

1 Supplemental Files

2 The impact of heat-set milk protein gel textures modified by pH on circulating
3 amino acid appearance and gastric function in healthy female adults: a
4 randomised controlled trial

5 Amber M. Milan, Giselle G.A. Menting, Matthew P.G. Barnett, Yutong Liu, Warren C.
6 McNabb, Nicole C. Roy, Scott C. Hutchings, Tanyaradzwa Mungure, Mike Weeks, Siqui
7 Li, Joanne Hort, Stefan Calder, Greg O'Grady, and Richard F. Mithen

8 Supplemental Table 1: Appeal and sensory evaluation by visual analogue scale
 9 following firm bovine dairy gel (FIRM-G) and soft bovine dairy gel (SOFT-G) ingestion.

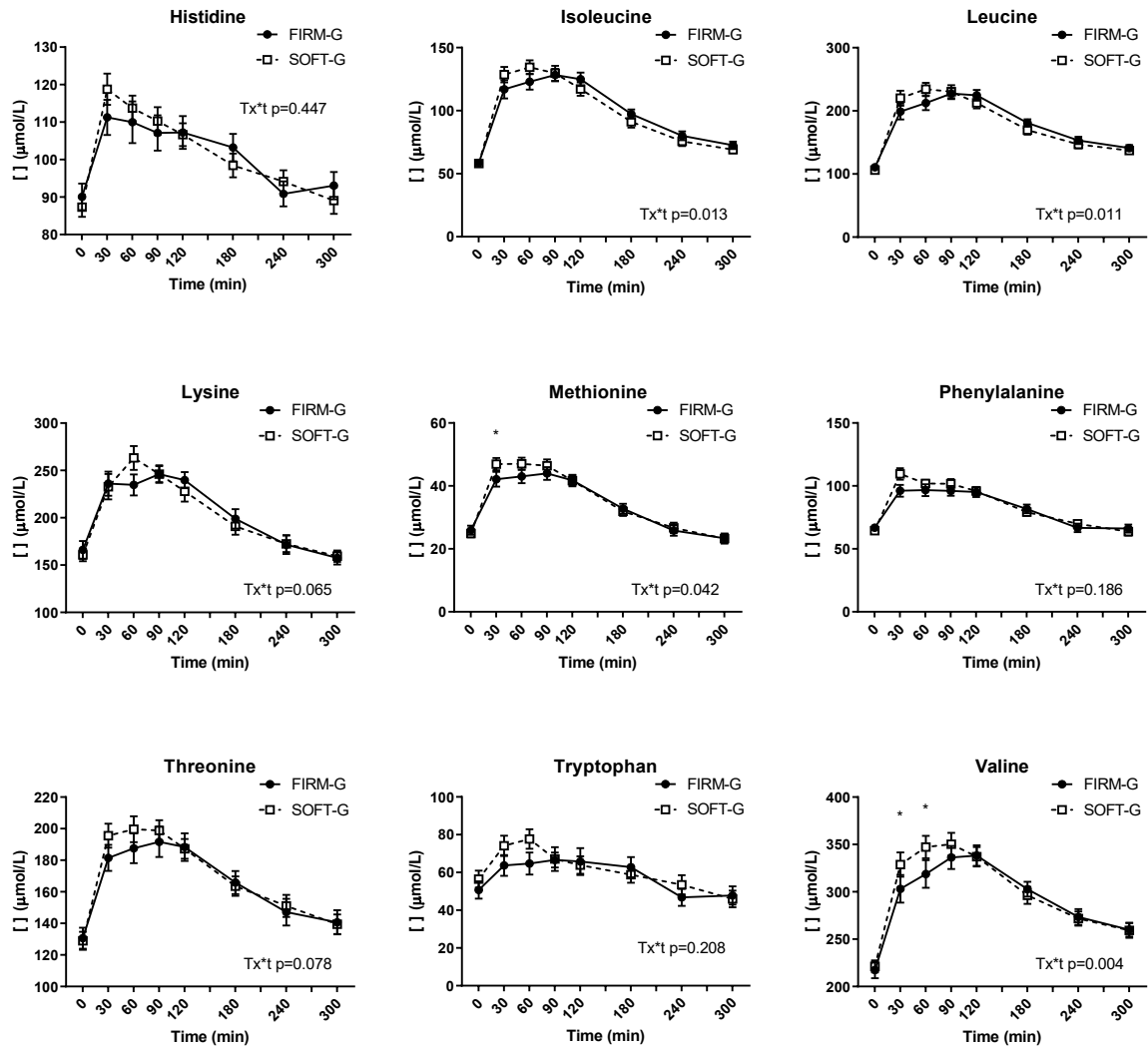
	FIRM-G ¹	SOFT-G	P value ²
Appeal ³			
Overall liking	46 ± 6	44 ± 6	0.664
Aftertaste	55 ± 5	53 ± 5	0.480
Mouthfeel	48 ± 6	56 ± 5	0.224
Palatability	43 ± 5	40 ± 5	0.480
Smell	67 ± 4	66 ± 5	0.839
Taste	40 ± 5	43 ± 6	0.553
Visual	49 ± 5	49 ± 6	0.955
Sensory evaluation ⁴			
Bitterness	16 ± 5	21 ± 7	0.442
Fattiness	34 ± 5	37 ± 6	0.212
Flavour intensity	35 ± 5	29 ± 5	0.386
'Melt in the mouth'	47 ± 6	51 ± 5	0.562
Mouth-drying	37 ± 6	43 ± 6	0.264
Saltiness	21 ± 4	19 ± 4	0.748
Savouriness	32 ± 5	29 ± 5	0.519
Smoothness	60 ± 4	72 ± 4	0.043
Sourness	15 ± 4	11 ± 3	0.425
Sweetness	23 ± 4	22 ± 4	0.425
Thickness	70 ± 3	59 ± 5	0.017

