

Oral administration of animal and plant protein mixture with *Lactiplantibacillus plantarum* IDCC 3501 improves protein digestibility

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Supplementary material

Table S1. The concentration of macronutrients of normal diet (ND) and high protein diet (HPD)

Nutrients					
Normal diet (ND)			High protein diet (HPD)		
Protein	%	18.6	Protein	%	40
Fat (ether extract)	%	6.2	Fat (ether extract)	%	4.6
Carbohydrate (available)	%	44.2	Carbohydrate (available)	%	32.6
Crude fiber	%	3.5	Crude fiber	%	2.6
Neutral detergent fiber	%	14.7	Neutral detergent fiber	%	10.8
Ash	%	5.3	Ash	%	3.9
Micronutrients (mineral, vitamin, etcl.)	%	7.5	Micronutrients (mineral, vitamin, etc.)	%	5.5
Total	%	100	Total	%	100

Table S2. The composition of amino acids in normal diet (ND).

Amino acids		
Glutamic acid	%	3.4
Leucine	%	1.8
Proline	%	1.6
Aspartic acid	%	1.4
Alanine	%	1.1
Serine	%	1.1
Arginine	%	1.0
Phenylalanine	%	1.0
Lysine	%	0.9
Valine	%	0.9
Glycine	%	0.8
Isoleucine	%	0.8
Threonine	%	0.7
Tyrosine	%	0.6
Histidine	%	0.4
Methionine	%	0.4
Cysteine	%	0.3
Tryptophan	%	0.2

Table S3. The content of constitutive amino acids in the mixture of animal and plant protein sample

Amino acids	Unit (g/100 g)	Percentage (%)
Glutamate	16.45 ± 0.88	9.37
Aspartate	7.88 ± 0.37	4.96
Leucine	7.84 ± 0.50	5.02
Lysine	6.64 ± 0.42	19.56
Proline	6.63 ± 0.36	7.88
Valine	4.52 ± 0.75	2.39
Serine	4.22 ± 0.40	4.10
Isoleucine	4.22 ± 0.73	5.38
Threonine	4.17 ± 0.01	5.02
Phenylalanine	3.64 ± 0.36	9.33
Alanine	3.45 ± 0.17	3.27
Tyrosine	2.75 ± 0.44	4.33
Glycine	2.01 ± 0.12	2.33
Histidine	1.96 ± 0.16	7.90
Methionine	1.80 ± 0.10	4.04
Cysteine	1.52 ± 0.07	1.81
Tryptophan	0.98 ± 0.02	2.14
Arginine	0.39 ± 0.15	1.17
Total amino acids	84.07 ± 0.26	100

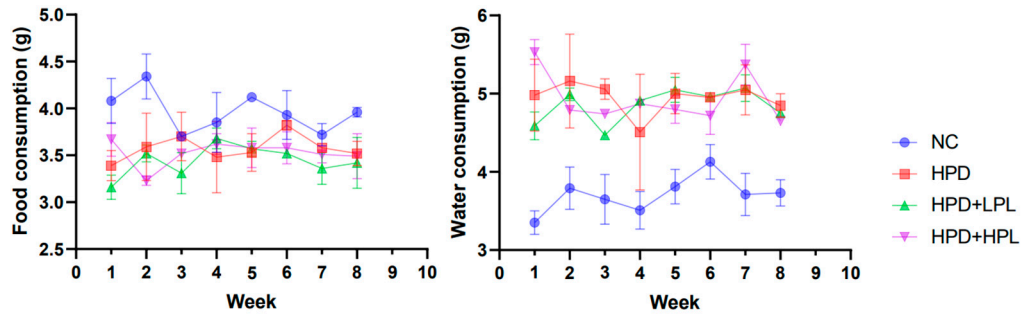


Figure S1. Daily water and food intake. **(a)** Average daily food intake changes during the animal experiment. **(b)** Average daily water intake changes during the animal experiment. NC: Normal control group; HPD: High-protein diet group; HPD + LPL: group treated with high-protein diet with 5×10^7 CFU/day *L. plantarum* IDCC 3501; HPD + HPL: group treated with high-protein diet with 5×10^8 CFU/day *L. plantarum* IDCC 3501. Values are mean with SD.

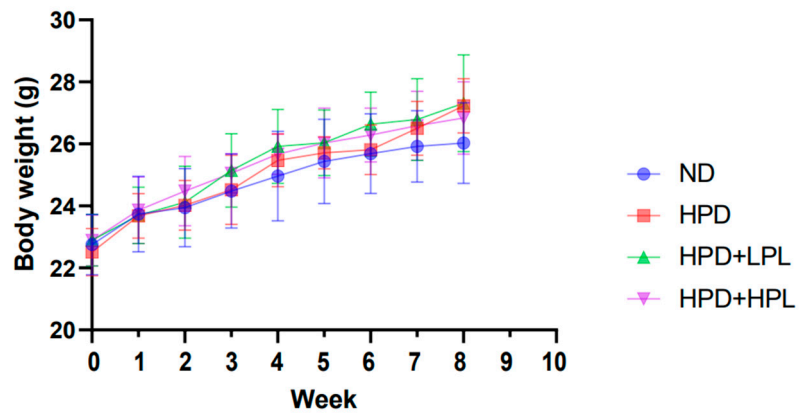


Figure S2. Body weight changes. Average body weight changes during the animal experiment. NC: Normal control group; HPD: High-protein diet group; HPD + LPL: group treated with high-protein diet with 5×10^7 CFU/day *L. plantarum* IDCC 3501; HPD + HPL: group treated with high-protein diet with 5×10^8 CFU/day *L. plantarum* IDCC 3501. Values are mean with SD.

