In vitro gastric emptying characteristics of konjac glucomannan with different viscosity and its effects on appetite regulation

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Supporting information

3. Results and Discussions

3.2 *In vitro* gastric emptying characteristic of the test breakfast

1.The structure of the dynamic human stomach-IV (DHS-IV) and the bionic human stomach.

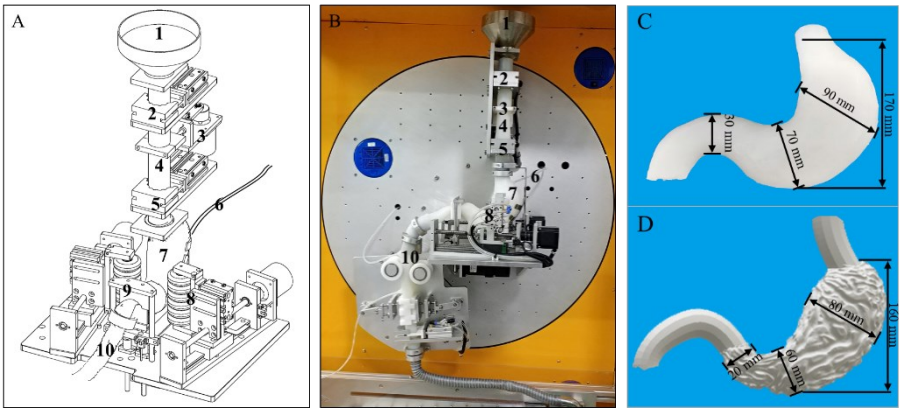

Fig.S1 (A) Schematic diagram and (B) image of the DHS-IV. 1: funnel; 2: upper esophagus clamp; 3: vibrator; 4: bionic esophagus; 5: lower esophagus clamp; 6: gastric juice secretion tube; 7: 3D-printed soft-elastic human stomach; 8: rolling-extrusion device; 9: pylorus clamp; 10: bionic duodenum. (C) The 3D-printed human stomach, and (D) its wrinkled internal surface. Fig.S1 A, C, and D were obtained from the operational manual of the DHS-IV.

2.The motion mode of the rolling-extrusion device and the pylorus during the digestion.

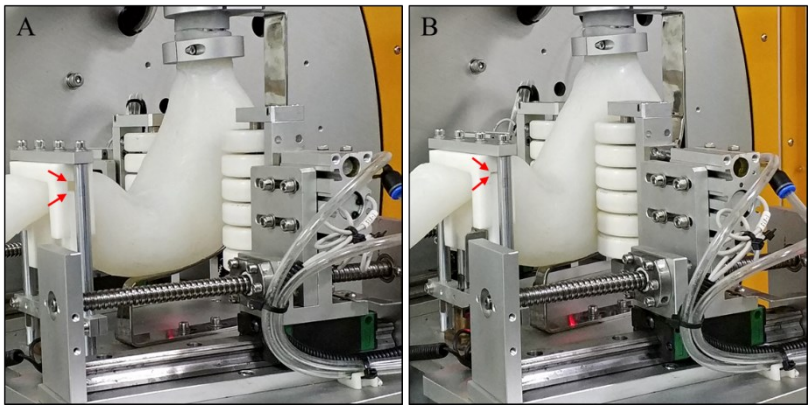

Fig. S2 The relaxed state of the stomach and pylorus (A), and their squeezed state (B). The red arrow in the picture showed the different state of the pylorus plate.

3. The tilting states of the entire system controlled by the auxiliary gastric emptying device.

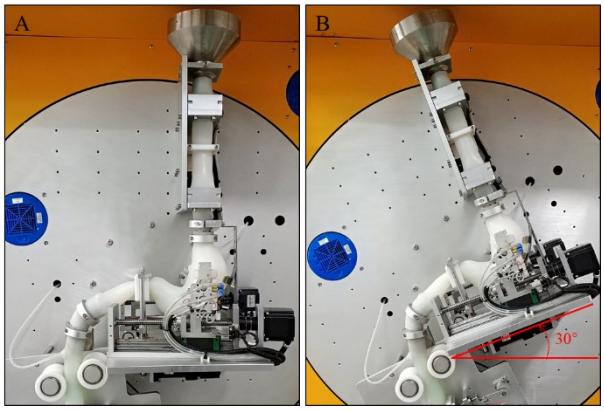

Fig. S3 The tilting angle of the stomach. A: tilting angel = 0°; B: tilting angel = + 30°. The anticlockwise rotation of the stomach would result in an accelerated gastric emptying rate.

3.3 Appetite and food intake

3.3.3 Food intake

1. According to the nutrition labeling of the food, the energy intake of the participant at the *ad libitum* lunch was calculated and shown as follows.

Table S1 Effect of meal viscosity on energy intake (n=22).

Group	Energy intake at the *ad libitum* lunch (kcal)		
	Beverage	Food	Total
C	25.9±10.2[a]	1807.8±175.1[a]	1831.2±173.0[a]
LV	28.5±6.4[a]	1743.1±331.7[ab]	1770.6±336.2[ab]
MV	29.1±5.3[a]	1661.2±319.6[ab]	1668.2±320.9[ab]
HV	26.5±10.7[a]	1627.1±250.2[b]	1652.6±250.1[b]

Means with different superscript letters at the same column differ significantly at $p<0.05$.

2. Appetite state of the participants in different groups, including the subjective appetite score and the concentration of the plasma hormone, were almost identical 3h after the test breakfast was consumed.

Table S2 Subjective appetite ratings at t=180min.

Group	Hunger (mmm)	Fullness (mm)	DE (mm)	PFC (mm)
C	76.6±11.1[a]	17.2±11.3[b]	78.9±10.2[a]	80.0±10.8[a]
LV	73.6±5.9[a]	22.2±8.7[ab]	76.2±5.0[a]	77.8±6.3[a]
MV	74.1±13.7[a]	27.7±11.4[a]	76.5±11.7[a]	79.5±11.2[a]
HV	75.2±9.8[a]	27.9±8.8[a]	76.6±10.5[a]	78.4±9.3[a]

Means with different superscript letters at the same column differ significantly at $p<0.05$.

Table S3 Concentrations of the satiety-related hormone at t=180min.

Group	Glucose (mmol/L)	Insulin (mU/L)	GLP-1 (pmol/L)	PYY_{3-36} (pg/mL)	CCK-8 (pmol/L)	Ghrelin (ng/L)
C	5.1±0.5[a]	8.7±2.5[b]	8.1±1.6[b]	37.4±2.3[a]	201.4±6.9[a]	2118.5±55.1[a]
LV	5.1±0.3[a]	10.6±2.7[ba]	8.8±1.8[b]	39.5±2.7[a]	201.7±7.4[a]	2103.6±83.3[a]
MV	5.1±0.4[a]	9.5±3.0[ba]	9.5±3.0[b]	38.8±4.7[a]	202.3±5.7[a]	2064.7±82.9[ba]
HV	5.4±0.2[a]	11.9±1.9[a]	11.5±2.0[a]	40.5±5.6[a]	204.8±4.4[a]	2008.0±68.7[b]

Means with different superscript letters at the same column differ significantly at $p<0.05$.