

Online Datasets

Dataset S1. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the soy-wheat diet.

Soy-wheat blend (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)				Parameters	
		1	2	3	4	mean	σ
Amino acids	<i>Alanine</i>	-3.83	-5.61	-3.86	-4.31	-4.40	0.84
	<i>Glycine</i>	-3.52	-4.65	-5.30	-4.78	-4.56	0.75
	<i>Valine</i>	-5.22	-5.25	-3.75	-4.70	-4.73	0.70
	<i>Leucine</i>	-2.59	-2.72	-3.07	-2.94	-2.83	0.21
	<i>Isoleucine</i>	-4.45	-4.53	-3.87	-3.60	-4.11	0.45
	<i>Aspartic acid + Threonine</i>	-6.56	-5.35	-4.17	-6.65	-5.68	1.17
	<i>Glutamic acid</i>	-3.83	-4.36	-3.87	-4.50	-4.14	0.34
	<i>Phenylalanine</i>	3.55	2.87	3.40	2.46	3.07	0.50

Dataset S2. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the cranberry leaf diet.

Cranberry leaves (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	5.55	4.37	5.74	5.22	0.74
	<i>Glycine</i>	-1.22	1.48	2.40	0.89	1.88
	<i>Valine</i>	7.70	7.65	7.82	7.72	0.09
	<i>Leucine</i>	9.32	8.77	8.66	8.92	0.36
	<i>Isoleucine</i>	7.55	8.91	7.91	8.12	0.70
	<i>Aspartic acid + Threonine</i>	11.19	11.58	8.75	10.51	1.54
	<i>Glutamic acid</i>	7.70	7.16	7.42	7.43	0.27
	<i>Phenylalanine</i>	15.22	15.69	14.93	15.28	0.38

Dataset S3. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the fall armyworm diet.

Insect (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	4.58	4.85	5.01	4.81	0.22
	<i>Glycine</i>	0.13	-0.08	0.68	0.24	0.39
	<i>Valine</i>	2.27	3.10	3.31	2.89	0.55
	<i>Leucine</i>	2.51	2.38	2.42	2.44	0.07
	<i>Isoleucine</i>	4.67	5.74	4.97	5.13	0.55
	<i>Aspartic acid + Threonine</i>	3.71	3.78	4.27	3.92	0.31
	<i>Glutamic acid</i>	4.74	4.99	5.55	5.09	0.41
	<i>Phenylalanine</i>	4.96	5.87	5.65	5.49	0.47

Dataset S4. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the maple wood diet.

Maple wood (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	-11.18	2.59		-4.30	9.74
	<i>Glycine</i>	-23.83	-8.97	-19.19	-17.33	7.61
	<i>Valine</i>	-9.64	2.31	-13.38	-6.90	8.19
	<i>Leucine</i>	-8.74	1.56	-14.00	-7.06	7.91
	<i>Isoleucine</i>	-14.54	0.84		-6.85	10.87
	<i>Aspartic acid + Threonine</i>		5.14	-2.43	1.35	5.35
	<i>Glutamic acid</i>	-10.94	0.54	-12.39	-7.60	7.09
	<i>Phenylalanine</i>	-2.38	8.37	-3.31	0.89	6.49

Dataset S5. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the birch wood diet.

Birch wood (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	-8.73	-6.58	-12.50	-9.27	3.00
	<i>Glycine</i>	-17.17	-11.21	-17.61	-15.33	3.57
	<i>Valine</i>	-8.13	-5.73	-11.08	-8.31	2.68
	<i>Leucine</i>	-13.27	-7.17	-10.91	-10.45	3.08
	<i>Isoleucine</i>	-7.76			-7.76	
	<i>Aspartic acid + Threonine</i>	-8.46	-7.01	-10.55	-8.67	1.78
	<i>Glutamic acid</i>	-6.89	-6.16	-10.46	-7.84	2.30
	<i>Phenylalanine</i>	1.03	2.70	-1.31	0.81	2.02

Dataset S6. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the shiitake mushroom diet.

