Supplemental data for

Digestion Characteristics and Probiotic Activity of An Tea Polysaccharides: Promoting *Lactobacillus* and *Bifidobacterium* In Vitro and In Vivo

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Table S1. Composition of the daily diet in the animal experiment.

Product	Percentage
Protein	22.9%
Carbohydrate	66.0%
Fat	11.1%
Total	100.0%
kcal/kg	3886

Table S2. Primer sequences used in the RT-qPCR experiment.

Gene		Sequence (5'-3')
Muc-2	Forward	ATGCCCACCTCCTCAAAGAC
	Reverse	GTAGTTTCCGTTGGAACAGTGAA
Occludin	Forward	TGAAAGTCCACCTCCTTACAGA
	Reverse	CCGGATAAAAAGAGTACGCTGG
Claudin-1	Forward	TGCCCCAGTGGAAGATTTACT
	Reverse	CTTTGCGAAACGCAGGACAT
ZO-1	Forward	TGAGTGCGTTTCTCTCCCTT
	Reverse	CCCTCTGTGTTCCTCATGGT
TNF-α	Forward	CTCATGCACCACCATCAAGG
	Reverse	ACCTGACCACTCTCCCTTTG
IL-1β	Forward	ATTGACCCATGATCATAGCAT
	Reverse	CGTGTCGTGGGCAGTGGGTTCA
IL-6	Forward	GATATTGACATCCCATAGCAT
	Reverse	GCAGTGGCGGTGTGTCGGTTCA
GAPDH	Forward	AGGTCGGTGTGAACGGATTTG
	Reverse	TGTAGACCATGTAGTTGAGGTCA

Table S3. The contents of the reducing sugars and total sugars of ATPSs at different time points during oral saliva, stomach, and small intestine digestion.

Digestion time	Reducing sugars (mg/mL)	Total sugars (mg/mL)
Saliva digestion stage		
0 min	0.153 ± 0.015a	0.812 ± 0.021a
10 min	0.160 ± 0.006a	0.801 ± 0.106a
30 min	0.164 ± 0.003a	0.881 ± 0.046a
Stomach		
0 h	0.155 ± 0.004b	0.852 ± 0.080b
0.5 h	0.158 ± 0.001b	0.831 ± 0.026b
1 h	0.167 ± 0.003b	0.820 ± 0.046b
2 h	0.177 ± 0.006b	0.813 ± 0.024b
4 h	0.177 ± 0.002b	0.786 ± 0.072b
6 h	0.184 ± 0.005b	0.831 ± 0.046b
Small intestine		
0 h	0.151 ± 0.012c	0.766 ± 0.094c
0.5 h	0.156 ± 0.005c	0.661 ± 0.020c
1 h	0.156 ± 0.001c	0.652 ± 0.014c
2 h	0.141 ± 0.009c	0.693 ± 0.073c
4 h	0.140 ± 0.002c	0.647 ± 0.005c
6 h	0.147 ± 0.028c	0.677 ± 0.038c

Different letters in the same column indicate significant differences between sample groups ($p<0.05$).

