

Supplemental Table 1: Examples of dishes proposed to astronauts for standardized meals.

Recipes	Nutritional values (kcal per 100g)	Macronutrients composition (g per 100g)		
		Proteins	Lipids	Carbohydrates
Salmon with candied Menton lemon	246	35.0	11.7	0.2
Riviera style swordfish	191	12.0	11.0	0.0
Britany lobster, quino with seaweed, Menton lemon condiment	194	12.9	5.7	22.8
Scottish salmon, candied tomatoes and grilled eggplant	281	33.2	15.5	2.2
Shredded chicken Parmentier	266	26.6	13.1	10.6
Spiced chicken stir-fried thai vegetables	276	56.2	4.6	0.0
Duck confit with capers	396	46.5	23.3	0.2
Lamb shoulder confit with sage, pearl barley and candied tomatoes	269	21.7	11.0	22.0
Landes yellow poultry cooked as “Poule au pot”	280	36.4	5.0	12.6
Beef cheeks in Bourguignon style, carrots and mushrooms	197	29.9	7.26	2.64
Carrots tops	29	0.6	0.4	6.5
Caponata	62	1.9	3.2	9.5
Vegetables and tomatoes fondue	36	0.9	0.9	6.8

Omelet cake with tomatoes and herbs	125	11.9	5.9	6.7
Egg cocotte, Basque style condiment	112	6.4	6.7	7.4
Cheese-cake	191	4.0	12.5	15.6
Muesli	282	5.5	14.3	33.9
Chocolate cake	340	5.0	27.9	18.8
Semolina with dried apricots	269	9.0	2.3	52.0
Apple fondant pieces	74	0.2	0.5	18.1
Creamy lemon baked	250	19.1	19.1	17.4

Supplemental Table 2: unadjusted ground and inflight substrate oxidation data of the astronauts.

	Ground	Inflight	Changes from ground							
	LSmeans (SE)	LSmeans (SE)	LSmeans (95%CI)	P Value	Min to max changes	Ground mean (SD)	Inflight mean (SD)	LSmeans (SE) changes	IQ Range BDC	IQ Range Inflight
<i>Fasting state</i>										
Energy expenditure (KJ/min)	4.73 (0.23)	4.52 (0.24)	-0.22 (-0.54 to 0.11)	0.17	-1.04 to 0.34	4.73 (0.82)	4.43 (0.68)	-0.22 (0.14)	1.65	0.76
Glucose oxidation (g/min)	0.13 (0.02)	0.18 (0.02)	0.06 (0.01 to 0.11)	0.03	-0.05 to 0.16	0.13 (0.06)	0.18 (0.05)	0.06 (0.02)	0.10	0.05
Lipid oxidation (g/min)	0.04 (0.01)	0.01 (0.00)	-0.03 (-0.05 to -0.01)	<0.01	-0.08 to 0.01	0.04 (0.03)	0.01 (0.01)	-0.03 (0.01)	0.04	0.02
Protein oxidation (g/min)	0.06 (0.00)	0.07 (0.00)	0.00 (0.00 to 0.01)	<.001	0.00 to 0.01	0.06 (0.01)	0.07 (0.01)	0.00 (0.00)	0.02	0.02
Respiratory quotient (RQ)	0.85 (0.02)	0.92 (0.02)	0.07 (0.02 to 0.12)	<0.01	-0.04 to 0.17	0.85 (0.06)	0.92 (0.04)	0.07 (0.02)	0.08	0.07
Lipid oxidation (%)	34 (6)	10 (3)	-23 (-37 to -9)	<0.01	-55 to 10	34 (19)	10 (10)	-23 (7)	27	20
Glucose oxidation (%)	44 (5)	65 (5)	21 (6 to 36)	0.01	-17 to 53	44 (20)	65 (13)	21 (7)	26	22
Protein oxidation (%)	22 (1)	24 (1)	2 (0 to 4)	0.02	-1 to 7	22 (3)	24 (5)	2 (1)	5	5
<i>Post breakfast-challenge</i>										
Energy expenditure iAUC (kJ)	302 (31)	447 (55)	145 (9 to 280)	0.04	-105 to 537	302 (103)	447 (174)	145 (63)	164	189
Glucose oxidation iAUC (g)	16.81 (6.13)	21.70 (3.74)	4.89 (-10.30 to 20.09)	0.51	-48.81 to 49.55	16.81 (20.33)	21.70 (11.81)	4.89 (7.18)	38.43	14.35
Lipid oxidation iAUC (g)	0.95 (2.23)	2.91 (0.80)	1.97 (-3.17 to 7.10)	0.42	-6.77 to 22.26	0.95 (7.39)	2.91 (2.52)	1.97 (2.37)	8.20	3.84
ΔRQ	0.06 (0.02)	0.05 (0.02)	-0.02 (-0.07 to 0.04)	0.56	-0.20 to 0.09	0.06 (0.06)	0.05 (0.06)	-0.02 (0.03)	0.09	0.05

Data are estimated LSmeans (SE), LSmeans (95%CI) and P values from mixed-effects models accounting for repeated measurements.

iAUC, incremental area under the curve over the 260 min period of measurement; ΔRQ, maximal postprandial RQ – fasting RQ.