Fungus (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	0.85	-0.58	-0.12	0.05	0.73
	<i>Glycine</i>	-3.03	-5.57	-5.97	-4.86	1.59
	<i>Valine</i>	-0.66	-6.04	-6.83	-4.51	3.36
	<i>Leucine</i>	1.80	0.00	0.82	0.87	0.90
	<i>Isoleucine</i>	0.04	0.77	1.07	0.62	0.53
	<i>Aspartic acid + Threonine</i>	3.70	0.89	0.34	1.64	1.80
	<i>Glutamic acid</i>	8.77	3.31	2.64	4.90	3.36
	<i>Phenylalanine</i>	8.68	4.45	4.33	5.82	2.48

Dataset S7. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the growth media used to culture *Streptomyces*.

Growth media (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	-0.55	0.69	0.17	0.10	0.62
	<i>Glycine</i>	-8.93	-7.96	-8.48	-8.45	0.48
	<i>Valine</i>	3.90	3.82	3.97	3.90	0.07
	<i>Leucine</i>	-1.23	-1.11	-1.58	-1.31	0.24
	<i>Isoleucine</i>	4.55	4.00	4.29	4.28	0.28
	<i>Aspartic acid + Threonine</i>	1.09	1.46	1.98	1.51	0.44
	<i>Glutamic acid</i>	5.78	5.53	5.18	5.50	0.30
	<i>Phenylalanine</i>	5.90	6.63	6.29	6.27	0.37

Dataset S8. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the growth media used to culture *E. coli*.

Growth media (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	0.15	-0.10	-0.34	-0.10	0.24
	<i>Glycine</i>	-0.56	-0.33	-0.13	-0.34	0.22
	<i>Valine</i>	2.70	3.67	3.12	3.17	0.49
	<i>Leucine</i>	1.44	1.62	1.72	1.60	0.14
	<i>Isoleucine</i>	3.24	3.32	2.82	3.13	0.27
	<i>Aspartic acid + Threonine</i>	2.32	2.40	2.66	2.46	0.18
	<i>Glutamic acid</i>	6.43	6.53	6.79	6.58	0.18
	<i>Phenylalanine</i>	3.23	3.25	3.23	3.24	0.01

Dataset S9. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the oak leaf diet provisioned to the leaf-cutter ants.

Oak leaves (diet)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>	-11.92	-14.90	-11.09	-11.67	-10.16	-11.95	1.79
	<i>Glycine</i>	-12.62	-17.55	-12.71	-13.76	-14.03	-14.13	2.01
	<i>Valine</i>	-13.52	-13.97	-12.71	-12.81	-15.16	-13.63	1.00
	<i>Leucine</i>	-13.11	-17.55	-12.58	-12.35	-14.57	-14.03	2.15
	<i>Isoleucine</i>	-16.47	-17.39	-12.63	-13.89	-12.83	-14.64	2.17
	<i>Aspartic acid + Threonine</i>	-15.08	-16.69	-13.22	-16.27	-17.44	-15.74	1.65
	<i>Glutamic acid</i>	-14.08	-14.04	-11.47	-14.14	-15.11	-13.77	1.36
	<i>Phenylalanine</i>	-5.20	-7.01	-2.90	-6.63	-5.83	-5.51	1.62

Dataset S10. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from enoki fungi (*Flammulina velutipes*) cultured on the soy-wheat diet.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>	2.22	3.07	2.56	3.20		2.76	0.46
	<i>Glycine</i>	4.88	6.19	4.72	5.88		5.42	0.73
	<i>Valine</i>		2.66	3.76	4.25		3.56	0.81
	<i>Leucine</i>		2.51	2.14	2.68		2.44	0.27
	<i>Isoleucine</i>		0.18	1.74	-1.00		0.31	1.38
	<i>Aspartic acid + Threonine</i>	-1.19	-0.62	-1.59	-2.68		-1.52	0.87
	<i>Glutamic acid</i>	3.54	3.65	3.42	3.58		3.55	0.09
	<i>Phenylalanine</i>	3.27	3.16	3.59	3.74		3.44	0.27