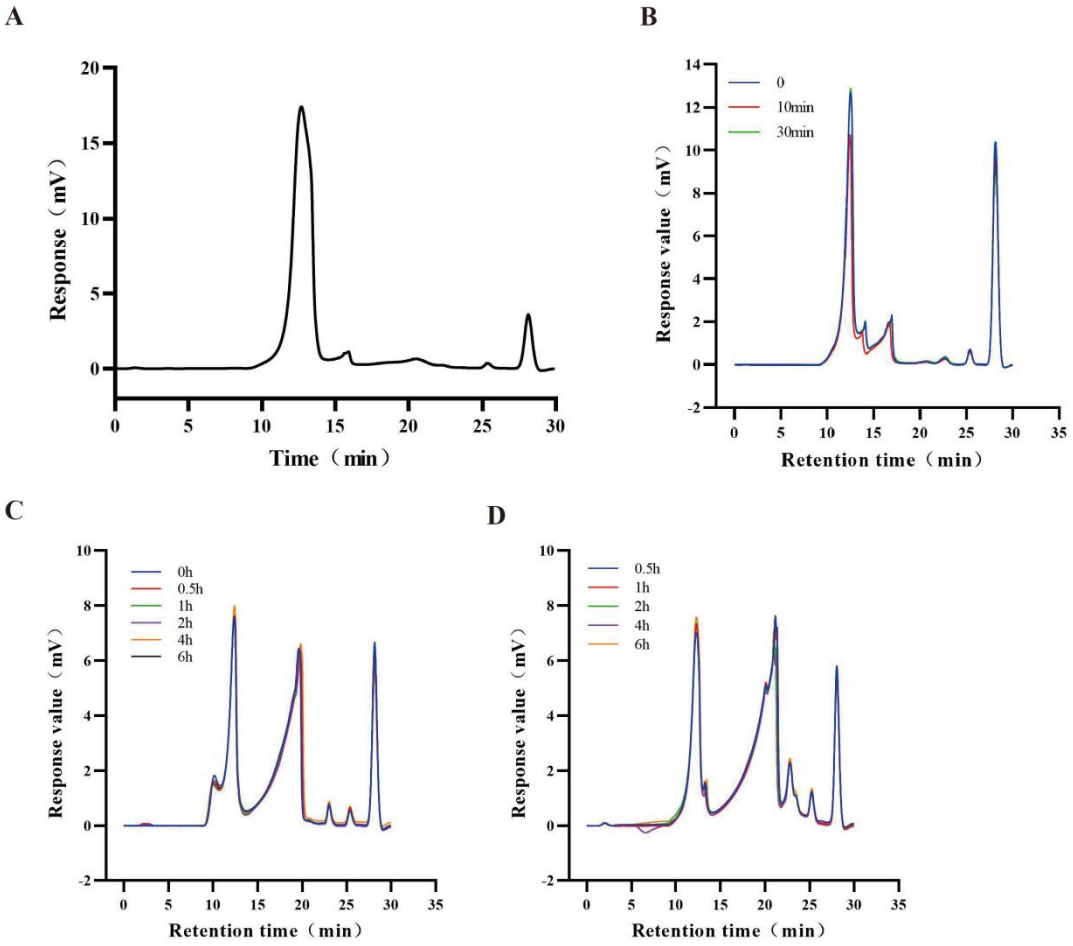


Figure S1. Effect of simulated digestion on the molecular weight of ATPSs. HPGPC chromatograms of undigested ATPSs (A), and changes of ATPSs during simulated saliva (B), gastric fluid (C), and intestinal fluid (D) digestion.

