Table S1. The data employed for multivariate analysis.

Number	Region	Phe g/100 g	Met g/100 g	Lys g/100 g	Thr g/100 g	Leu g/100 g	Ile g/100 g	Val g/100 g	Asp g/100 g	Ser g/100 g	Glu g/100 g	Pro g/100 g	Gly g/100 g	Ala g/100g	His g/100 g	Arg g/100 g	Cys g/100 g	Tyr g/100 g
1	Lhasa	1.00	0.73	2.33	1.18	2.12	1.23	1.29	2.46	0.99	3.81	0.87	1.12	1.49	1.03	1.68	0.24	0.84
2	Lhasa	0.98	0.71	2.28	1.16	2.08	1.18	1.24	2.40	0.98	3.69	0.86	1.06	1.44	1.01	1.62	0.23	0.84
3	Lhasa	0.87	0.60	2.05	1.04	1.84	1.03	1.11	2.12	0.88	3.32	0.78	0.97	1.30	0.90	1.45	0.23	0.69
4	Lhasa	0.89	0.44	2.08	1.05	1.89	1.06	1.12	2.16	0.87	3.40	0.76	1.00	1.35	0.85	1.46	0.23	0.72
5	Lhasa	0.99	0.47	2.28	1.19	2.09	1.18	1.32	2.43	1.00	3.62	0.92	1.18	1.55	1.05	1.60	0.25	0.78
6	Lhasa	0.88	0.59	2.01	1.04	1.84	1.03	1.12	2.15	0.89	3.35	0.93	1.28	1.43	0.84	1.52	0.23	0.71
7	Lhasa	1.06	0.74	2.45	1.27	2.21	1.24	1.36	2.57	1.12	3.97	1.01	1.32	1.63	1.09	1.81	0.29	0.86
8	Lhasa	1.08	0.76	2.48	1.29	2.25	1.27	1.37	2.64	1.12	4.00	0.96	1.17	1.59	1.11	1.78	0.27	0.89
9	Lhasa	0.97	0.66	2.25	1.15	2.02	1.12	1.21	2.32	0.98	3.61	0.93	1.18	1.48	1.01	1.63	0.26	0.77
10	Lhasa	1.01	0.71	2.34	1.19	2.11	1.19	1.25	2.45	0.99	3.79	0.90	1.11	1.48	1.06	1.65	0.22	0.84
11	Lhasa	0.96	0.66	2.21	1.11	1.98	1.14	1.20	2.33	0.93	3.60	0.83	1.03	1.39	0.97	1.57	0.17	0.78
12	Lhasa	1.17	0.81	2.74	1.37	2.48	1.45	1.49	2.83	1.14	4.32	0.99	1.24	1.69	1.22	1.95	0.21	1.02
13	Lhasa	0.90	0.66	2.12	1.07	1.93	1.12	1.15	2.21	0.90	3.43	0.77	0.98	1.33	0.91	1.50	0.20	0.77
14	Lhasa	0.94	0.68	2.24	1.13	2.02	1.18	1.22	2.34	0.95	3.62	0.82	1.04	1.40	0.97	1.56	0.16	0.82
15	Lhasa	1.00	0.73	2.34	1.16	2.12	1.23	1.25	2.41	0.97	3.79	0.86	1.06	1.45	1.04	1.62	0.20	0.85
16	Lhasa	0.95	0.70	2.25	1.13	2.04	1.17	1.18	2.33	0.94	3.69	0.82	1.02	1.39	0.97	1.57	0.19	0.83
17	Lhasa	0.88	0.62	2.06	1.04	1.86	1.08	1.12	2.15	0.87	3.26	0.77	0.96	1.29	0.87	1.45	0.18	0.76
18	Lhasa	0.83	0.57	1.96	0.98	1.76	1.02	1.03	2.02	0.82	3.25	0.75	0.97	1.22	0.80	1.40	0.19	0.72
19	Lhasa	0.89	0.64	2.10	1.05	1.90	1.11	1.12	2.17	0.87	3.39	0.78	0.96	1.30	0.71	1.47	0.16	0.76
20	Shannan	0.83	0.61	1.98	1.01	1.84	1.02	1.05	2.06	0.82	3.17	0.76	0.94	1.31	0.83	1.39	0.27	0.67
21	Shannan	0.51	0.27	1.18	0.60	1.08	0.60	0.62	1.16	0.52	1.88	0.51	0.69	0.81	0.50	0.86	0.15	0.35
22	Shannan	0.80	0.34	1.88	0.94	1.74	0.97	0.98	1.89	0.78	2.98	0.71	0.88	1.23	0.79	1.30	0.22	0.58