Dataset S11. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the fungus, *Trichoderma viridae*, cultured on the soy-wheat diet.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>		-1.24	-0.92	-1.08	0.23
	<i>Glycine</i>	-2.12	0.21	2.28	0.13	2.20
	<i>Valine</i>		0.37	1.04	0.70	0.48
	<i>Leucine</i>	-3.05	0.57	0.16	-0.78	1.98
	<i>Isoleucine</i>	1.27	0.23	0.43	0.64	0.55
	<i>Aspartic acid + Threonine</i>	3.31	2.29	3.06	2.89	0.53
	<i>Glutamic acid</i>	2.42	1.58	1.26	1.75	0.60
	<i>Phenylalanine</i>	3.49	2.70	3.20	3.13	0.40

Dataset S12. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the fungus, *Leucoagaricus gongylophorus*, cultured on the soy-wheat diet.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>			0.26	0.26	
	<i>Glycine</i>	-11.01	-8.74	-7.46	-9.07	1.80
	<i>Valine</i>					
	<i>Leucine</i>					
	<i>Isoleucine</i>		2.03	-1.82	0.11	2.72
	<i>Aspartic acid + Threonine</i>	5.22	-0.13	1.38	2.16	2.76
	<i>Glutamic acid</i>	3.33	1.46	2.53	2.44	0.94
	<i>Phenylalanine</i>	4.44	2.68	2.78	3.30	0.99

Dataset S13. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from fairy shrimp, *Branchinecta*, cultured on the soy-wheat diet.

Crustacean (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	4.44	4.73	7.84	5.67	1.88
	<i>Glycine</i>	-5.71	-4.96	-3.75	-4.81	0.98
	<i>Valine</i>	3.92	2.69	3.01	3.20	0.64
	<i>Leucine</i>	6.58	2.14	3.86	4.19	2.24
	<i>Isoleucine</i>	15.85	10.27	10.63	12.25	3.13
	<i>Aspartic acid + Threonine</i>	3.92	1.45	4.56	3.31	1.64
	<i>Glutamic acid</i>	3.05	2.77	3.72	3.18	0.49
	<i>Phenylalanine</i>	2.84	4.07	4.16	3.69	0.74

Dataset S14. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from mice, *Mus musculus*, cultured on the soy-wheat diet.

Mammal (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	4.48	5.50	2.75	4.24	1.39
	<i>Glycine</i>	1.42	0.61	2.37	1.47	0.88
	<i>Valine</i>	3.69	1.81	0.34	1.95	1.68
	<i>Leucine</i>	3.97	5.72	2.98	4.22	1.39
	<i>Isoleucine</i>	3.38	3.13	2.79	3.10	0.30
	<i>Aspartic acid + Threonine</i>	-1.43	0.03	2.34	0.31	1.90
	<i>Glutamic acid</i>	4.46	5.06	3.85	4.46	0.61
	<i>Phenylalanine</i>	4.14	4.69	3.38	4.07	0.66

Dataset S15. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from red flour beetles, *Tribolium castaneum*, cultured on the soy-wheat diet.

Insect (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	2.45	1.59	2.27	2.10	0.45
	<i>Glycine</i>	0.69	-0.75	-4.30	-1.45	2.57
	<i>Valine</i>	-0.91	2.41	2.97	1.49	2.10
	<i>Leucine</i>	-2.52	-0.84	0.90	-0.82	1.71
	<i>Isoleucine</i>	6.28	2.81	3.42	4.17	1.85
	<i>Aspartic acid + Threonine</i>	2.66	1.09	1.81	1.85	0.78
	<i>Glutamic acid</i>	1.43	4.59	4.26	3.43	1.74
	<i>Phenylalanine</i>	2.92	4.89	5.16	4.32	1.23

Dataset S16. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the black mold, *Aspergillus niger*, cultured on cranberry leaves.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	11.15	12.47	12.24	11.95	0.71
	<i>Glycine</i>	7.31	11.19	9.58	9.36	1.95
	<i>Valine</i>	11.59	12.43	13.16	12.39	0.78
	<i>Leucine</i>	11.99	12.10	13.99	12.69	1.13
	<i>Isoleucine</i>	11.62	11.27	12.08	11.66	0.40
	<i>Aspartic acid + Threonine</i>	15.50	12.92	13.81	14.08	1.31
	<i>Glutamic acid</i>	15.44	15.89	16.33	15.89	0.44
	<i>Phenylalanine</i>	15.71	14.77	14.96	15.15	0.50

