
GER1	0.43±0.07	0.97±0.34	0.23±0.19	1.18±0.21	1.20±0.21	2.38±0.64

GER2	0.97±0.02	4.17±1.16	0.80±0.32	3.68±1.26	4.97±0.23	8.65±1.03
GER3	0.80±0.07	0.99±0.04	0.64±0.25	1.24±0.23	1.63±0.12	2.87±0.61
GER4	0.54±0.04	0.48±0.01	0.38±0.25	0.77±0.22	0.86±0.21	1.62±0.19
KR1	0.47±0.06	1.12±0.75	0.24±0.03	1.75±0.24	1.36±0.19	3.11±0.88
KR2	0.92±0.08	1.97±0.49	0.31±0.08	4.04±0.23	2.28±0.25	6.32±0.53
THA1	1.59±0.14	2.67±0.55	1.7±0.19	3.65±0.40	4.37±0.23	8.02±1.77
THA2	1.44±0.08	1.25±0.08	1.87±0.25	2.35±0.26	3.12±0.29	5.47±0.53
THA3	0.15±0.01	0.49±0.03	0.22±0.02	0.50±0.23	0.71±0.27	1.21±0.38

Notes: MN, Southern Fujian, China; MB, Northern Fujian, China; MX, Western Fujian, China; GD, Guangdong, China; TW, Taiwan, China; HB, Hubei, China; ZJ, Zhejiang, China; SC, Sichuan, China; JP, Japan; LK, Sri Lanka; MM, Myanmar; AUS, Australia; GER, Germany; KR, Korea; THA, Thailand.

**Table S5 DoT of phytochemical components of Oolong tea in different regions**

Region	Theanine	Caffeine	EGC	C	EC	EGCG	ECG
Guangdong, China	0.07	3.63	0.88	0.04	0.19	3.25	0.94
Southern Fujian, China	0.06	2.04	2.15	0.04	0.35	1.98	0.52
Northern Fujian, China	0.03	2.93	1.12	0.03	0.28	1.69	0.67
Western Fujian, China	0.12	2.08	2.02	0.04	0.35	2.02	0.53
Taiwan, China	0.05	2.43	2.39	0.04	0.36	2.13	0.47
Hubei, China	0.23	2.31	2.17	0.03	0.33	1.64	0.35
Zhejiang, China	0.05	2.30	1.15	0.03	0.23	1.58	0.47
Sichuan, China	0.13	2.65	1.90	0.02	0.26	1.48	0.33
Japan	0.09	3.13	1.99	0.07	0.49	2.25	0.81
Myanmar	0.29	2.37	2.16	0.04	0.34	1.82	0.38
Sri Lanka	0.04	3.14	0.75	0.05	0.21	1.15	0.65
Australia	0.08	1.80	0.89	0.05	0.23	1.13	0.45
Germany	0.09	2.63	0.61	0.05	0.25	0.95	0.45
Korea	0.08	2.02	1.36	0.04	0.26	0.89	0.24
Thailand	0.04	2.20	0.66	0.05	0.39	0.84	1.10
Mean value	0.10	2.51	1.48	0.04	0.30	1.65	0.56