23	Shannan	0.81	0.55	1.90	0.96	1.76	0.98	1.02	1.90	0.82	3.02	0.77	0.99	1.29	0.84	1.36	0.25	0.59
24	Shannan	0.85	0.39	1.99	1.00	1.86	1.05	1.03	2.03	0.84	3.24	0.77	0.97	1.31	0.73	1.40	0.23	0.65
25	Shannan	0.89	0.64	2.08	1.06	1.92	1.08	1.11	2.19	0.88	3.37	0.77	0.97	1.36	0.96	1.45	0.26	0.67
26	Shannan	0.86	0.53	1.98	1.00	1.83	1.04	1.05	2.08	0.83	3.19	0.75	0.95	1.31	0.75	1.37	0.26	0.63
27	Shannan	0.88	0.66	2.06	1.04	1.93	1.09	1.09	2.15	0.85	3.28	0.78	0.96	1.36	0.85	1.45	0.24	0.74
28	Shannan	0.90	0.51	2.12	1.06	1.94	1.10	1.10	2.20	0.88	3.39	0.78	0.97	1.38	0.87	1.45	0.26	0.67
29	Shannan	0.86	0.59	2.00	1.01	1.85	1.06	1.06	2.07	0.86	3.09	0.77	0.94	1.28	0.81	1.40	0.23	0.68
30	Shannan	1.05	0.70	2.43	1.22	2.24	1.26	1.30	2.53	1.05	3.86	0.93	1.15	1.57	0.95	1.69	0.32	0.85
31	Shannan	0.79	0.29	1.84	0.93	1.71	0.97	0.95	1.91	0.77	2.92	0.71	0.87	1.19	0.71	1.27	0.22	0.58
32	Shannan	0.79	0.36	1.86	0.92	1.71	0.97	0.95	1.91	0.76	2.96	0.70	0.86	1.19	0.67	1.31	0.21	0.59
33	Shannan	0.88	0.63	2.01	1.02	1.89	1.07	1.07	2.12	0.84	3.25	0.80	1.01	1.34	0.82	1.44	0.23	0.70
34	Shannan	0.96	0.67	2.20	1.11	2.05	1.16	1.14	2.31	0.93	3.54	0.91	1.18	1.45	0.86	1.60	0.22	0.77
35	Shannan	0.90	0.48	2.07	1.05	1.94	1.10	1.10	2.20	0.88	3.36	0.84	1.05	1.39	0.84	1.49	0.25	0.70
36	Shannan	0.93	0.44	2.09	1.07	1.96	1.12	1.13	2.22	0.86	3.33	0.82	1.01	1.39	0.82	1.46	0.26	0.67
37	Shannan	0.89	0.63	2.04	1.04	1.90	1.09	1.12	2.16	0.87	3.28	0.80	0.99	1.37	0.86	1.46	0.22	0.68
38	Shannan	0.88	0.63	2.00	1.00	1.87	1.06	1.05	2.09	0.82	3.27	0.81	1.02	1.33	0.75	1.47	0.22	0.70
39	Shannan	0.89	0.43	2.03	0.99	1.84	1.05	1.02	2.07	0.82	3.29	0.79	0.97	1.30	0.73	1.42	0.23	0.65
40	Shannan	0.83	0.38	1.90	0.96	1.77	1.01	0.99	2.02	0.80	3.14	0.72	0.87	1.23	0.70	1.34	0.23	0.61
41	Shannan	0.84	0.59	1.93	0.97	1.79	1.04	1.06	2.01	0.79	3.04	0.74	0.90	1.27	0.72	1.36	0.26	0.65
42	Shannan	0.83	0.60	1.99	0.99	1.90	1.06	1.08	2.05	0.83	3.25	0.79	1.00	1.33	0.74	1.44	0.29	0.69
43	Shannan	0.83	0.33	1.97	0.97	1.87	1.05	1.04	1.99	0.81	3.17	0.77	0.96	1.29	0.70	1.38	0.25	0.64
44	Shannan	0.95	0.68	2.19	1.11	2.08	1.16	1.15	2.30	0.93	3.66	0.87	1.11	1.45	0.82	1.60	0.25	0.79
45	Shannan	0.81	0.50	1.87	0.93	1.78	0.98	0.98	1.91	0.79	3.05	0.80	1.01	1.25	0.68	1.37	0.26	0.63
46	Shannan	0.86	0.55	2.01	1.00	1.93	1.07	1.07	2.06	0.83	3.26	0.81	1.03	1.34	0.82	1.45	0.29	0.70
47	Linzhi	0.90	0.66	2.22	1.10	2.04	1.17	1.25	2.29	0.94	3.60	0.84	1.02	1.38	0.91	1.60	0.19	0.82
48	Linzhi	0.97	0.63	2.27	1.11	2.09	1.18	1.24	2.28	0.94	3.66	0.88	1.05	1.40	0.83	1.62	0.23	0.86

