Supporting information

Protein amino acids in fine and coarse atmospheric aerosol: concentrations, compositions, sources and possible bacterial degradation state

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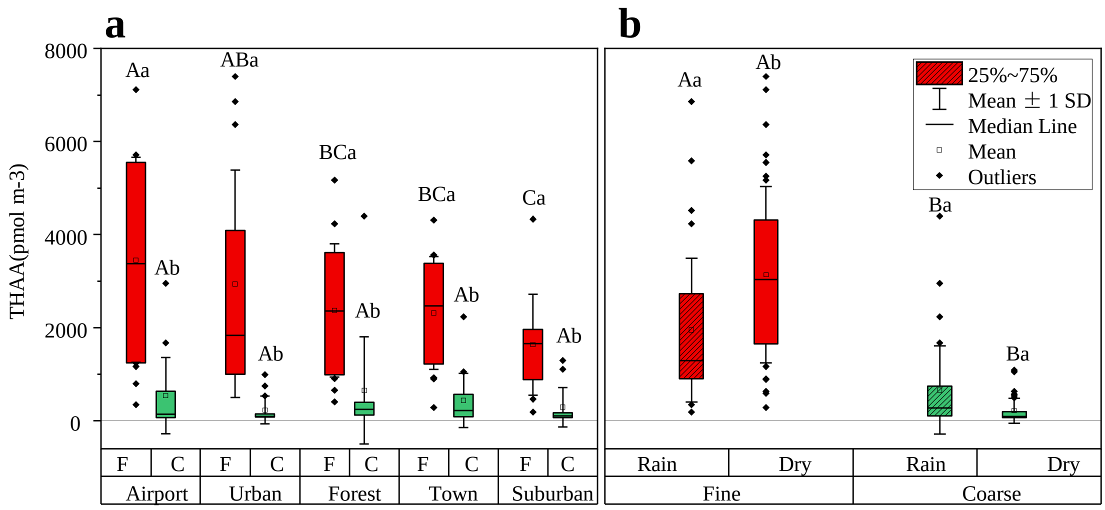

Figure S1. Concentrations of THAA for fine and coarse particles in airport, urban, forest, town and suburban sites (a) and Concentrations of THAA for fine and coarse particles on rainy and dry days(b). Red box indicates fine particles and blue box indicates coarse particles. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. In a, different uppercase letters denote means found to be statistically different between sites and different lower case letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, $p < 0.05$). In b, different uppercase letters denote means found to be statistically different between fine and coarse particles and different lower case letters denote means found to be statistically different between rainy and dry days (two-way ANOVA, $p < 0.05$). In order to make graph more visual clarity, a zero-line were added.

