

**Table S1: Sample geometries, dimensions, preparation methods and compression strains used (n=59)**

Item	Shape	Dimensions (l x w x h) (mm)	Contact Surface Area* (mm <sup>2</sup> )	Preparation	Strain (%)
Apple	Rectangular	27 x 20 x 18	540	None	5
Baguette	Cylindrical	50 (∅) x 25	1964	None	5
Bakwa (pork jerky)	Rectangular	50 x 30 x 5	1500	None	20
Beef, steak	Rectangular	60 x 37 x 12	2220	Pan fried	20
Beef, steak (pieces)	Rectangular	40 x 33 x 12	1320	Pan fried	30
Bok choy (vegetable)	Rectangular	50 x 28 x 10	1400	Boiled	30
Bread, white	Rectangular	40 x 40 x 10	1600	None	30
Broccoli, boiled	Cylindrical	50 (∅) x 25	1963	Boiled	30
Broccoli, steamed	Cylindrical	50 (∅) x 25	1963	Steamed	30
Bulgour	Cylindrical	50 (∅) x 25	1963	Boiled	30
Burger (patty)	Rectangular	45 x 24 x 2	1080	Pan fried	30
Burger (pre-made)	Rectangular	35 x 33 x 10	1155	Pan fried	30
Carrot (raw)	Cylindrical	24 (∅) x 12	452	Peeled	5
Carrot (boiled)	Cylindrical	30 (∅) x 20	707	Boiled	20
Carrot (mashed)	Cylindrical	45 (∅) x 10	1590	Boiled and mashed	30
Chicken ball	Rectangular	20 x 20 x 20	400	Boiled	30
Chicken breast	Rectangular	34 x 30 x 15	1020	Boiled	30
Chicken nugget	Rectangular	30 x 20 x 15	600	Baked	30
Chicken sliced	Rectangular	49 x 45 x 2	2205	None	30
Chicken wings	Rectangular	80 x 44 x 15	3520	Oven baked	20
Egg (hard boiled)	Rectangular	57 x 20 x 12	1140	Boiled	30
Egg mayo	Cylindrical	50 (∅) x 25	1964	Boiled/mixed	30
Fish ball	Rectangular	23 x 16 x 10	368	Boiled	30
Fish fillet	Rectangular	40 x 30 x 6	1200	Boiled	30
Fish finger	Rectangular	35 x 26 x 17	910	Oven baked	30
Ham (Thick)	Rectangular	33 x 30 x 20	990	None	20
Ham (Thin)	Rectangular	46 x 35 x 2	1610	None	30
Jell-O	Rectangular	40 x 36 x 12	1440	Cold set	30
Kailan (vegetable)	Rectangular	56 x 30 x 15	1680	Boiled	30
Kueh (glutinous rice cakes)	Rectangular	38 x 18 x 18	684	None	30
Lasagne	Rectangular	50 x 35 x 10	1750	Microwaved	30
Mushroom (canned)	Rectangular	23 x 18 x 17	414	Boiled	30
Noodle, spaghetti	Rectangular	55 x 25 x 3	1375	Boiled	30
Noodle, udon	Rectangular	55 x 30 x 5	1650	Boiled	30
Papaya	Rectangular	40 x 35 x 20	1400	None	30
Papaya, green (shredded)	Rectangular	40 x 12 x 1	480	Shredded	30
Pasta, penne	Rectangular	55 x 12 x 10	660	Boiled	30
Peanut (roasted)	Cylindrical	40 (∅) x 5	1257	None	5
Pizza	Rectangular	55 x 30 x 15	1650	Oven baked	30
Pork belly (roasted)	Rectangular	45 x 40 x 10	1800	Roasted	10
Potato chips	Irregular	30 x 30 x 3	900	Fried	30

Potato (boiled)	Rectangular	35 x 30 x 23	1050	Boiled	5
Potato (mashed)	Cylindrical	52 (∅) x 25	2124	Boiled and mashed	30
Prata (flat bread)	Rectangular	51 x 30 x 20	1530	None	30
Quiche	Rectangular	40 x 30 x 30	1200	Microwaved	30
Rice, brown	Cylindrical	51 (∅) x 25	2043	Rice cooker	30
Rice, fried	Cylindrical	50 (∅) x 25	1964	Microwaved	30
Rice, glutinous	Rectangular	30 x 25 x 16	750	None	30
Rice, white	Cylindrical	45 (∅) x 30	1590	Steamed	30
Salmon canned	Rectangular	40 x 28 x 20	1120	None	30
Salmon smoked	Rectangular	49 x 40 x 3	1960	None	30
Salmon steak	Rectangular	40 x 35 x 25	1400	Pan fried	30
Sotong	Cylindrical	30 (∅) x 7	707	Boiled	30
Tofu puffs	Rectangular	40 x 35 x 20	1400	Oven baked	30
Tofu, firm	Rectangular	45 x 42 x 20	1890	None	30
Tofu, silken	Rectangular	25 x 25 x 15	625	None	30
Tok (sticky rice cake)	Rectangular	35 x 15 x 14	525	Boiled	30
Tomato (canned)	Rectangular	37 x 30 x 24	1110	None	30
Tomato (raw)	Rectangular	30 x 24 x 16	720	None	30
Vanilla ice cream	Rectangular	40 x 30 x 26	1200	None	30

