

1 **Supplementary Material**

2 **Table S1:** Inclusion criteria: Rome IV criteria for functional constipation

-
- 1) Age: 19 to 75 years
 - 2) More than two of the following symptoms of functional constipation in the last 3 months:
 - (i) Fewer than three bowel movements a week
 - (ii) Hard or lumpy stools in more than 1/4 defecations
 - (iii) Straining during a bowel movement in more than 1/4 defecations
 - (iv) Sensation of incomplete evacuation in more than 1/4 defecations
 - (v) Sensation of anorectal obstruction/blockade in more than 1/4 defecations
 - (vi) Manual maneuvers to facilitate more than 1/4 defecations
 - 3) Loose stools are not present and there are insufficient Rome IV criteria for irritable bowel syndrome
 - 4) Intestinal transit time > 36 h
-

4 **Table S2:** Exclusion criteria

-
- 1) Felt abdominal pain or discomfort at least once a week and more than the following two symptoms matching the Rome IV criteria of irritable bowel syndrome in the last 3 months:
 - (i) Abdominal pain or discomfort that improves or disappears after a bowel movement
 - (ii) A change in the number of bowel movements with the onset of abdominal pain or discomfort
 - (iii) Changes in stool consistency with the onset of abdominal pain or discomfort
 - 2) Intestinal or gallbladder resection surgery
 - 3) Organic gastrointestinal disease
 - 4) Abnormal results of colonoscopy or radiologic tests within the preceding 3 years
 - 5) Diagnosed with one of the following diseases: endocrine disorders (diabetes), malignant tumors, renal failure, hepatic failure
 - 6) Abnormal results of one of the following tests:
 - (i) aspartate transaminase/alanine transaminase more than two times upper normal limits
 - (2) Creatinine > 2.0 mg/dL
 - 7) Within the preceding 2 weeks, taken medicines (antibiotics, antidiarrheals, laxatives, etc.) or health functional foods (probiotics, probiotics, fibers, etc.) that may affect digestive tract movement
-

5

6

Characteristic	Treatment (n = 34)	Control (n = 29)	Total (n = 63)	p-value
Gender				1.0000
Male	5 (14.7)	4 (13.8)	9 (14.3)	
Female	29 (85.3)	25 (86.2)	54 (85.7)	
Age (years)	36.41 ± 14.90	34.55 ± 13.55	35.48 ± 14.23	0.6086
Dietary intakes				
Energy (kcal)	1351.08 ± 722.13	1332.98 ± 492.74	1342.03 ± 607.44	0.9095
Carbohydrate (g)	208.77 ± 132.75	205.28 ± 88.87	207.03 ± 110.81	0.9071
Fat (g)	35.13 ± 18.73	34.60 ± 14.51	34.87 ± 16.62	0.9010
Vegetable (g)	18.51 ± 11.73	18.40 ± 8.26	18.46 ± 10.00	0.9641
Animal (g)	16.62 ± 10.07	16.20 ± 10.21	16.41 ± 10.14	0.8712
Protein (g)	45.84 ± 22.94	45.85 ± 17.15	45.85 ± 20.05	0.9987
Fiber (g)	13.21 ± 10.31	12.87 ± 5.76	13.04 ± 8.04	0.8707
Moisture (g)	532.31 ± 273.40	476.49 ± 211.32	504.40 ± 242.36	0.3744
Alcohol consumption				0.1990
Non-drinker	17 (50.0)	20 (69.0)	37 (58.7)	
Drinker	17 (50.0)	9 (31.0)	26 (41.3)	
Smoking status				0.092
Non-smoker	34 (100.0)	26 (89.7)	60 (95.2)	
Smoker	0 (0.0)	3 (10.3)	3 (4.8)	
Caffeinated drinks intake				0.1286
Never	2 (5.9)	6 (20.7)	8 (12.7)	
1/day or more	32 (94.1)	23 (79.3)	55 (87.3)	

7 **Table S3:** Baseline characteristics of the subjects.