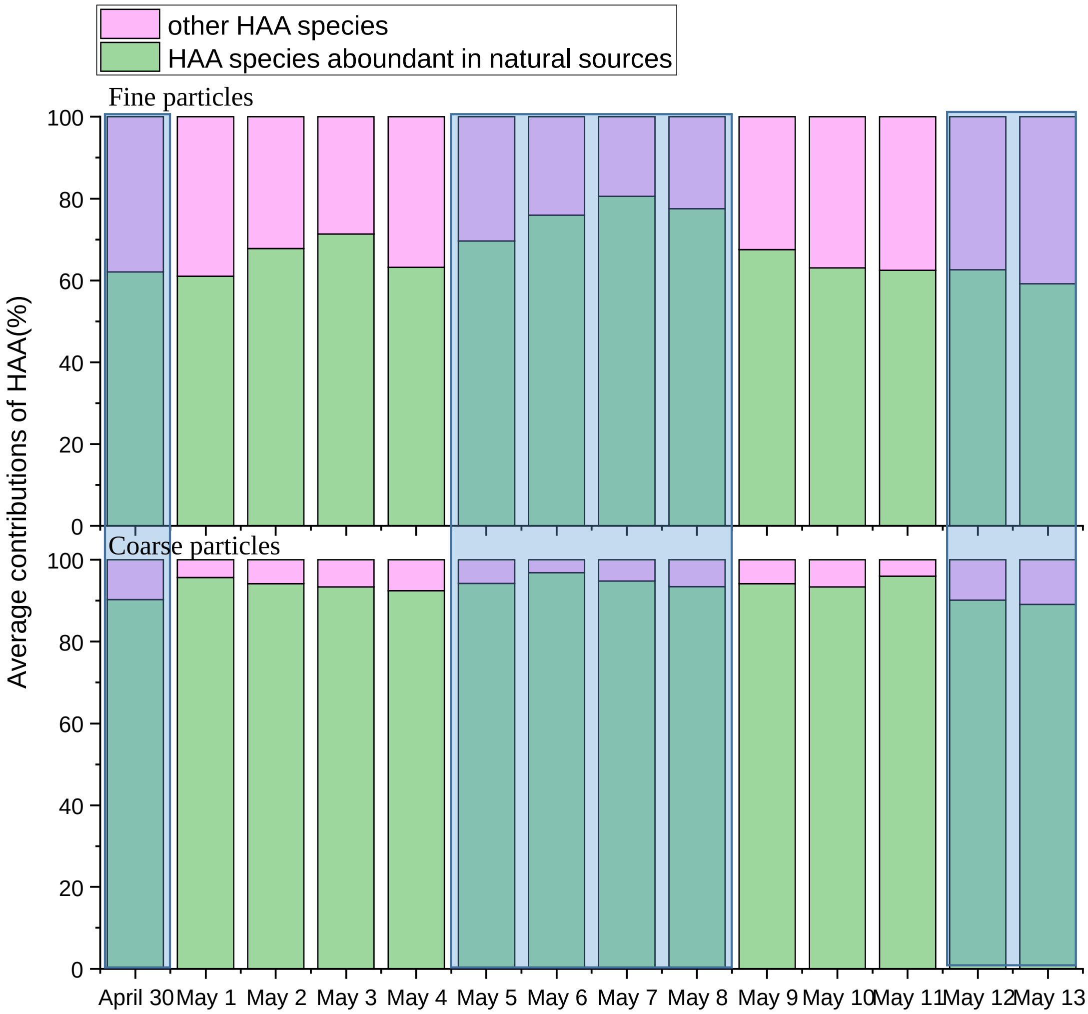

Figure S2. Average contributions of HAA species with high abundance in natural sources (hydrophobic (Ala, Val, Leu, and Ile), neutral (Pro) and hydrophilic (Glu, Lys, and Asp)) to total HAAs during 14 consecutive sampling days.