49	Linzhi	1.01	0.71	2.57	1.25	2.33	1.33	1.40	2.56	1.05	4.09	0.94	1.12	1.54	1.02	1.82	0.22	0.97
50	Linzhi	0.91	0.69	2.27	1.12	2.11	1.19	1.25	2.28	0.94	3.68	0.82	0.98	1.37	0.87	1.66	0.23	0.85
51	Linzhi	0.92	0.66	2.22	1.10	2.04	1.16	1.21	2.22	0.93	3.62	0.85	1.02	1.37	0.80	1.61	0.23	0.81
52	Linzhi	1.04	0.75	2.56	1.27	2.37	1.36	1.41	2.55	1.08	4.11	0.99	1.19	1.57	0.95	1.85	0.25	0.96
53	Linzhi	0.91	0.66	2.27	1.10	2.08	1.18	1.21	2.24	0.93	3.64	0.83	0.98	1.37	0.77	1.60	0.20	0.82
54	Linzhi	1.03	0.45	2.53	1.23	2.33	1.32	1.39	2.51	1.04	3.99	0.93	1.13	1.54	1.01	1.73	0.23	0.89
55	Linzhi	0.96	0.65	2.41	1.16	2.18	1.25	1.32	2.34	0.98	3.78	0.88	1.05	1.46	1.00	1.68	0.25	0.89
56	Linzhi	1.03	0.57	2.06	1.00	1.87	1.07	1.09	2.00	0.87	3.40	0.82	0.94	1.25	0.66	1.49	0.20	0.78
57	Linzhi	0.96	0.55	1.82	0.90	1.68	0.96	1.01	1.87	0.80	3.01	0.95	1.23	1.26	0.62	1.44	0.20	0.70
58	Linzhi	1.05	0.58	2.06	1.00	1.84	1.05	1.09	2.05	0.89	3.34	0.85	0.98	1.23	0.69	1.47	0.24	0.77
59	Linzhi	1.35	0.64	2.61	1.30	2.44	1.36	1.41	2.66	1.12	4.37	1.05	1.27	1.62	0.82	1.79	0.26	0.90
60	Linzhi	1.06	0.72	2.47	1.22	2.30	1.30	1.37	2.49	1.02	4.02	0.97	1.12	1.54	0.75	1.78	0.27	0.96
61	Linzhi	0.97	0.41	2.32	1.13	2.12	1.19	1.26	2.32	0.95	3.78	0.84	0.97	1.39	0.80	1.62	0.21	0.83
62	Linzhi	1.03	0.73	2.53	1.22	2.31	1.31	1.37	2.52	1.01	4.04	0.95	1.09	1.54	0.89	1.81	0.25	0.99
63	Linzhi	0.94	0.67	2.30	1.11	2.08	1.19	1.27	2.29	0.94	3.65	0.88	1.06	1.43	0.81	1.62	0.21	0.88
64	Linzhi	1.00	0.69	2.39	1.16	2.20	1.23	1.28	2.40	0.98	3.78	0.91	1.08	1.45	0.84	1.70	0.25	0.94
65	Linzhi	0.88	0.67	2.13	1.06	1.99	1.12	1.19	2.17	0.89	3.47	0.80	0.96	1.34	0.89	1.53	0.21	0.83
66	Linzhi	0.93	0.45	2.23	1.08	2.08	1.16	1.20	2.25	0.92	3.66	0.89	1.09	1.40	0.85	1.59	0.23	0.82
67	Linzhi	0.85	0.64	2.06	1.02	1.91	1.08	1.13	2.09	0.85	3.32	0.80	0.95	1.29	0.86	1.48	0.23	0.81
68	Linzhi	0.91	0.68	2.19	1.10	2.01	1.13	1.23	2.24	0.92	3.59	0.83	1.04	1.40	0.86	1.57	0.25	0.84
69	Linzhi	0.95	0.70	2.30	1.12	2.11	1.17	1.21	2.29	0.93	3.69	0.89	1.05	1.39	0.86	1.63	0.26	0.89
70	Linzhi	0.93	0.68	2.24	1.10	2.08	1.15	1.19	2.26	0.92	3.62	0.87	1.06	1.39	0.84	1.57	0.23	0.88
71	Linzhi	0.84	0.59	2.01	0.99	1.83	1.03	1.09	2.03	0.85	3.17	0.80	0.95	1.24	0.73	1.42	0.19	0.80
72	Linzhi	0.89	0.63	2.13	1.05	1.96	1.11	1.18	2.17	0.90	3.38	0.83	1.01	1.34	0.75	1.55	0.21	0.86
73	Linzhi	0.92	0.64	2.21	1.08	2.01	1.16	1.24	2.22	0.92	3.44	0.86	1.03	1.38	0.79	1.56	0.22	0.87
74	Xigaze	0.90	0.36	2.14	1.06	2.03	1.13	1.13	2.17	0.88	3.51	0.82	1.04	1.40	0.84	1.53	0.27	0.72