10 ¹ Values presented as mean ± SEM (mm).

11 ² Interactions were analysed by general linear model with Sidak corrected post hoc
 12 analysis.

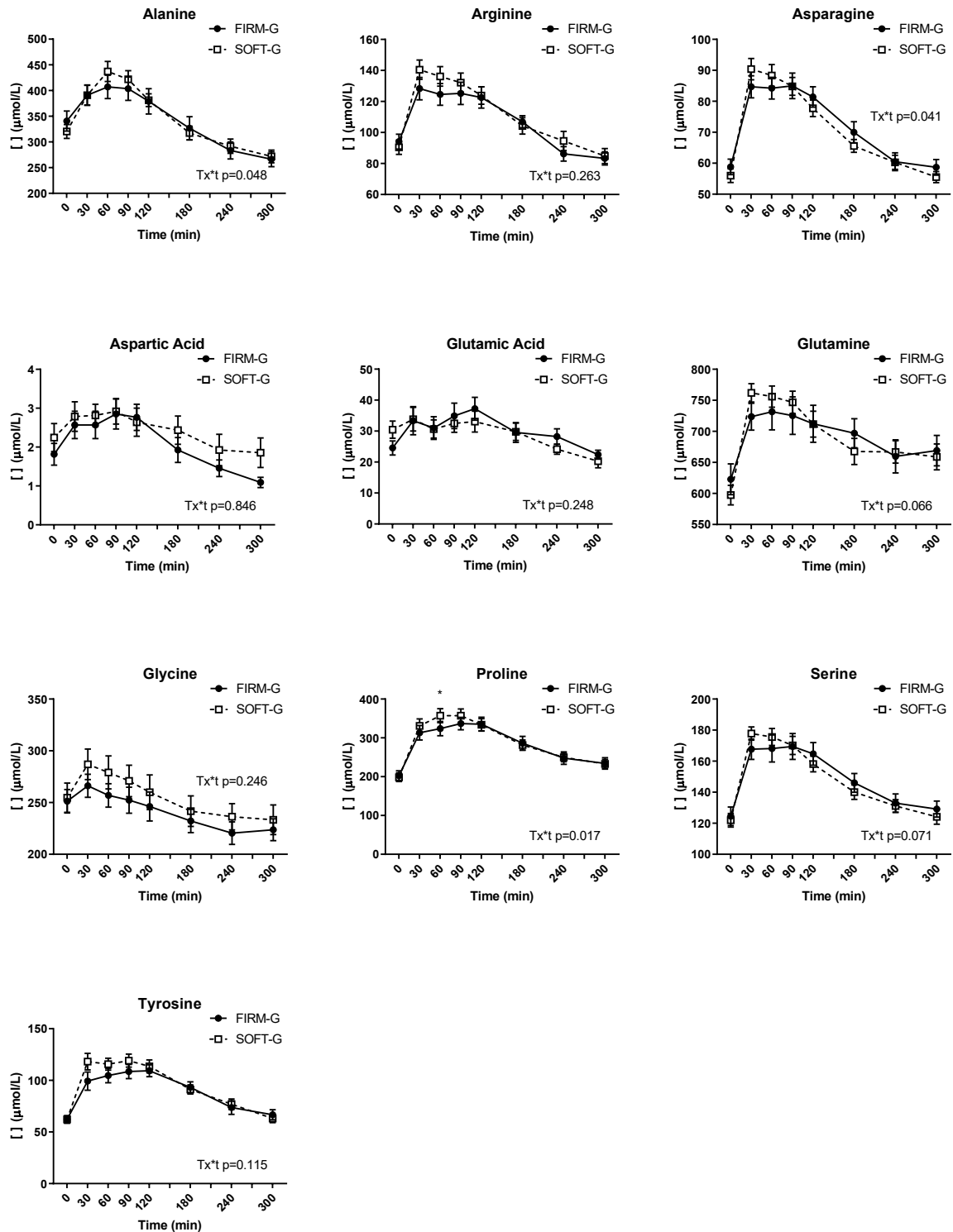
13 ³ Scores for appeal: 0 mm = 'bad / disliked', and 100 mm = 'good / liked'.

14 ⁴ Scores for sensory evaluation: 0 mm = 'not at all', and 100 mm = 'extremely'.