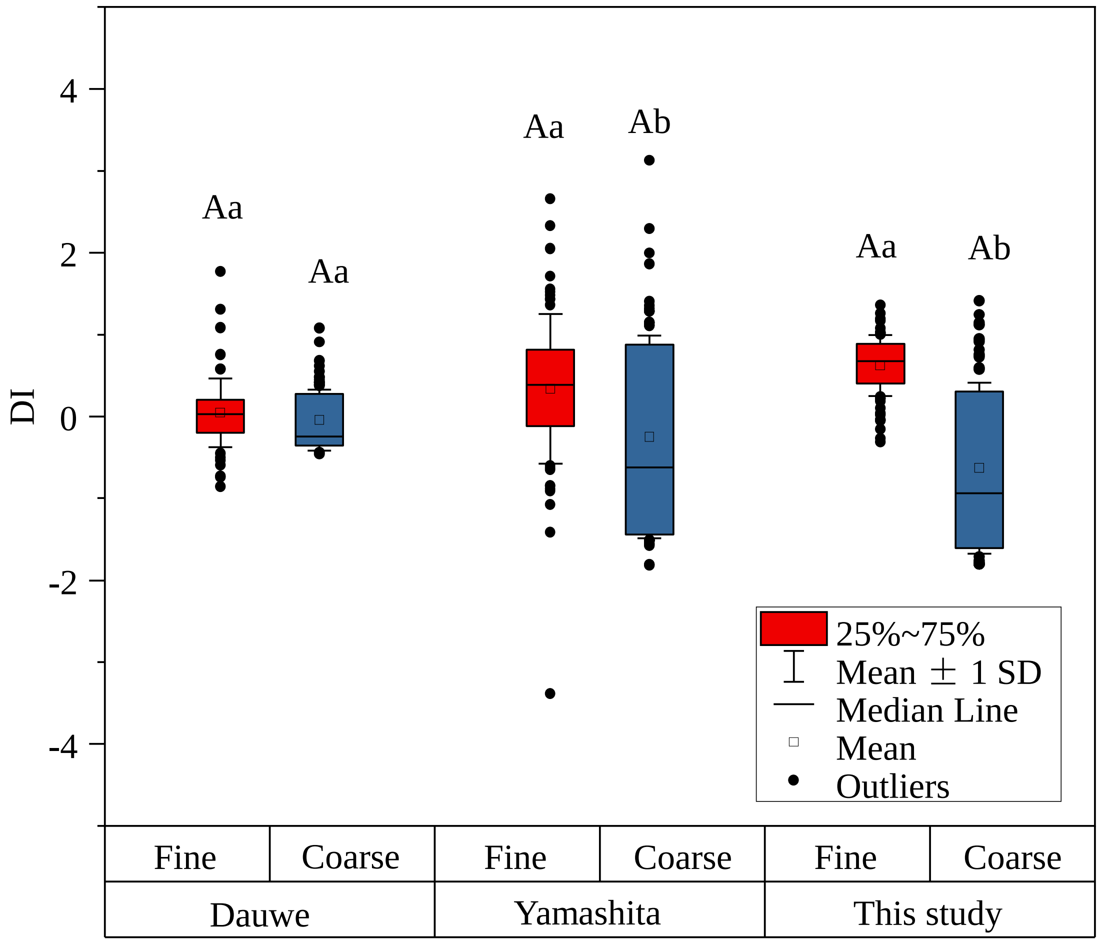

Figure S3. Comparison of DI values obtained by principal component analysis (this study) with those calculated by using the coefficients reported by Dauwe et al., 1999 and Yamashia and Tanoue, 2003. Red box indicates fine particles and blue box indicates coarse particles. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. Identical uppercase letters denote DI means found to be not statistically different between different calculating methods and different lower case letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, $p < 0.05$).