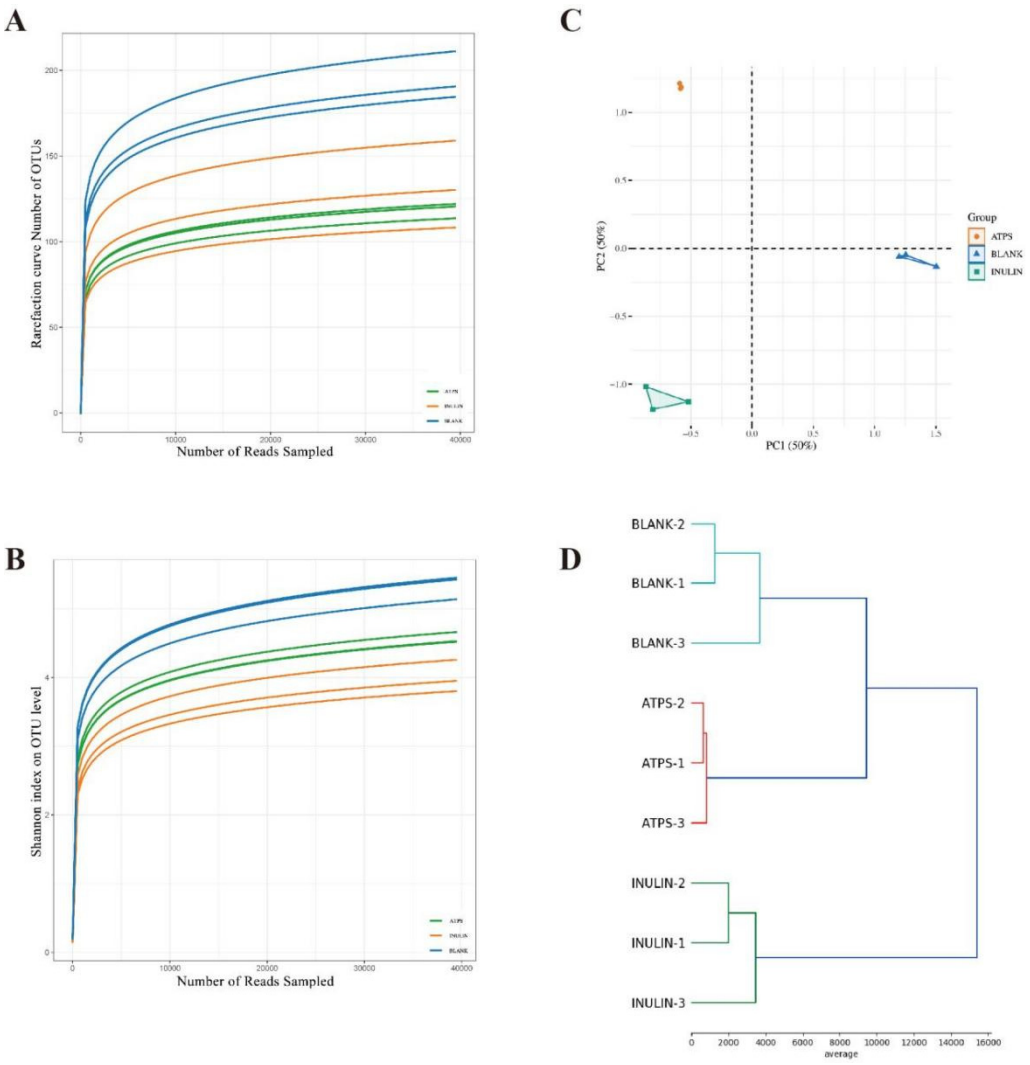


Figure S2. The effect of ATPSs on the structure of the gut microbiota. Dilution curves (A), Shannon diversity curves (B), PCA (C), and clustering analysis (D).

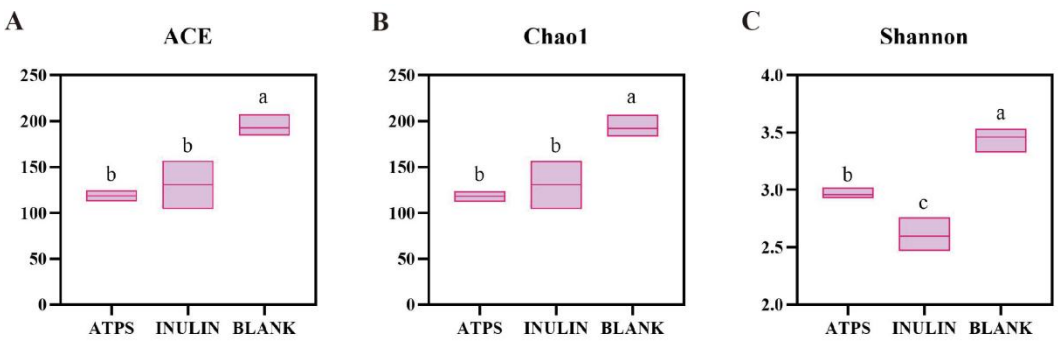


Figure S3. Effect of ATPSs on the **alpha diversity of the gut microbiota**, including the ACE index (A), Chao1 index (B), and Shannon index (C). Significant differences are indicated by distinct letters ($p < 0.05$).