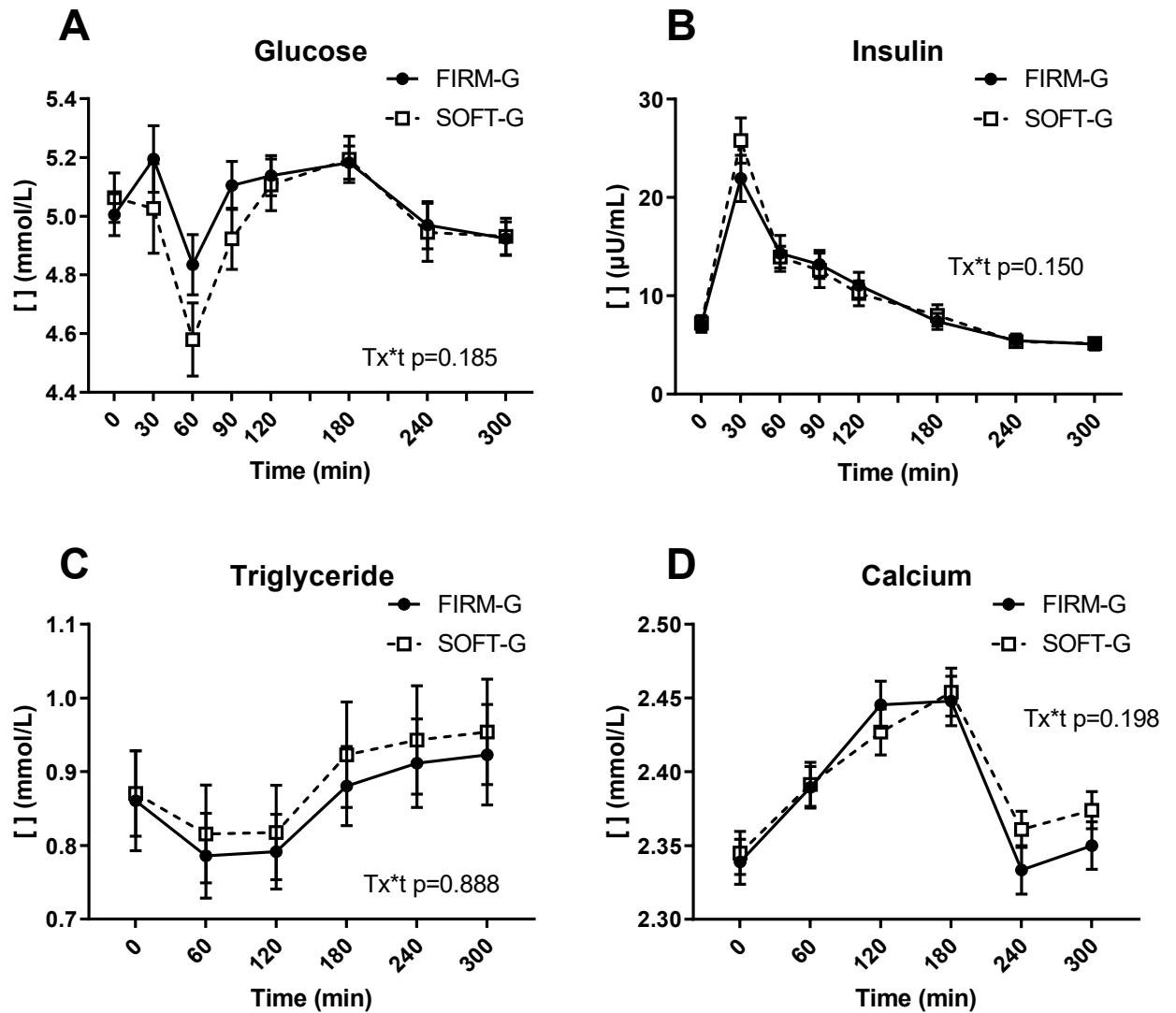
15
16

17 Supplemental Figure 1: Plasma indispensable amino acid concentrations for firm
 18 bovine dairy gel (FIRM-G; black) and soft bovine dairy gel (SOFT-G; white). Data are
 19 presented as mean \pm SEM in $\mu\text{mol/L}$ (n=20).



20
21

22 Supplemental Figure 2: Plasma dispensable amino acid concentrations for firm bovine
 23 dairy gel (FIRM-G; black) and soft bovine dairy gel (SOFT-G; white). Data are
 24 presented as mean \pm SEM in $\mu\text{mol/L}$ (n=20).



25
26

27 Supplemental Figure 3: Postprandial clinical biochemistry for firm bovine dairy gel
 28 (FIRM-G; black) and soft bovine dairy gel (SOFT-G; white) of plasma (A) glucose, (B)
 29 insulin, (C) triglycerides, and (D) serum calcium. Data are presented as mean \pm SEM
 30 (n=20).

31 Supplemental Table 2: Digestive symptom, appetite, and desire for specific food types
 32 scores by visual analogue scale following firm bovine dairy gel (FIRM-G) and soft
 33 bovine dairy gel (SOFT-G) ingestion.