Table S4. The concentration of free amino acid profiles in the blood serum of mice. Values are mean with SD. Different superscript letters (a-b) indicate significant differences between the groups ($P \leq 0.05$).

($\mu\text{mol/L}$)	Normal diet	High protein diet	High protein diet & low <i>L. plantarum</i>	High protein diet & high <i>L. plantarum</i>
Glutamine	3014.30 \pm 680.20 ^a	2405.36 \pm 342.00 ^a	2427.52 \pm 324.47 ^a	2442.28 \pm 562.84 ^a
Taurine	557.43 \pm 76.11 ^a	510.03 \pm 94.66 ^a	525.07 \pm 49.61 ^a	479.51 \pm 69.96 ^a
Alanine	188.52 \pm 53.10 ^a	211.44 \pm 51.80 ^a	215.68 \pm 38.39 ^a	267.41 \pm 46.62 ^b
Lysine	144.64 \pm 18.24 ^{ab}	145.12 \pm 34.13 ^{ab}	141.29 \pm 29.57 ^a	193.99 \pm 39.35 ^b
Proline	180.30 \pm 40.34 ^a	162.06 \pm 41.16 ^a	171.13 \pm 18.17 ^a	181.87 \pm 26.49 ^a
Glycine	164.16 \pm 35.26 ^a	142.67 \pm 33.69 ^a	155.61 \pm 15.68 ^a	159.79 \pm 22.88 ^a
Valine	82.76 \pm 40.97 ^a	114.61 \pm 20.71 ^{ab}	120.42 \pm 35.18 ^{ab}	149.04 \pm 27.13 ^b
Arginine	121.25 \pm 10.92 ^a	124.27 \pm 27.98 ^a	117.70 \pm 17.09 ^a	141.80 \pm 18.77 ^a
Leucine	68.86 \pm 7.77 ^a	86.49 \pm 21.27 ^{ab}	91.30 \pm 32.66 ^{ab}	119.47 \pm 24.14 ^b
Threonine	75.81 \pm 5.90 ^a	80.91 \pm 23.80 ^a	82.99 \pm 19.04 ^a	105.50 \pm 24.40 ^a
Serine	67.14 \pm 18.16 ^a	60.68 \pm 18.01 ^a	59.99 \pm 6.83 ^a	73.74 \pm 13.98 ^a
Tyrosine	53.36 \pm 8.62 ^a	54.02 \pm 16.26 ^b	53.91 \pm 11.10 ^b	63.63 \pm 16.00 ^b
Isoleucine	39.01 \pm 5.91 ^a	45.28 \pm 10.08 ^{ab}	47.61 \pm 15.31 ^{ab}	61.58 \pm 11.07 ^b
Phenylalanine	37.89 \pm 6.16 ^a	36.77 \pm 7.17 ^a	37.99 \pm 6.38 ^a	43.11 \pm 5.73 ^a
Methionine	25.08 \pm 11.77 ^a	29.32 \pm 8.84 ^a	28.73 \pm 6.24 ^a	37.77 \pm 7.85 ^a
Histidine	32.50 \pm 10.44 ^a	27.38 \pm 4.43 ^a	29.23 \pm 3.35 ^a	32.24 \pm 3.84 ^a
Glutamate	11.60 \pm 3.46 ^a	19.27 \pm 2.96 ^b	22.69 \pm 5.22 ^b	21.56 \pm 2.38 ^b
Tryptophan	9.65 \pm 6.97 ^a	10.05 \pm 1.96 ^a	11.09 \pm 2.66 ^a	13.36 \pm 3.68 ^a
Cysteine	31.58 \pm 60.02 ^a	9.93 \pm 3.29 ^a	7.96 \pm 2.66 ^a	7.77 \pm 1.54 ^a
Aspartate	3.70 \pm 2.39 ^a	7.33 \pm 1.46 ^b	7.88 \pm 1.48 ^b	7.50 \pm 1.58 ^b
Asparagine	0.08 \pm 0.03 ^a	0.06 \pm 0.02 ^a	0.07 \pm 0.01 ^a	0.09 \pm 0.03 ^a
GABA	0.53 \pm 0.24 ^a	0.12 \pm 0.18 ^b	0.00 \pm 0.00 ^b	0.05 \pm 0.12 ^b