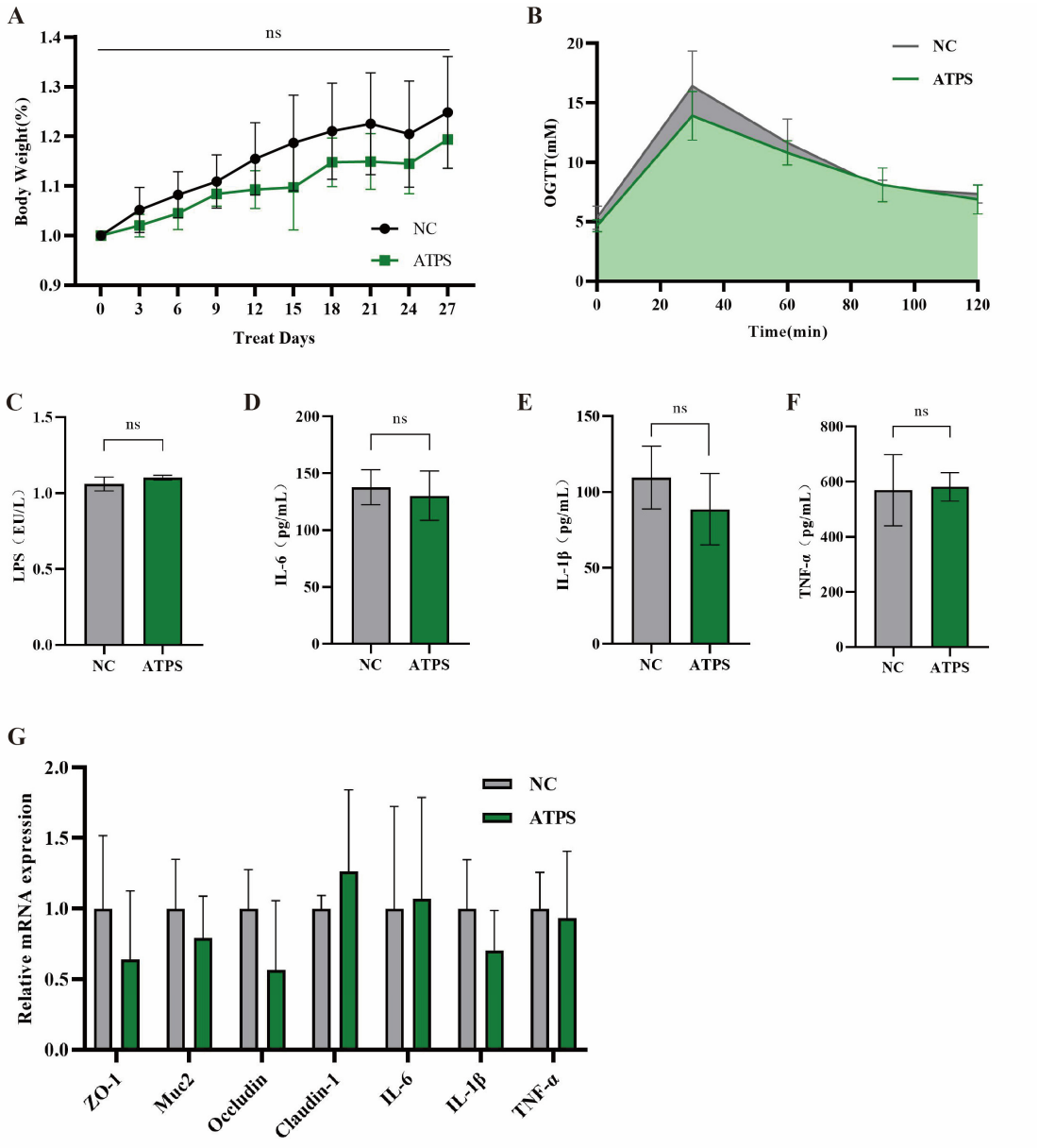


Figure S4. Short-term ATPS administration showed a limited effect on mice. The effect of ATPSs on mice body weight (A), oral glucose tolerance test (OGTT) results (B), serum levels of LPS (C), IL-6 (D), IL-1β (E), TNF-α (F), and colonic gene expression, including ZO-1, Muc2, Occludin, Claudin-1, IL-6, IL-1β, and TNF-α (G). Statistical significance was determined by independent sample t-tests.