Attribute	Time (min)	FIRM-G ¹			SOFT-G			p value ²
Abdominal cramps ³	0	3	±	1	12	±	6	0.502
	1	4	±	2	3	±	1	
	5	3	±	1	5	±	3	
	30	3	±	2	2	±	1	
	60	3	±	1	3	±	2	
	90	4	±	2	2	±	1	
	120	2	±	1	4	±	2	
	180	6	±	4	7	±	4	
	240	2	±	2	5	±	2	
	300	6	±	4	4	±	2	
Abdominal distension	0	7	±	4	8	±	4	0.728
	1	7	±	3	5	±	3	
	5	8	±	3	5	±	2	
	30	9	±	4	5	±	3	
	60	8	±	3	6	±	4	
	90	4	±	2	6	±	4	
	120	9	±	4	6	±	3	
	180	5	±	2	6	±	4	
	240	5	±	2	6	±	4	
	300	7	±	3	7	±	4	
Abdominal rumbling	0	17	±	6	10	±	4	0.219
	1	15	±	5	10	±	5	
	5	17	±	5	15	±	5	
	30	16	±	5	14	±	5	
	60	18	±	5	18	±	6	
	90	18	±	5	18	±	6	
	120	14	±	5	18	±	5	
	180	28	±	7	20	±	6	
	240	28	±	7	16	±	5	
	300	19	±	6	15	±	5	
Belching	0	7	±	4	5	±	3	0.931
	1	4	±	2	8	±	5	
	5	12	±	5	15	±	5	
	30	9	±	5	13	±	5	
	60	9	±	5	10	±	5	
	90	11	±	5	10	±	5	
	120	8	±	4	7	±	4	
	180	9	±	4	10	±	5	
	240	9	±	4	6	±	4	

Bloating	300	9 ±	5	4 ±	3	0.659
	0	11 ±	5	6 ±	3	
	1	9 ±	3	5 ±	2	
	5	9 ±	4	8 ±	4	
	30	12 ±	4	7 ±	3	
	60	13 ±	5	12 ±	4	
	90	11 ±	3	11 ±	4	
	120	11 ±	4	13 ±	5	
	180	9 ±	3	8 ±	4	
	240	6 ±	2	9 ±	4	
Diarrhoea	300	7 ±	2	6 ±	3	0.519
	0	2 ±	1	1 ±	1	
	1	2 ±	1	1 ±	0	
	5	2 ±	1	0 ±	0	
	30	2 ±	1	1 ±	1	
	60	1 ±	1	1 ±	1	
	90	2 ±	1	2 ±	1	
	120	1 ±	1	4 ±	3	
	180	6 ±	5	1 ±	0	
	240	1 ±	1	1 ±	0	
Faecal urgency	300	2 ±	1	4 ±	3	0.071
	0	3 ±	2	8 ±	1	
	1	3 ±	2	7 ±	5	
	5	5 ±	3	4 ±	4	
	30	5 ±	3	8 ±	3	
	60	4 ±	3	8 ±	4	
	90	4 ±	2	11 ±	4	
	120	3 ±	2	8 ±	5	
	180	4 ±	3	8 ±	4	
	240	5 ±	3	4 ±	4	
Flatulence	300	4 ±	3	4 ±	3	0.939
	0	3 ±	1	3 ±	2	
	1	4 ±	2	4 ±	2	
	5	10 ±	5	4 ±	4	
	30	11 ±	5	13 ±	6	
	60	10 ±	5	10 ±	5	
	90	9 ±	5	10 ±	5	
	120	7 ±	4	9 ±	3	
	180	7 ±	4	8 ±	4	
	240	8 ±	4	6 ±	3	
Gastric reflux	300	8 ±	5	7 ±	4	0.495
	0	9 ±	5	5 ±	4	
	1	7 ±	4	5 ±	4	
	5	7 ±	4	4 ±	2	
	30	8 ±	4	5 ±	4	
	60	6 ±	4	5 ±	3	