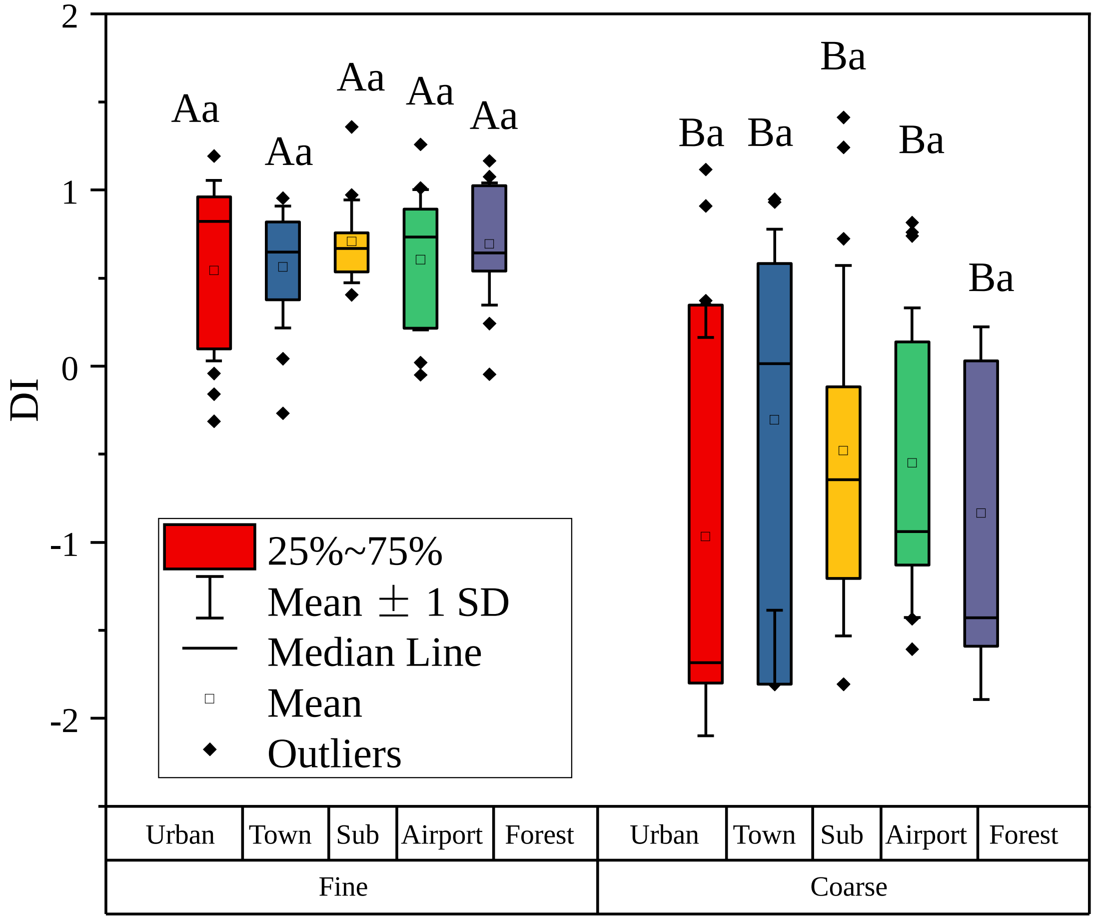

Figure S4. DI values for fine and coarse particles in urban, town, suburban airport and forest sites. The box encloses 50% of the data, the whisker is standard deviation of the data, the horizontal bar is the median, solid circles are outliers. Different uppercase letters denote means found to be statistically different between fine and coarse particles (two-way ANOVA, Tukey-HSD test, $p < 0.05$). Identical lower case letters denote means found to be not statistically different between sites.

Table S1. Result of principal component analysis. For each PC with an eigenvalue >1, eigenvalues, percent of variation explained (%), cumulative variation explained (Cumulative%) are listed.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.360	38.286	38.286	5.360	38.286	38.286
2	2.926	20.899	59.185	2.926	20.899	59.185
3	1.335	9.534	68.719	1.335	9.534	68.719
4	1.074	7.670	76.388	1.074	7.670	76.388
5	.858	6.127	82.515			
6	.732	5.232	87.747			
7	.593	4.233	91.979			
8	.481	3.438	95.417			
9	.304	2.169	97.586			
10	.170	1.211	98.798			
11	.111	.791	99.588			
12	.031	.221	99.810			
13	.027	.190	100.000			
14	-4.620E-16	-3.300E-15	100.000			

Extraction Method: Principal Component Analysis.

Table S2. Result of principal component analysis (PCA). PC loadings (eigenvectors) for each AA are listed.

Component Score Coefficient Matrix

	Component			
	1	2	3	4
Ala	.143	-.138	-.159	-.067
Gly	.087	.105	.175	-.423
Val	.132	-.233	-.038	.072
Leu	.133	-.228	.031	.082
Ile	.138	-.212	.011	.092
Pro	-.180	.001	-.056	.134
Ser	.096	.229	-.185	.133
Thr	.071	.112	-.204	-.295
Phe	.120	.124	-.140	-.102
Asp	.094	.164	-.152	.070
Glu	.137	.180	.074	.016
Lys	.119	.108	.341	.220
His	.023	.053	.636	.160
Tyr	.026	.082	-.205	.718

Extraction Method: Principal Component Analysis.
Component Scores.