Soil properties	L-A	M-A	H-A
pH	4.36±0.14^{ab}	4.05±0.04^{b}	4.53±0.05^{a}
SOM（g/kg）	21.23±3.40^{b}	33.87±3.82^{a}	25.13±0.75^{ab}
TN（g/kg）	1.06±0.12^{a}	1.12±0.09^{a}	1.22±0.02^{a}
TP（mg/kg）	0.73±0.19^{a}	0.61±0.05^{a}	0.20±0.18^{b}
TK（mg/kg）	12.27±1.39^{a}	8.05±0.62^{b}	5.98±0.40^{b}
Catalase(ml/g)	2.99±0.27^{ab}	2.05±0.37^{b}	3.44±0.27^{a}
Acid Phosphatase(mg/kg)	384.40±33.45^{c}	812.39±17.43^{a}	608.61±57.52^{b}
Urease(mg/kg)	535.58±129.93^{a}	301.27±67.04^{a}	420.31±54.33^{a}

Table S1: Soil chemical properties at three different altitudes. L-A, Low Altitude, M-A, Middle Altitude, H-A, High Altitude. (mean ± standard error, n=4).

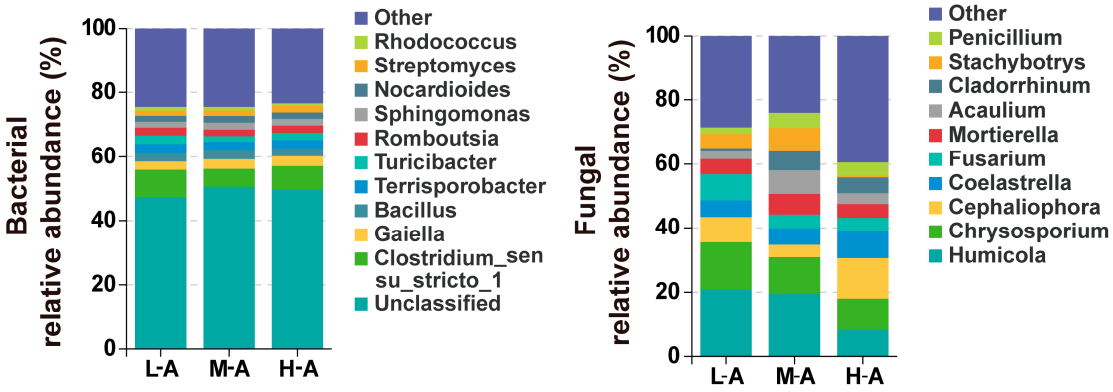

Figure S1: The relative abundance of the bacterial and fungal community at the genus level (n=3). L-A, Low Altitude, M-A, Middle Altitude, H-A, High Altitude.

	pH	SOM	TN	TP	TK	Catalase	Acid Phosphatase	Urease
Theanine	-0.12	-0.38	-0.47	0.64	**0.92****	-0.11	-0.64	0.32
Caffeine	-0.44	-0.05	-0.64	**0.86****	**0.79***	-0.43	-0.12	0.21
Catechin	**-0.73***	0.36	-0.31	**0.96****	0.53	**-0.68***	0.16	-0.13
Theanine/ Caffeine	-0.04	-0.42	-0.33	0.52	**0.86****	-0.02	**-0.74***	0.28
Theanine/ Catechin	0.01	-0.48	-0.47	0.54	**0.92****	-0.01	**-0.73***	0.37

Table S2: Correlation analysis of major components in tea with soil chemical properties. Bold indicates a strong correlation.

Microbial diversity index	pH	SOM	TN	TP	TK	Catalase	Acid Phosphatase	Urease
Bacterial richness	-0.23	-0.15	-0.28	0.03	0.35	-0.30	-0.37	-0.03
Fungal Shannon diversity	-0.15	0.17	0.13	0.22	-0.23	-0.20	0.43	0.12
Fungal richness	0.07	-0.38	-0.15	0.34	**0.73***	-0.07	-0.65	0.23
Fungal Shannon diversity	-0.17	0.23	0.33	-0.29	-0.45	0.00	0.10	-0.53

Table S3: Correlation analysis between soil microbial diversity and Soil chemical properties.Bold indicates a strong correlation.

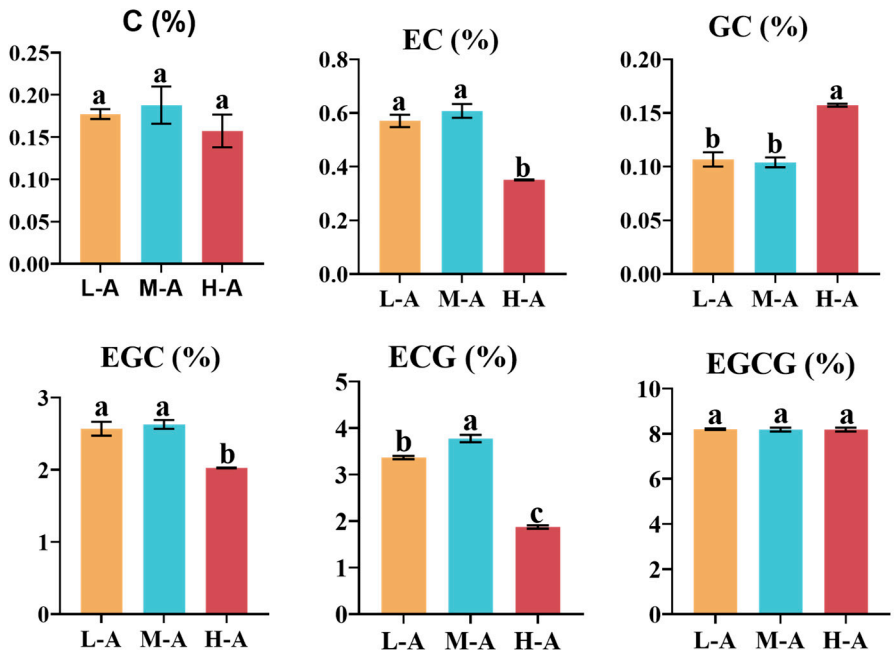

Figure S2: Composition of catechins in tea leaves. The data represent means ± standard error (n=3). Letters denote statistically significant differences between seasons ($p < 0.05$).C; catechin, EC; epicatechin, GC; gallocatechin, EGC; epigallocatechin, ECG, epicatechin-3-gallate, EGCG; epigallocatechin gallate.