Dataset S17. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the carnivorous fungus, *Beauveria bassiana*, cultured on fall armyworm larvae.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	12.29	5.89	11.15	9.78	3.41
	<i>Glycine</i>	3.22	0.47	3.27	2.32	1.60
	<i>Valine</i>	13.99	7.87	13.13	11.66	3.31
	<i>Leucine</i>	11.16	3.63	7.14	7.31	3.77
	<i>Isoleucine</i>	9.96	3.73	9.34	7.68	3.43
	<i>Aspartic acid + Threonine</i>	6.11	1.92	3.82	3.95	2.10
	<i>Glutamic acid</i>	15.42	9.71	11.93	12.35	2.88
	<i>Phenylalanine</i>	7.24	3.07	6.32	5.54	2.19

Dataset S18. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from carnivorous beetles, *Dermestes*, cultured on dried fall armyworm homogenate.

Insect (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	7.11	8.43	9.11	8.22	1.02
	<i>Glycine</i>	3.90	9.43	8.24	7.19	2.91
	<i>Valine</i>	9.89	7.13	10.71	9.24	1.88
	<i>Leucine</i>	5.59	6.17	3.39	5.05	1.47
	<i>Isoleucine</i>	8.06	8.76	6.02	7.62	1.42
	<i>Aspartic acid + Threonine</i>	2.89	4.10	4.52	3.84	0.85
	<i>Glutamic acid</i>	10.21	10.59	10.43	10.41	0.20
	<i>Phenylalanine</i>	1.53	4.70	3.15	3.13	1.58

Dataset S19. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from a freshwater fish, *Poecilia reticulata*, cultured on dried fall armyworm homogenate.

Fish (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)				Parameters	
		1	2	3	4	mean	σ
Amino acids	<i>Alanine</i>	9.79	6.86	7.88	7.20	7.93	1.31
	<i>Glycine</i>	-0.37	0.51	1.78	4.46	1.60	2.11
	<i>Valine</i>	4.24	5.63	8.21	7.68	6.44	1.84
	<i>Leucine</i>	2.16	2.38	1.97	5.07	2.89	1.46
	<i>Isoleucine</i>	9.23	10.20	12.56	9.56	10.39	1.50
	<i>Aspartic acid + Threonine</i>	1.27	0.77	4.97	4.90	2.98	2.27
	<i>Glutamic acid</i>	13.81	11.27	14.01	13.20	13.07	1.25
	<i>Phenylalanine</i>	6.04	4.18	7.72	5.70	5.91	1.46

Dataset S20. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from a white-rot wood fungus, *Irpex lacteus*, cultured on maple wood substrates.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	-8.70	-7.66		-8.18	0.73
	<i>Glycine</i>	-13.76	-9.29	-16.30	-13.12	3.55
	<i>Valine</i>	-3.43	-6.77		-5.10	2.36
	<i>Leucine</i>	-4.21	-6.92	-8.45	-6.53	2.15
	<i>Isoleucine</i>	4.40		-9.95	-2.78	10.15
	<i>Aspartic acid + Threonine</i>	-0.09	-4.95	-7.25	-4.10	3.66
	<i>Glutamic acid</i>	-4.68	-4.29	-6.78	-5.25	1.34
	<i>Phenylalanine</i>	-3.89	-4.96	-3.51	-4.12	0.75

Dataset S21. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from a brown-rot wood fungus, *Gloeophyllum trabeum*, cultured on maple wood substrates.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	2.20	-6.55		-2.17	6.19
	<i>Glycine</i>	-19.29	-21.46	-20.63	-20.46	1.09
	<i>Valine</i>	2.66	-8.20		-2.77	7.68
	<i>Leucine</i>	-4.31	-8.70	-9.61	-7.54	2.84
	<i>Isoleucine</i>		-4.66	-1.86	-3.26	1.98
	<i>Aspartic acid + Threonine</i>	-4.54	-10.67	-10.54	-8.58	3.50
	<i>Glutamic acid</i>	0.07	-4.20	-0.59	-1.57	2.30
	<i>Phenylalanine</i>	1.98	-3.18	0.66	-0.18	2.68