75	Xigaze	0.87	0.58	2.09	1.03	1.99	1.11	1.13	2.13	0.87	3.35	0.82	1.04	1.39	0.84	1.51	0.29	0.73
76	Xigaze	0.88	0.38	2.09	1.02	1.95	1.09	1.10	2.07	0.87	3.32	0.79	0.99	1.36	0.73	1.47	0.28	0.65
77	Xigaze	0.88	0.41	2.09	1.01	1.99	1.11	1.10	2.09	0.85	3.30	0.80	1.01	1.37	0.82	1.48	0.25	0.71
78	Xigaze	0.87	0.36	2.12	1.03	2.01	1.13	1.11	2.16	0.86	3.33	0.80	0.99	1.36	0.96	1.50	0.23	0.72
79	Xigaze	0.88	0.62	2.16	1.06	2.03	1.13	1.15	2.22	0.88	3.35	0.81	1.01	1.39	1.03	1.54	0.23	0.80
80	Xigaze	0.93	0.68	2.27	1.13	2.13	1.19	1.20	2.36	0.95	3.69	0.86	1.07	1.47	0.91	1.62	0.21	0.82
81	Xigaze	0.84	0.61	2.06	1.01	1.92	1.07	1.07	2.11	0.85	3.32	0.77	0.93	1.31	0.84	1.46	0.23	0.72
82	Xigaze	0.84	0.57	1.98	0.98	1.87	1.04	1.03	2.03	0.82	3.13	0.77	0.95	1.29	0.73	1.44	0.23	0.73
83	Xigaze	0.86	0.41	2.08	1.03	1.98	1.09	1.06	2.13	0.85	3.44	0.80	0.97	1.33	0.65	1.50	0.24	0.73
84	Xigaze	0.87	0.38	2.11	1.03	1.98	1.10	1.09	2.10	0.85	3.33	0.81	1.00	1.35	0.78	1.49	0.25	0.71
85	Xigaze	0.79	0.48	1.89	0.97	1.78	0.99	1.03	1.95	0.85	3.15	0.77	0.97	1.27	0.62	1.41	0.28	0.67
86	Xigaze	0.76	0.26	1.84	0.91	1.74	0.97	0.97	1.85	0.75	2.90	0.72	0.88	1.20	0.81	1.30	0.22	0.61
87	Xigaze	0.83	0.36	1.99	0.99	1.88	1.04	1.02	2.02	0.84	3.24	0.80	0.98	1.27	0.65	1.45	0.26	0.71
88	Xigaze	0.88	0.58	2.10	1.04	1.97	1.11	1.13	2.15	0.87	3.32	0.83	1.00	1.35	0.85	1.50	0.27	0.75
89	Xigaze	0.86	0.61	2.08	1.03	1.94	1.07	1.11	2.14	0.85	3.23	0.82	1.01	1.35	0.94	1.49	0.25	0.72