\*Average contact surface area: 1287 ± 536mm<sup>2</sup>

**Table S2 – Macronutrient Composition and Oral Processing Behaviours of the Foods (n=59)**

Item	Protein (g/100g)	Carbohydrate (g/100g)	Fat (g/100g)	Water (g/100g)	Fibers (g/100g)	Energy Density (kcal/100g)	Bites	Bite Size	Chews	Chews per bite	OET (s)	ER (g/min)
Apple	0.3	13.8	0.2	85.8	2.4	52	7	8.6	186.2	26.6	122.1	26.9
Baguette	11.8	56.4	1.8	30.0	2.4	289	19	3.1	606.1	31.9	397.7	7.9
Bakwa (pork jerky)	26.7	42.7	13.7	16.9	0.0	401	12	5.8	582	48.5	317.3	10.3
Beef, steak	26.7	0.7	3.3	69.3	0.0	139	9	6.4	216	24	146	26.2
Beef, steak (pieces)	26.7	0.7	3.3	69.3	0.0	139	16	3.3	288	18	192	18.2
Bok choy (vegetable)	1.6	1.78	0.2	96.5	1.0	12	7	8.6	146.3	20.9	110	32
Bread, white	10	44.3	3.6	42.1	3.7	250	13	5	393.9	30.3	262	13.1
Broccoli, boiled	3.9	0.8	0.3	95.0	2.7	27	8	6.9	128	16	79	41.5
Broccoli, steamed	3.9	0.8	0.3	95.0	2.7	27	10	5.4	200	20	131	26.5
Bulgour	11	66	1.2	21.8	10.0	339	11	4.8	176	16	127	28
Burger (patty)	19	1	15	65.0	0.0	213	7	7.3	147	21	105	32.2
Burger (pre-made)	18	1	15	66.0	0.0	209	8	6.8	144	18	94	35.6
Carrot (raw)	0.8	5	0.1	94.1	3.9	31.6	13	4.8	526.5	40.5	287.1	11.1
Carrot (boiled)	1.1	10.5	0.2	88.3	3.3	45	6	9.5	183	30.5	111.3	31.3
Carrot (mashed)	0.5	2.7	0.5	96.3	1.8	23	9	6.2	72	8	53	64.6
Chicken ball	13.5	10.6	9.4	66.5	2.0	180	6	9	236.4	39.4	150.6	21.9
Chicken breast	26	0	12.7	61.3	0.0	218.2	8	7.4	196	24.5	135.3	26.6
Chicken nugget	21	1	1.5	76.5	0.5	100	10	5.4	150	15	95	33.3
Chicken sliced	20.4	0	40.7	39.0	0.0	454	20	2.9	196	9.8	183.3	18.1

