Supplementary Table 1 Compositions of experimental diets[#]

	Control	10% WPI	20% WPI	30% WPI	10% SPI	20% SPI	30% SPI
Ingredient (g)							
Casein	200	0	0	0	0	0	0
Whey protein isolate	0	100	200	300	0	0	0
Soy protein isolate	0	0	0	0	100	200	300
L-Cystine	3	3	3	3	3	3	3
Corn starch	506.2	0	0	0	0	0	0
Maltodextrin 10	125	125	125	97.8	125	125	97.8
Sucrose	72.8	172.8	72.8	0	172.8	72.8	0
Cellulose, BW200	50	50	50	50	50	50	50
Soybean oil	25	25	25	25	25	25	25
Cocoa butter	20	245	245	245	245	245	245
Mineral mix S10026B	50	50	50	50	50	50	50
Vitamin mix V10001C	1	1	1	1	1	1	1
Choline bitartrate	2	2	2	2	2	2	2
FD&C yellow dye #5	0.04	0	0	0	0	0	0
FD&C blue dye #1	0.01	0.05	0.05	0.05	0.05	0.05	0.05
Total (g)	1055.05	773.85	773.85	773.85	773.85	773.85	773.85
Energy (kcal %)							
Protein	20%	10%	20%	30%	10%	20%	30%
Carbohydrate	70%	30%	20%	10%	30%	20%	10%
Fat	10%	60%	60%	60%	60%	60%	60%
Energy density (kcal/g)	3.85	5.22	5.22	5.22	5.22	5.22	5.22

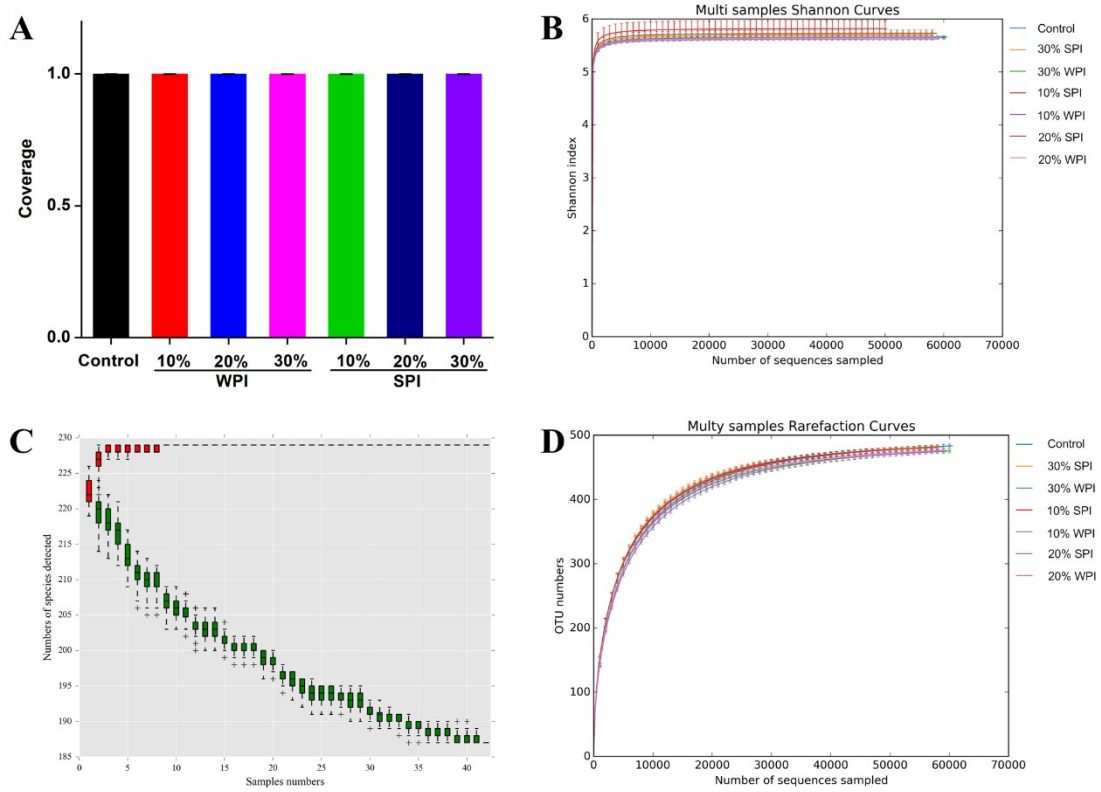
[#] The feeds composition table has been reported in our previous study.[1] WPI, whey protein isolate; SPI, soy protein isolate.