Dataset S22. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from a white-rot wood fungus, *Irpex lacteus*, cultured on birch wood substrates.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	-0.21	-3.93	-1.49	-1.88	1.89
	<i>Glycine</i>	-5.00	-10.44	-6.44	-7.29	2.82
	<i>Valine</i>	0.94	-2.91	0.32	-0.55	2.07
	<i>Leucine</i>	-2.58	-6.58	-5.31	-4.82	2.04
	<i>Isoleucine</i>	3.65	-1.36	0.34	0.88	2.54
	<i>Aspartic acid + Threonine</i>	-0.33	-5.21	-1.93	-2.49	2.49
	<i>Glutamic acid</i>	2.07	-3.03	-1.71	-0.89	2.64
	<i>Phenylalanine</i>	1.31	-1.57	0.30	0.01	1.46

Dataset S23. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from a brown-rot wood fungus, *Gloeophyllum trabeum*, cultured on birch wood substrates.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	2.20			2.20	
	<i>Glycine</i>	-19.29			-19.29	
	<i>Valine</i>	2.66			2.66	
	<i>Leucine</i>	-4.31			-4.31	
	<i>Isoleucine</i>					
	<i>Aspartic acid + Threonine</i>	-4.54		-1.41	-2.97	2.21
	<i>Glutamic acid</i>	0.07		1.14	0.60	0.75
	<i>Phenylalanine</i>	1.98		0.54	1.26	1.02

Dataset S24. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the flour moth, *Plodia interpunctella*, cultured on homogenates of dried shiitake mushrooms.

Insect (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	9.92	8.28	9.78	9.33	0.91
	<i>Glycine</i>	-2.33	-0.10	6.25	1.27	4.45
	<i>Valine</i>	7.50	5.39	6.45	6.45	1.05
	<i>Leucine</i>	6.61	2.31	6.96	5.30	2.59
	<i>Isoleucine</i>					
	<i>Aspartic acid + Threonine</i>	8.57	9.53	12.53	10.21	2.07
	<i>Glutamic acid</i>	16.51	13.01	14.47	14.66	1.76
	<i>Phenylalanine</i>	8.94	6.50	7.16	7.53	1.26

Dataset S25. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the actinomycetous bacterium, *Streptomyces* (sirexAA-E), cultured in a broth of yeast-extract, sucrose, and tryptic soy.

Bacterium (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	4.12	2.66	3.57	3.45	0.74
	<i>Glycine</i>	-1.68	-1.59	-1.12	-1.46	0.30
	<i>Valine</i>	5.42	5.81	6.37	5.87	0.48
	<i>Leucine</i>	1.93	1.82	1.72	1.82	0.11
	<i>Isoleucine</i>	9.21	8.50	9.57	9.09	0.55
	<i>Aspartic acid + Threonine</i>	4.63	4.62	4.34	4.53	0.16
	<i>Glutamic acid</i>	12.57	12.62	12.21	12.47	0.23
	<i>Phenylalanine</i>	6.83	6.56	5.87	6.42	0.50

Dataset S26. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the proteobacterium, *E. coli* (DH5- α), cultured in a broth of yeast-extract and tryptone.

Bacterium (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)			Parameters	
		1	2	3	mean	σ
Amino acids	<i>Alanine</i>	6.02	5.94	6.62	6.19	0.37
	<i>Glycine</i>	0.23	1.35	0.45	0.68	0.59
	<i>Valine</i>	6.41	6.30	6.56	6.42	0.13
	<i>Leucine</i>	3.44	2.57	3.66	3.22	0.58
	<i>Isoleucine</i>	3.32	3.12	3.07	3.17	0.13
	<i>Aspartic acid + Threonine</i>	6.08	7.57	6.20	6.62	0.83
	<i>Glutamic acid</i>	13.50	13.32	13.43	13.42	0.09
	<i>Phenylalanine</i>	3.33	3.79	3.64	3.59	0.23

Dataset S27. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from pupae of the leaf-cutter ant, *Acromyrmex echinator*, collected from fungus-garden colonies.