	90	5 ±	3	4 ±	3	
	120	6 ±	4	5 ±	3	
	180	7 ±	5	5 ±	3	
	240	7 ±	4	5 ±	3	
	300	8 ±	4	5 ±	4	
Nausea	0	8 ±	4	6 ±	3	0.261
	1	9 ±	4	10 ±	5	
	5	12 ±	5	2 ±	1	
	30	10 ±	5	2 ±	1	
	60	6 ±	3	2 ±	1	
	90	6 ±	3	3 ±	1	
	120	8 ±	4	4 ±	1	
	180	7 ±	4	3 ±	1	
	240	9 ±	4	7 ±	4	
	300	3 ±	1	3 ±	1	
Vomiting	0	5 ±	4	6 ±	5	0.901
	1	2 ±	1	5 ±	4	
	5	2 ±	1	1 ±	1	
	30	2 ±	1	4 ±	2	
	60	4 ±	3	1 ±	1	
	90	2 ±	1	4 ±	3	
	120	4 ±	3	1 ±	0	
	180	1 ±	1	1 ±	1	
	240	1 ±	1	1 ±	0	
	300	2 ±	1	4 ±	3	
Digestive comfort	0	62 ±	7	54 ±	7	0.151
	1	73 ±	6	67 ±	6	
	5	69 ±	4	65 ±	5	
	30	66 ±	4	61 ±	5	
	60	65 ±	5	60 ±	6	
	90	66 ±	5	65 ±	5	
	120	66 ±	5	62 ±	6	
	180	62 ±	5	60 ±	7	
	240	60 ±	6	61 ±	7	
	300	67 ±	6	63 ±	6	
How satisfied do you feel? ⁴	0	29 ±	5	29 ±	6	0.265
	1	23 ±	4	28 ±	6	
	5	53 ±	5	61 ±	5	
	30	42 ±	4	54 ±	5	
	60	39 ±	4	37 ±	5	
	90	44 ±	4	44 ±	6	
	120	36 ±	4	34 ±	5	
	180	27 ±	3	31 ±	5	
	240	21 ±	3	24 ±	4	
	300	19 ±	3	21 ±	4	
How full do you feel?	0	33 ±	6	30 ±	6	0.598

	1	33 ±	6	27 ±	5	
	5	54 ±	5	58 ±	5	
	30	44 ±	4	50 ±	5	
	60	42 ±	4	49 ±	6	
	90	44 ±	4	43 ±	7	
	120	36 ±	4	34 ±	6	
	180	24 ±	3	32 ±	5	
	240	21 ±	3	23 ±	4	
	300	18 ±	3	17 ±	3	
How hungry do you feel?	0	54 ±	6	52 ±	6	0.056
	1	58 ±	7	51 ±	7	
	5	35 ±	6	33 ±	6	
	30	48 ±	5	44 ±	6	
	60	57 ±	4	48 ±	7	
	90	56 ±	4	39 ±	6	
	120	62 ±	4	54 ±	6	
	180	71 ±	4	66 ±	5	
	240	70 ±	4	72 ±	4	
	300	79 ±	3	69 ±	5	
How much do you think you can eat?	0	65 ±	4	61 ±	6	0.691
	1	62 ±	5	64 ±	5	
	5	52 ±	5	53 ±	5	
	30	60 ±	4	55 ±	5	
	60	60 ±	3	60 ±	5	
	90	59 ±	4	57 ±	5	
	120	64 ±	4	65 ±	5	
	180	74 ±	3	70 ±	4	
	240	73 ±	5	75 ±	3	
	300	82 ±	3	79 ±	3	
Desire to eat something fatty ⁵	0	60 ±	6	60 ±	6	0.640
	1	57 ±	6	60 ±	6	
	5	63 ±	6	68 ±	7	
	30	57 ±	7	64 ±	6	
	60	63 ±	7	62 ±	7	
	90	57 ±	7	61 ±	7	
	120	56 ±	6	65 ±	7	
	180	50 ±	7	57 ±	7	
	240	51 ±	7	51 ±	7	
	300	45 ±	7	40 ±	7	
Desire to eat something salty	0	51 ±	7	58 ±	5	0.242
	1	46 ±	6	55 ±	6	
	5	55 ±	7	58 ±	6	
	30	47 ±	6	53 ±	5	
	60	47 ±	5	56 ±	6	
	90	46 ±	5	54 ±	6	
	120	44 ±	5	55 ±	6	