8 Values are presented as number (%) or mean ± standard deviation; p-values are based on Fisher's exact
9 test.

10

11

12 **Table S4:** Severity of adverse effects

Severity	Treatment (n = 34), n (%)	Control (n = 29), n (%)
Mild	2 (5.9)	2 (6.9)
Moderate	0	1 (3.4)
Severe	0	0

13

14 **Table S5:** Vital signs, weight, and body mass index (BMI) of the subjects.

		Treatment (n = 34), mean \pm SD	Control (n = 29), mean \pm SD	p-value
SBP (mmHg)	Baseline	119.68 \pm 17.03	113.66 \pm 12.89	0.1239
	4 weeks	115.15 \pm 16.49	113.55 \pm 12.34	0.6698
DBP (mmHg)	Baseline	71.03 \pm 12.13	66.66 \pm 7.84	0.0904
	4 weeks	70.85 \pm 10.81	67.79 \pm 8.22	0.2171
Pulse (beats/min)	Baseline	82.47 \pm 14.82	81.21 \pm 11.97	0.7142
	4 weeks	77.38 \pm 11.66	83.59 \pm 12.94	0.0498*
Body temperature (°C)	Baseline	36.50 \pm 0.12	36.50 \pm 0.14	0.5849
	4 weeks	36.50 \pm 0.13	36.45 \pm 0.16	0.1944
Weight (kg)	Baseline	59.07 \pm 9.05	59.19 \pm 9.15	0.8493
	4 weeks	58.61 \pm 9.94	58.66 \pm 9.89	0.8250
BMI (kg/m ²)	Baseline	22.45 \pm 2.92	22.50 \pm 3.02	0.6299
	4 weeks	22.07 \pm 3.43	22.08 \pm 3.36	0.5999

15 SBP, systolic blood pressure; DBP, diastolic blood pressure; SD, standard deviation. p-values are based
16 on Fisher's exact test (*p < 0.05).

18 **Table S6:** Results of hematological analysis.

		Treatment (n = 34)	Control (n = 29)	p-value
WBC	Baseline	0 (0.0)	2 (6.9)	>0.05
	4 weeks	1 (2.9)	3 (10.3)	>0.05
RBC	Baseline	0 (0.0)	1 (3.4)	>0.05
	4 weeks	0 (0.0)	1 (3.4)	>0.05
Hemoglobin	Baseline	2 (5.9)	1 (3.4)	>0.05
	4 weeks	1 (2.9)	1 (3.4)	>0.05
Hematocrit	Baseline	1 (2.9)	1 (3.4)	>0.05
	4 weeks	1 (2.9)	1 (3.4)	>0.05
Platelets counts	Baseline	0 (0.0)	0 (0.0)	>0.05
	4 weeks	0 (0.0)	0 (0.0)	>0.05

19 WBC, white blood cell count; RBC, red blood cell count.

20 Values are expressed as the number (%) of subjects with abnormal values; p-values are based on

21 Fisher's exact test.

22 **Table S7:** Results of blood chemistry analysis.

		Treatment (n = 34)	Control (n = 29)	p-value
Total bilirubin	Baseline	0 (0.0)	2 (6.9)	>0.05
	Last visit	1 (2.9)	3 (10.3)	>0.05
ALP	Baseline	0 (0.0)	1 (3.4)	>0.05
	Last visit	0 (0.0)	1 (3.4)	>0.05
AST	Baseline	2 (5.9)	1 (3.4)	>0.05
	Last visit	1 (2.9)	1 (3.4)	>0.05
ALT	Baseline	1 (2.9)	1 (3.4)	>0.05
	Last visit	1 (2.9)	1 (3.4)	>0.05
GGT	Baseline	0 (0.0)	0 (0.0)	>0.05
	Last visit	0 (0.0)	0 (0.0)	>0.05

23 ALP, alkaline phosphatase; AST, aspartate transaminase; ALT, alanine transaminase; GGT, gamma-
24 glutamyl transferase.

25 Values are expressed as the number (%) of subjects with abnormal values; p-values are based on
26 Fisher's exact test.

27

28