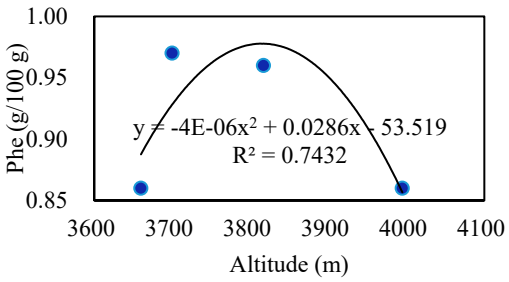
Table S2. Composition and concentrations of seventeen amino acids in Tibetan chicken from different cities. Values are means±SD.

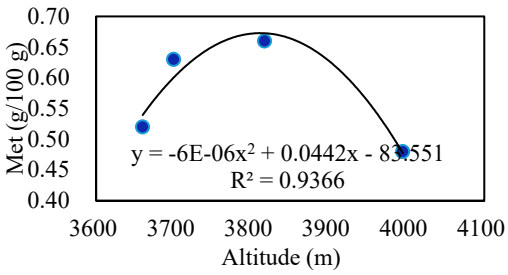
Amino acids	All cities	Lhasa	Shannan	Linzhi	Xigaze
Phe (g/100 g)	0.91±0.10	0.96±0.08^{a}	0.85±0.09^{b}	0.97±0.10^{a}	0.86±0.04^{b}
Met (g/100 g)	0.57±0.13	0.66±0.09^{a}	0.52±0.13^{b}	0.63±0.08^{a}	0.48±0.13^{b}
Lys (g/100 g)	2.14±0.22	2.24±0.19^{a}	1.98±0.20^{b}	2.27±0.19^{a}	2.07±0.10^{b}
Thr (g/100 g)	1.07±0.11	1.14±0.10^{a}	1.00±0.10^{b}	1.11±0.09^{a}	1.02±0.05^{b}
Leu (g/100 g)	1.98±0.19	2.03±0.17^{ab}	1.85±0.19^{c}	2.09±0.18^{a}	1.95±0.10^{bc}
Ile (g/100 g)	1.12±0.11	1.16±0.10^{a}	1.04±0.11^{b}	1.18±0.10^{a}	1.09±0.06^{b}
Val (g/100 g)	1.15±0.13	1.22±0.11^{a}	1.05±0.11^{b}	1.24±0.11^{a}	1.09±0.06^{b}
Asp (g/100 g)	2.19±0.22	2.34±0.20^{a}	2.05±0.23^{b}	2.28±0.19^{a}	2.10±0.11^{b}
Ser (g/100 g)	0.90±0.09	0.96±0.09^{a}	0.83±0.09^{b}	0.94±0.07^{a}	0.85±0.04^{b}
Glu (g/100 g)	3.45±0.36	3.63±0.28^{a}	3.19±0.33^{b}	3.66±0.31^{a}	3.31±0.17^{b}
Pro (g/100 g)	0.83±0.08	0.86±0.08^{a}	0.78±0.08^{b}	0.88±0.06^{a}	0.80±0.03^{b}
Gly (g/100 g)	1.02±0.10	1.09±0.11^{a}	0.97±0.10^{b}	1.05±0.08^{a}	0.99±0.04^{b}
Ala (g/100 g)	1.37±0.12	1.43±0.12^{a}	1.31±0.13^{c}	1.40±0.11^{ab}	1.34±0.06^{bc}
His (g/100 g)	0.84±0.13	0.97±0.12^{a}	0.78±0.10^{b}	0.83±0.10^{b}	0.81±0.12^{b}
Arg (g/100 g)	1.52±0.15	1.60±0.14^{a}	1.41±0.14^{b}	1.62±0.12^{a}	1.47±0.07^{b}
Cys (g/100 g)	0.23±0.03	0.22±0.04^{c}	0.24±0.03^{ab}	0.23±0.02^{bc}	0.25±0.02^{a}
Tyr (g/100 g)	0.76±0.11	0.80±0.08^{b}	0.66±0.09^{d}	0.86±0.07^{a}	0.72±0.05^{c}
EAA (g/100 g)	8.94±0.94	9.40±0.82^{a}	8.30±0.90^{b}	9.50±0.76^{a}	8.55±0.46^{b}
FAA (g/100 g)	11.43±1.13	12.07±0.99^{a}	10.65±1.11^{b}	12.05±0.89^{a}	10.97±0.53^{b}
TAA (g/100 g)	22.06±2.22	23.28±1.99^{a}	20.53±2.16^{b}	23.26±1.77^{a}	21.20±1.07^{b}