Supplementary Table 2 Primers sequences used in Real-time PCR

Genes	Sequence
CD36 forward	GCAGGTCTATCTACGCTGTGTTCG
CD36 reverse	TGTCTGGATTCTGGAGGGGTGATG
SLC27A1 forward	TCTACGGGTTGACGGTGGTACTG
SLC27A1 reverse	CTCAGCAGGTAGCGGCAGATTTC
PPARγ forward	GCCAAGGTGCTCCAGAAGATGAC
PPARγ reverse	GTGAAGGCTCATGTCTGTCTCTGTC
CPT1b forward	GAGGAAGGGTAGAGTGGGCAGAG
CPT1b reverse	TCATCCAGGGTCACAAAGAAAGCAG
PPARα forward	CTTCACGATGCTGTCCTCCTTGATG
PPARα reverse	GATGTCACAGAACGGCTTCCTCAG
AMPKα forward	CTACCTAGCAACCAGCCCAC
AMPKα reverse	ACGTCTGAGGGCTTTCCTTG
SREBP1c forward	GGATGCGGCTGTTGTCTACCATAAG
SREBP1c reverse	CCAGGTTAGAAGCAGCAAGATGTCC
FASN forward	GGATATTGTCGCTCTGAGGCTGTTG
FASN reverse	TGCTCCTTGCTGCCATCTGTATTG
ACC1 forward	CCCAGAGATGTTTCGGCAGTCAC
ACC1 reverse	GTCAGGATGTCGGAAGGCAAAGG
HSL forward	GACAGGACAGCAAGGTACTCAACAG
HSL reverse	GCCTCCGTGGATGTGAACAACC
DGAT1 forward	AGCTATCCAGACAACCTGACCTACC
DGAT1 reverse	TCAAGAACTCGTCGTAGCAGAAAGC
LPL forward	CGCTCTCAGATGCCCTACAAAGTG
LPL reverse	TTGTGTTGCTTGCCATCCTCAGTC
GLUT4 forward	AGCCAGCCTACGCCACCATAG
GLUT4 reverse	TCCGTCGTCCAGCTCGTTCTAC
IRS-1 forward	CCAGCAGCAGTAGCAGCATCAG
IRS-1 reverse	GCTTACCGCCACCACTCTCAAC
PI3K forward	GGAATGTCGGGAGCAGCAACC
PI3K reverse	TCTACCACTACGGAGCAGGCATAG
AKT forward	TCAGGATGTGGATCAGCGAGAGTC
AKT reverse	AGGCAGCGGATGATAAAGGTGTTG
mTOR forward	ACCGTCCGCCTTCACAGATACC
mTOR reverse	GCAGTCCGTTCCTTCTCCTTCTTG
S6K1 forward	CCTGTCAGCCCAGTCAAATTCTCTC
S6K1 reverse	CCGCTCACTGTCACATCCATCTG
β-actin forward	TATGCTCTCCCTCACGCCATCC
β-actin reverse	GTCACGCACGATTTCCCTCTCAG

CD36, cluster of differentiation 36; *SLC27A1*, solute carrier family 27 member 1; *PPARγ*, peroxisome proliferator-activated receptor gamma; *CPT1b*, carnitine palmityl transferase 1b; *PPARα*, peroxisome proliferator-activated receptor alpha; *AMPKα*, AMP-activated protein kinase alpha; *SREBP1c*, sterol regulatory element binding protein-1c; FASN, fatty acid synthase; ACC1,

acetyl-Coenzyme A carboxylase alpha; *HSL*, hormone-sensitive lipase; *DGAT1*, diacylglycerol O-acyltransferase 1; *LPL*, lipoprotein lipase; *GLUT4*, glucose transporter 4; *IRS-1*, insulin receptor substrate 1; *PI3K*, phosphatidylinositol 3-kinase; *AKT*, protein kinase B; *mTOR*, mammalian target of rapamycin; *S6K1*, S6 kinase 1.



Supplementary Fig. 1 Coverage (A); Shannon index curve (B); cumulative curve of species relative abundance at genus level (C); rarefaction curve (D). Data represent mean ± SEM ($n = 6$). WPI, whey protein isolate; SPI, soy protein isolate.

Reference

1. A. Ji, W. Chen, T. Zhang, R. Shi, X. Wang, Y. Wang, H. Xu and D. Li, Whey protein and soy protein prevent obesity by upregulating uncoupling protein 1 to activate brown adipose tissue and promote white adipose tissue browning in high-fat diet-fed mice, *Food Funct.*, 2022, 13, 12836–12851.