Insect (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>	-0.24	-1.01	-0.09	-0.66	0.36	-0.33	0.53
	<i>Glycine</i>	-0.59	-3.42	-5.83	-5.94	-4.12	-3.98	2.19
	<i>Valine</i>	0.83	0.43	-0.85	-2.43	-0.26	-0.46	1.28
	<i>Leucine</i>	-0.17	-0.37	-1.81	-2.67	0.81	-0.84	1.39
	<i>Isoleucine</i>	-1.75	-0.62	-0.71	-1.15	2.69	-0.31	1.73
	<i>Aspartic acid + Threonine</i>	-0.67	-2.90	-2.90	-2.10	-0.29	-1.77	1.23
	<i>Glutamic acid</i>	1.55	0.20	1.51	-0.69	3.67	1.25	1.65
	<i>Phenylalanine</i>	-4.78	-5.27	-4.38	-5.35	-4.45	-4.84	0.45

Dataset S28. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the fungus, *Leucoagaricus gongylophorus*, cultured within leaf-cutter ant fungus-gardens.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>	-3.19		-6.08	-3.78	-7.82	-5.22	2.14
	<i>Glycine</i>	-9.31	-5.15	-10.17	-11.28	-5.16	-8.21	2.88
	<i>Valine</i>	-3.47		-4.71	-5.41	-2.44	-4.01	1.32
	<i>Leucine</i>	-3.65	-8.38	-4.21	-5.35	-0.80	-4.48	2.75
	<i>Isoleucine</i>	-4.36		-3.61	-4.85	0.44	-3.10	2.41
	<i>Aspartic acid + Threonine</i>	-1.71	-1.74	-3.76	-3.15	-1.85	-2.44	0.95
	<i>Glutamic acid</i>	-6.27	-5.16	-6.79	-6.95	-4.99	-6.03	0.91
	<i>Phenylalanine</i>	-4.89	-4.84	-4.79	-4.94	-4.86	-4.86	0.06

Dataset S29. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the fungus, *Escovopsis*, which was sampled within leaf-cutter ant fungus-gardens.

Fungus (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>	0.20	-1.11	3.42	2.21		1.18	2.02
	<i>Glycine</i>	-11.92	-8.93	-8.18	-10.63		-9.92	1.68
	<i>Valine</i>	-1.93	-1.33	0.47	-1.81		-1.15	1.11
	<i>Leucine</i>	-1.69	0.37	-2.02	-2.96		-1.58	1.40
	<i>Isoleucine</i>	1.66		3.16	0.33		1.72	1.42
	<i>Aspartic acid + Threonine</i>	-4.54	-3.88	0.06	-2.40		-2.69	2.04
	<i>Glutamic acid</i>	5.50	7.24	11.27	8.06		8.02	2.42
	<i>Phenylalanine</i>	0.17	0.90	3.49	0.45		1.25	1.52

Dataset S30. Raw data ($\delta^{15}\text{N}$ ‰) for amino acids extracted from the filamentous bacterium, *Pseudonocardia*, collected from leaf-cutter ant exoskeletons.

Bacterium (consumer)		Samples analysed (units: $\delta^{15}\text{N}$ ‰)					Parameters	
		1	2	3	4	5	mean	σ
Amino acids	<i>Alanine</i>							
	<i>Glycine</i>	7.11	6.14				6.63	0.69
	<i>Valine</i>							
	<i>Leucine</i>	7.07					7.07	
	<i>Isoleucine</i>							
	<i>Aspartic acid + Threonine</i>	6.41	6.25				6.33	0.11
	<i>Glutamic acid</i>	9.83	11.15	8.91	7.33	10.72	9.59	1.53
	<i>Phenylalanine</i>	-4.60	-4.68	-4.56	-4.92	-3.78	-4.51	0.43