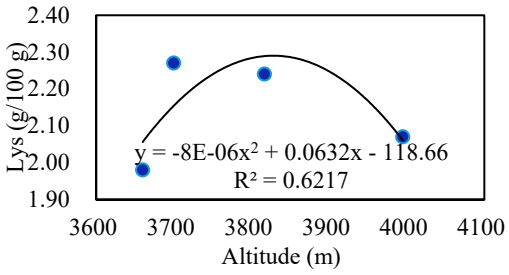
Note: the letters without common are significantly different ($p < 0.05$). FAA: flavor amino acids; EAA: essential amino acids; TAA: total amino acids.

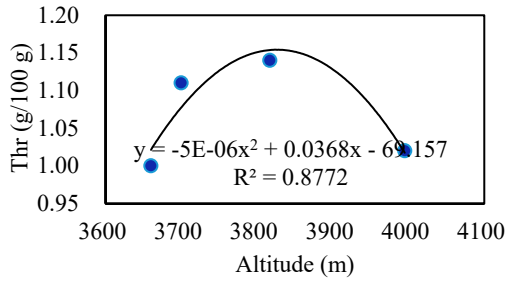
Table S3. Comparision of amino acids with the amino acid pattern profile recommended by the World Health Organization and the Food and Agriculture Organization of the United Nations (WHO/FAO).

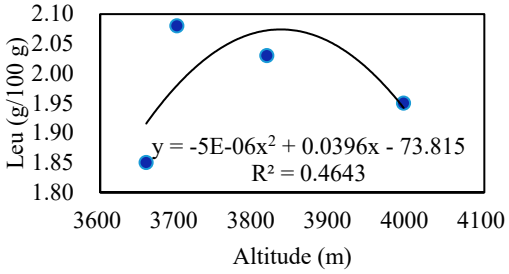
Amino acids	Recommended value by WHO/FAO	Lhasa	Shannan	Linzhi	Xigaze
(Phe+Tyr)/TAA (%)	6.00	7.57±0.14	7.37±0.14	7.86±0.29	7.44±0.10
(Met+Cys)/TAA (%)	3.50	3.73±0.27	3.67±0.50	3.70±0.37	3.42±0.52
Lys/TAA (%)	5.50	9.62±0.14	9.67±0.14	9.77±0.18	9.75±0.11
Thr/TAA (%)	4.00	4.88±0.04	4.86±0.06	4.79±0.07	4.82±0.05
Leu/TAA (%)	7.00	8.71±0.12	9.01±0.12	8.97±0.16	9.19±0.13
Ile/TAA (%)	4.00	4.98±0.13	5.09±0.08	5.08±0.08	5.13±0.08
Val/TAA (%)	5.00	5.23±0.10	5.11±0.08	5.33±0.11	5.13±0.07
EAA/TAA (%)	40.00	40.37±0.52	40.40±0.33	40.83±0.36	40.31±0.29
FAA/TAA (%)	—	51.84±0.44	51.92±0.40	51.82±0.67	51.75±0.50

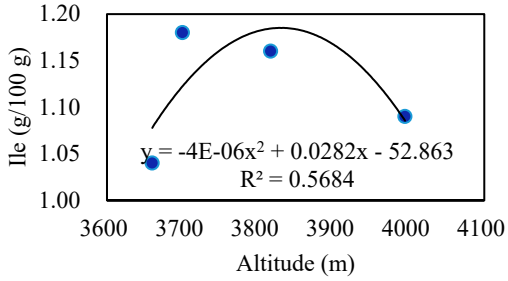

Phe (g/100 g)
y = -4E-06x² + 0.0286x - 53.519
R² = 0.7432
Altitude (m)