	180	40 ±	5	50 ±	6	
	240	38 ±	4	40 ±	6	
	300	30 ±	4	34 ±	6	
Thoughts of food: savoury	0	38 ±	7	43 ±	6	0.111
	1	36 ±	6	39 ±	5	
	5	36 ±	4	50 ±	7	
	30	39 ±	5	45 ±	5	
	60	37 ±	4	44 ±	6	
	90	35 ±	4	42 ±	6	
	120	34 ±	5	40 ±	6	
	180	22 ±	3	37 ±	6	
	240	25 ±	5	32 ±	7	
	300	18 ±	3	27 ±	7	
Desire to eat something sweet	0	49 ±	6	55 ±	7	0.411
	1	47 ±	6	51 ±	6	
	5	49 ±	8	51 ±	7	
	30	51 ±	6	49 ±	5	
	60	52 ±	7	51 ±	6	
	90	48 ±	6	50 ±	7	
	120	48 ±	7	53 ±	6	
	180	42 ±	6	47 ±	6	
	240	40 ±	6	45 ±	7	
	300	38 ±	6	44 ±	6	

34 ¹ Values presented as mean ± SEM (mm).

35 ² Interactions were analysed by general linear model with Sidak corrected post hocs.

36 ³ Scores for digestive symptoms: 0 mm = 'no symptom', and 100 mm = 'the most
37 severe symptom imaginable'; digestive comfort scale: 0 = 'extremely comfortable'; 100
38 = 'extremely uncomfortable'.

39 ⁴ Satisfied: 0 mm = 'yes very much', and 100 mm = 'no not at all'; Full: 0 mm = 'I am
40 completely empty', and 100 mm = 'I cannot eat another bite'; Hungry: 0 mm = 'I am
41 not hungry at all', and 100 mm = 'I have never been more hungry'; How much do you
42 think you can eat: 0 mm = 'nothing at all', and 100 mm = 'a lot'.

43 ⁵ Desire for specific food types: 0 mm = 'yes very much', and 100 mm = 'no not at all'.
44

45 Supplemental Table 3: Body surface gastric mapping derived parameters of
 46 amplitude, Gastric Alimetry Rhythm Index and Principle Gastric Frequency
 47 incremental area under the curve (AUC), maximum concentration (C_{max}) and time to
 48 maximum concentration (T_{max}) over 5 h following firm bovine dairy gel (FIRM-G) and
 49 soft bovine dairy gel (SOFT-G) ingestion.

Measure		FIRM-G			SOFT-G			P value
AUC	BMI-Adjusted Amplitude (μV)	-15.3	\pm	10.1	-26.7	\pm	15.7	0.395
	Gastric Alimetry Rhythm Index	0.68	\pm	0.16	0.68	\pm	0.22	0.909
	Principal Gastric Frequency (cpm)	0.23	\pm	0.18	-0.01	\pm	0.13	0.131
C_{max}	BMI-Adjusted Amplitude (μV)	55.8	\pm	4.5	58.0	\pm	4.4	0.460
	Gastric Alimetry Rhythm Index	0.70	\pm	0.04	0.73	\pm	0.04	0.410
	Principal Gastric Frequency (cpm)	3.02	\pm	0.05	3.05	\pm	0.06	0.442
T_{max}	BMI-Adjusted Amplitude (μV)	1.8	\pm	0.4	1.2	\pm	0.2	0.149
	Gastric Alimetry Rhythm Index	2.7	\pm	0.4	2.1	\pm	0.3	0.252
	Principal Gastric Frequency (cpm)	2.2	\pm	0.4	1.4	\pm	0.3	0.135

50 ¹ Data presented as mean \pm SEM; n=19.

51 ² Significance between gels analysed by Student's paired *t* test.