Egg (hard boiled)	13.2	0.3	10.9	75.6	0.0	151.1	6	8.9	144	24	116.7	29.2
Egg mayo	10.7	4.22	15.2	69.9	0.0	195.0	8	6.7	103.2	12.9	75.6	44.8
Fish ball	9.9	4.6	0.9	84.6	0.1	66.21	5	11.9	151	30.2	84.6	39.5
Fish fillet	20.2	0	3.3	76.5	0.2	111	7	8.1	88.9	12.7	60.5	55.7
Fish finger	13	16	8	63.0	0.4	188	8	6.6	112	14	78	42.7
Ham (Thick)	16.7	3.1	3.5	76.7	0.0	111	9	6.1	283.5	31.5	171.9	21.9
Ham (Thin)	12	1.1	4.8	82.1	0.0	96	7	8.8	191.8	27.4	126.4	28.2
Jell-O	1.3	16.2	0	82.5	0.0	69	8	7.3	23.2	2.9	49.8	70.1
Kailan (vegetable)	1.1	3.8	0.7	94.3	2.5	22	8	7	207.2	25.9	148.7	21.4
Kueh (glutinous rice cakes)	1	31.3	5	62.7	0.3	174.3	7	9.5	186.9	26.7	103.6	34.2
Lasagne	10	13	9	68.0	0.4	173	6	8.9	66	11	48	66.1
Mushroom (canned)	2.5	0.5	0.5	96.5	2.5	18	9	6	144	16	86	39.7
Noodle, spaghetti	5.8	30.9	0.9	62.4	1.8	158	7	8.3	191.8	27.4	129.7	26.5
Noodle, udon	2.6	30.7	0.1	66.6	0.8	135	7	8.2	169.4	24.2	118.3	30.6
Papaya	0.4	6.9	0.1	92.6	2.3	34.0	5	11.2	64	12.8	45.4	68.2
Papaya, green (shredded)	0.9	5.2	0.1	93.8	2.0	27	14	3.9	492.8	35.2	325.5	10.7
Pasta, penne	15	67	2.5	15.5	1.4	356	11	5	187	17	127	27.6
Peanut (roasted)	25	11.5	53	10.5	6.4	623	51	1.2	770.1	15.1	497.5	6.6
Pizza	10	22	11	57.0	1.7	229	8	6.4	144	18	101	31.8
Pork belly (roasted)	23.9	0.9	31.9	43.3	0.0	387.4	9	6.9	298.8	33.2	212.1	17.4
Potato chips	6	53.4	25.1	15.5	3.3	463	54	1	669.6	12.4	464.2	7.1
Potato (boiled)	1.7	20.0	0.1	78.2	1.6	86	8	6.8	88	11	59	53.3
Potato (mashed)	1.7	20.0	0.1	78.2	1.8	86	8	7	88.8	11.1	68.3	49
Prata (flat bread)	8.5	32.5	11.9	47.1	2.2	271	10	5.7	309	30.9	226.1	15.8
Quiche	9	16	16	59.0	1.1	246	7	7.4	105	15	79	38.6
Rice, brown	3.1	24.8	0.8	71.3	1.5	119	12	4.6	286.8	23.9	189.7	19
Rice, fried	4.3	20.9	5.9	68.9	0.0	153	10.7	4.7	223.63	20.9	174	29.5
Rice, glutinous	2.8	39.0	0.4	57.9	0.3	170.5	6	9	189.6	31.6	117.6	27.4
Rice, white	2.8	31.1	0.5	65.6	0.0	140	11	4.9	264	24	194.5	19.9
Salmon canned	23.5	0	7.8	68.7	0.0	164	11	4.8	176	16	138	26
Salmon smoked	25	0.5	7	67.5	0.0	165	12	4.9	144	12	89	36.7
Salmon steak	23.7	0	8	68.3	0.0	167	9	5.8	99	11	79	40.6
Sotong	15.6	3.1	1.38	80.0	0.0	92	9	6.1	398.7	44.3	250.5	14.4
Tofu puffs	23.5	3.6	17.6	55.3	1.2	259	13	5.3	614.9	47.3	390.6	9.3
Tofu, firm	16	2	8	74.0	0.3	145	7	7.9	217	31	145	27.7
Tofu, silken	4.8	0.8	2.4	92.0	0.2	43	7	8.1	49.7	7.1	49.5	69.8
Tok (sticky rice cake)	3.3	33.3	0.5	62.9	0.3	151	7	8.2	315	45	200.2	16.8
Tomato (canned)	1.5	4.5	0.5	93.5	0.7	24	6	9.1	42	7	28	101.1
Tomato (raw)	0.7	2.9	0.4	96.0	1.4	20	5	10.2	70	14	47	63.2
Vanilla ice cream	4.3	22.6	13.3	59.8	0.3	227	16	3.9	89.6	5.6	126.2	26.5

**Table S3 – Correlation Coefficients between Mechanical Properties (n=59)**

	<b>Hardness</b>	<b>Adhesiveness</b>	<b>Springiness</b>	<b>Cohesiveness</b>	<b>Chewiness</b>	<b>Resilience</b>	<b>Modulus</b>
<b>Hardness</b>		-0.027	0.126	0.171	0.864**	0.332**	0.757**
<b>Adhesiveness</b>			-0.218	0.070	-0.166	-0.112	-0.080
<b>Springiness</b>				0.777**	0.553**	0.815**	0.018
<b>Cohesiveness</b>					0.542**	0.834**	0.015
<b>Chewiness</b>						0.678**	0.593**
<b>Resilience</b>							0.221