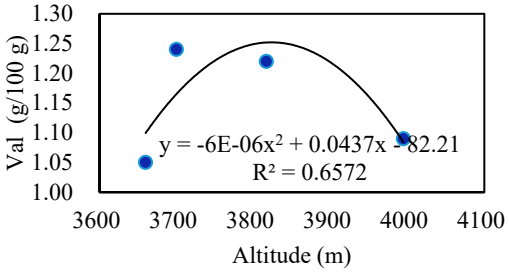

Met (g/100 g)
y = -6E-06x² + 0.0442x - 83.551
R² = 0.9366
Altitude (m)

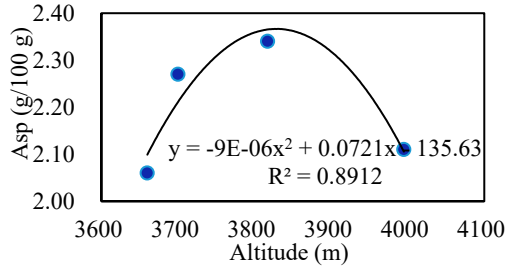

Lys (g/100 g)
y = -8E-06x² + 0.0632x - 118.66
R² = 0.6217
Altitude (m)

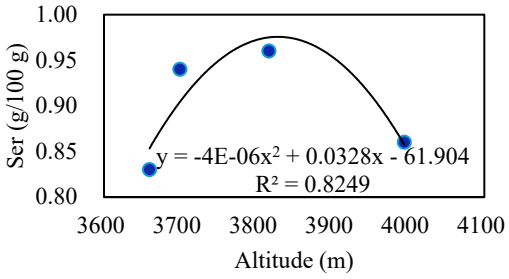

Thr (g/100 g)
y = -5E-06x² + 0.0368x - 69.157
R² = 0.8772
Altitude (m)

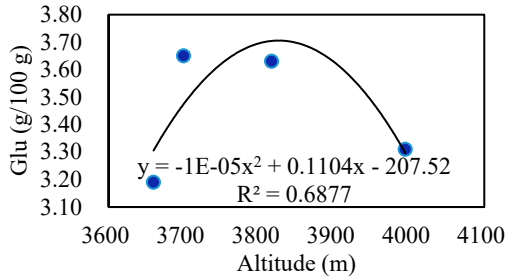

Leu (g/100 g)
y = -5E-06x² + 0.0396x - 73.815
R² = 0.4643
Altitude (m)

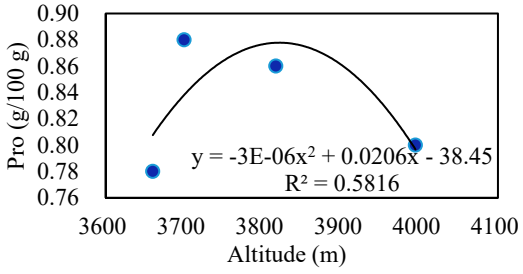

Ile (g/100 g)
y = -4E-06x² + 0.0282x - 52.863
R² = 0.5684
Altitude (m)

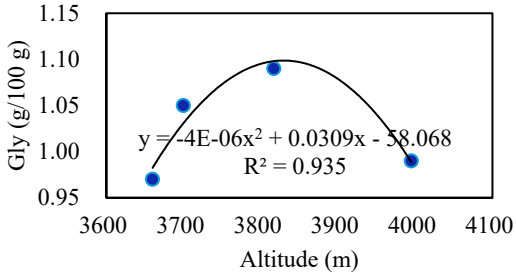

Val (g/100 g)
y = -6E-06x² + 0.0437x - 82.21
R² = 0.6572
Altitude (m)


Asp (g/100 g)
y = -9E-06x² + 0.0721x - 135.63
R² = 0.8912
Altitude (m)


Ser (g/100 g)
y = -4E-06x² + 0.0328x - 61.904
R² = 0.8249
Altitude (m)


Glu (g/100 g)
y = -1E-05x² + 0.1104x - 207.52
R² = 0.6877
Altitude (m)