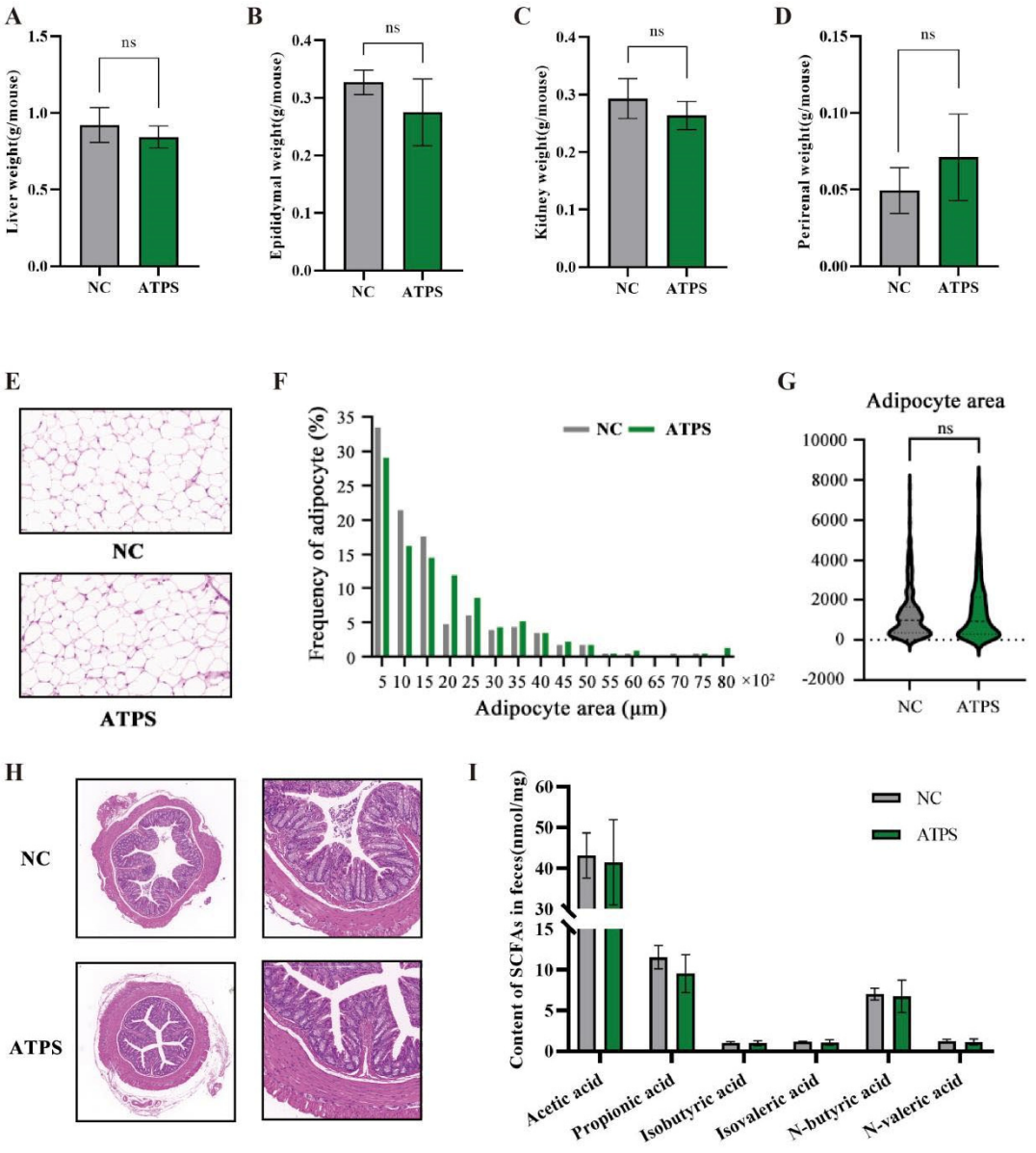


Figure S5. Effect of short-term ATPS administration on organ indices and SCFA content in cecal contents. Liver (A), epididymal fat (B), kidneys (C), perirenal fat (D), and histological sections of epididymal fat tissue (E) and the distribution of the epididymal fat cell area (F, G). Hematoxylin and eosin (H&E) staining of colon sections (H) and SCFA content in cecal contents (I). Results are presented as mean ± SD with significance determined by independent sample t-tests ($p < 0.05$).