

Table S1: Mean and standard deviations for experiments on female reindeer, caribou (*Rangifer*) and muskoxen (*Ovibos*) during late winter from February to April in Fairbanks, Alaska, USA. Reindeer and caribou were fed all three rations as complete diets whereas muskoxen were fed hay that was supplemented with the control or the spike rations.

	“Control” - High N 2.2 % N; 1.57 ‰ $\delta^{15}\text{N}$			“Spike” - High N High $\delta^{15}\text{N}$ 2.5 % N; 6.88 ‰ $\delta^{15}\text{N}$			“Low” - Low N 1.3% N; 3.19 ‰ $\delta^{15}\text{N}$		
	Fed	Fasted	Refed	Fed	Fasted	Refed	Fed	Fasted	Refed
Reindeer (n=6)									
Mass (kg)	117.9 ± 13.2	116.2 ± 12.9	117.4 ± 12.4	116.5 ± 12.2	114.6 ± 12.3	115.8 ± 13.7	109.6 ± 14.5	106.4 ± 13.7	104.1 ± 15.3
Rump fat (mm)	38.2 ± 9.6	39.9 ± 12.9	39.3 ± 11.2	36.1 ± 10.5	33.9 ± 11.5	31.7 ± 10.5	23.7 ± 7.5	25.8 ± 11.6	19.8 ± 8.2
Serum Urea (mgN·dl ⁻¹)	21.5 ± 2.5	27.0 ± 8.9	20.8 ± 7.3	21.1 ± 5.1	25.8 ± 9.7	18.9 ± 3.1	10.9 ± 4.9	15.8 ± 8.0	21.8 ± 14.1
Fecal Fiber δN^{15}	5.94 ± 0.75	6.44 ± 0.48	5.55 ± 0.61	8.15 ± 0.35	8.71 ± 0.75	7.64 ± 0.40	5.56 ± 0.97	6.07 ± 0.76	5.67 ± 0.67
Serum Protein δN^{15}	7.50 ± 0.35	7.65 ± 0.29	7.63 ± 0.42	8.08 ± 0.34	8.54 ± 0.37	8.67 ± 0.48	9.11 ± 0.71	9.14 ± 0.73	8.98 ± 0.98
Clot δN^{15}	6.20 ± 0.56	6.62 ± 0.73	6.93 ± 0.86	6.65 ± 0.17	6.68 ± 0.20	6.65 ± 0.31	6.68 ± 0.28	6.86 ± 0.21	6.99 ± 0.32
Serum amino acids δN^{15}	3.50 ± 0.71	3.71 ± 0.63	3.16 ± 0.46	4.57 ± 1.04	4.42 ± 0.64	4.69 ± 0.81	5.22 ± 0.97	5.48 ± 1.08	4.51 ± 1.12
Urinary urea δN^{15}	2.87 ± 0.39	7.95 ± 1.67	3.04 ± 0.06	6.91 ± 0.94	8.49 ± 0.46	6.13 ± 0.51	6.49 ± 2.69	7.92 ± 1.24	5.84 ± 3.54
Caribou (n=6)									
Mass (kg)	97.3 ± 12.1	95.5 ± 12.6	97.0 ± 11.2	98.5 ± 12.2	96.4 ± 12.6	96.3 ± 13.0	95.9 ± 13.6	93.7 ± 14.1	93.2 ± 14.6
Serum Urea (mgN·dl ⁻¹)	24.5 ± 7.2	27.2 ± 6.5	22.3 ± 1.7	25.9 ± 5.5	29.3 ± 6.7	25.5 ± 5.9	11.2 ± 2.6	23.1 ± 7.0	11.0 ± 8.3
Fecal Fiber δN^{15}	5.58 ± 0.30	6.34 ± 0.37	5.70 ± 0.38	8.00 ± 0.41	7.50 ± 0.64	7.13 ± 0.45	5.98 ± 0.77	6.59 ± 0.47	5.69 ± 0.48
Serum Protein δN^{15}	7.37 ± 0.28	7.63 ± 0.12	7.32 ± 0.29	8.23 ± 0.28	8.40 ± 0.26	9.02 ± 0.26	8.75 ± 0.19	8.87 ± 0.24	8.82 ± 0.22
Clot δN^{15}	6.07 ± 0.32	6.08 ± 0.30	6.00 ± 0.27	6.26 ± 0.35	6.34 ± 0.31	6.41 ± 0.36	6.53 ± 0.28	6.51 ± 0.28	6.58 ± 0.18
Serum amino acids δN^{15}	3.63 ± 0.60	3.79 ± 0.55	3.66 ± 0.54	5.09 ± 0.73	4.07 ± 0.63	5.64 ± 0.87	4.44 ± 0.86	4.07 ± 0.58	4.44 ± 0.78
Urinary urea δN^{15}	5.22 ± 1.57	5.88 ± 1.18	1.90 ± 1.04	5.69 ± 0.88	8.17 ± 1.04	6.18 ± 0.67	2.21 ± 0.79	6.97 ± 1.31	2.21 ± 2.49
Muskox (n=8)									
Mass (kg)	204.9 ± 29.3	198.6 ± 30.7	201.6 ± 29.7	202.0 ± 30.1	196.6 ± 30.8	198.5 ± 29.7	—	—	—
Rump fat (mm)	19.9 ± 12.3	20.0 ± 9.1	22.1 ± 11.1	22.1 ± 10.9	21.0 ± 10.3	18.6 ± 7.2	—	—	—
Serum Urea (mgN·dl ⁻¹)	9.2 ± 2.8	25.2 ± 5.1	8.1 ± 1.4	7.8 ± 3.9	24.3 ± 6.7	6.7 ± 2.5	—	—	—
Fecal Fiber δN^{15}	3.53 ± 0.32	3.69 ± 0.32	3.70 ± 0.49	3.99 ± 0.49	4.05 ± 0.62	5.24 ± 0.96	—	—	—
Serum Protein δN^{15}	5.76 ± 0.28	5.88 ± 0.37	5.79 ± 0.38	5.85 ± 0.39	5.95 ± 0.44	6.15 ± 0.42	—	—	—
Clot δN^{15}	5.34 ± 0.43	5.33 ± 0.53	5.26 ± 0.46	5.20 ± 0.41	5.17 ± 0.50	5.08 ± 0.41	—	—	—
Serum amino acids δN^{15}	1.61 ± 0.54	2.40 ± 0.65	1.92 ± 0.41	2.14 ± 0.68	2.62 ± 1.03	2.40 ± 1.34	—	—	—
Urinary urea δN^{15}	0.17 ± 0.55	1.75 ± 0.48	0.22 ± 1.06	1.71 ± 0.63	2.75 ± 0.89	2.90 ± 0.77	—	—	—