Pro (g/100 g)
y = -3E-06x² + 0.0206x - 38.45
R² = 0.5816
Altitude (m)


Gly (g/100 g)
y = -4E-06x² + 0.0309x - 58.068
R² = 0.935
Altitude (m)

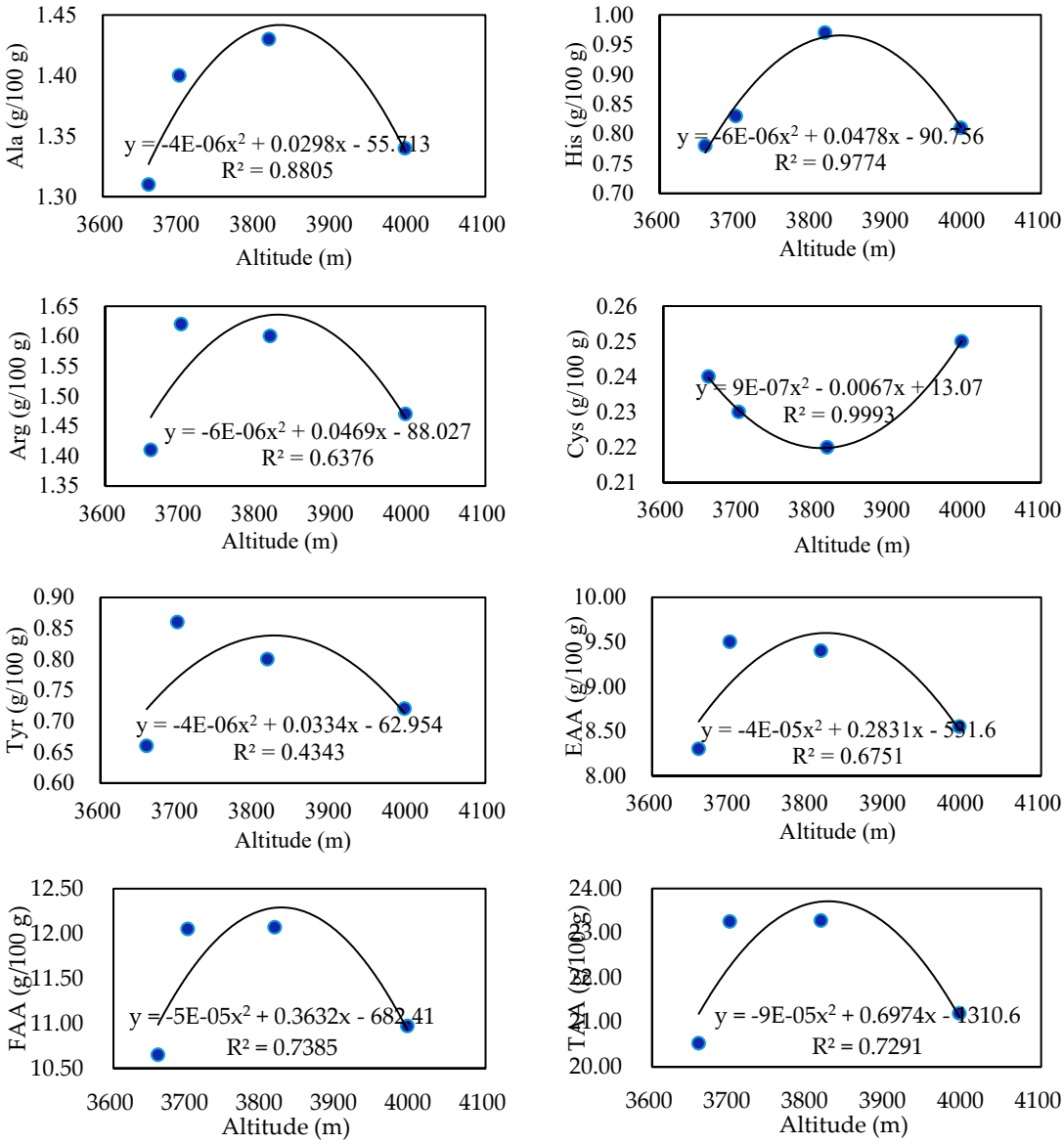


Figure S1. Relationship between means amino acids concentration and altitude of different cities