

Table S1. Chemical composition of the fish meal and poultry by-product meal.

	Fish meal	Poultry by-product meal
Dry Matte %	95.66	94.03
Crude protein %	63.73	63.16
Crude lipid %	8.98	10.24
Ash %	15.09	12.40
EAA¹ g/100g		
Arg	4.06	4.06
Cys	0.48	0.59
His	1.46	1.26
Ile	2.58	2.37
Leu	4.35	4.77
Lys	4.66	3.65
Met	1.81	1.22
Phe	2.58	2.16
Tyr	1.84	1.85
Thr	2.60	2.18
Trp	0.70	0.80
Val	2.98	2.53
NEAA² g/100g		
Ala	4.19	4.01
Asp	5.29	4.60
Glu	8.21	7.31
Gly	5.58	5.36
Pro	3.44	3.72
Ser	2.00	2.08

¹EAA, essential amino acid.²NEAA, non-essential amino acids.

Table S2. Ingredients composition of the experimental diets (%).

Ingredients	Dietary Treatment¹			
	PBM0	PBM5	PBM10	PBM15
Fish meal	55.00	50.00	45.00	40.00
Poultry by-product meal	0.00	5.00	10.00	15.00
Soy protein concentrate	5.00	5.00	5.00	5.00
Wheat meal	25.80	25.80	25.80	25.80
Soybean oil	3.00	3.00	3.00	3.00
Extruded soybean	5.00	5.00	5.00	5.00
Shrimp paste	3.00	3.00	3.00	3.00
Choline chloride	2.00	2.00	2.00	2.00
Vitamin premix ²	0.20	0.20	0.20	0.20
Mineral premix ³	0.50	0.50	0.50	0.50
Choline chloride	0.50	0.50	0.50	0.50

¹PBM0, PBM5, PBM10 and PBM15 (no replacement of fish meal, PBM replacement of 5%, 10%, 15% of fish meal). The same below

²Vitamin premix: provided by Zhejiang Jindadi Agricultural Co., Ltd., Zhejiang, China.

³Mineral premix: provided by Zhejiang Jindadi Agricultural Co., Ltd., Zhejiang, China.

Table S3. Chemical and amino acid composition and fatty acid profile of the test diets.

	Dietary Treatment¹			
	Con	PBM5	PBM10	PBM15
Proximate composition % as fed				
Dry matter	90.65	90.88	90.59	90.74
Crude protein	43.89	43.86	43.83	43.80
Crude lipid	9.73	9.79	9.86	9.92
Crude ash	12.60	12.47	12.33	12.20
EAA¹ g/100g				
Arg	2.89	2.89	2.89	2.89
His	1.07	1.06	1.05	1.04
Ile	1.86	1.85	1.84	1.83
Leu	3.16	3.19	3.21	3.23
Lys	3.14	3.09	3.03	2.98
Met	1.15	1.13	1.10	1.07
Cys	0.44	0.44	0.45	0.46
Phe	1.92	1.90	1.88	1.85
Tyr	1.35	1.35	1.35	1.35
Thr	1.82	1.80	1.78	1.76
Trp	0.44	0.44	0.45	0.45
Val	2.13	2.11	2.09	2.07
NEAA² g/100g				
Ala	2.83	2.82	2.81	2.80
Asp	3.94	3.91	3.87	3.84
Glu	6.50	6.45	6.41	6.36
Gly	3.59	3.58	3.57	3.55
Pro	2.58	2.59	2.61	2.62
Ser	1.63	1.63	1.64	1.64

¹PBM0, PBM5, PBM10 and PBM15 (no replacement of fish meal, PBM replacement of 5%, 10%, 15% of fish meal). The same below

²EAA, essential amino acid.

³NEAA, non-essential amino acids.

Table S4. Primer sequences of the intestinal and liver genes of the Chinese soft-shelled turtle.

Gene	Accession Number	Pair primers	Size(bp)	Tm(°C)
<i>β-actin</i>	XM_006134860	F: TGAGCTTCGTGTAGCACCTG R: AGGATGGCATGGGGTAAAGC	252	58.18 58.02
<i>IL-10</i>	KT203380	F: ACAGGAAATATGGGGAAGGACG R: AAGATTTAAACTGAGGTTCTGGAAG	126	56.79 52.13
<i>IFN-γ</i>	JN021380	F: GTCCCAACCAACGGCAAAC R: GACTTTGTTGCTTCAAACGGG	195	57.87 54.85
<i>TNF-α</i>	XM_014575959	F: TCCTCCGGCACATCATCTTG R: GTACCACACTTCGGTCTCGG	116	57.51 58.18
<i>IL-1β</i>	NM_001317048	F: TCCAACACCAAGTGAGGCTG R: ACTCAAACCTGGGTGGTGTCC	249	57.90 57.64
<i>IL-8</i>	FJ472848	F: AGTGAGTTGTTTGTCTCAATTAGT R: AGCTTGGGGCAGAGAAGAGA	209	53.47 58.53
<i>IL-15</i>	XM_006121622	F: ACATACGTGAAGATGAATGTGAAGT R: GCGCACATGCTGTTGGATT	116	53.51 57.07
<i>IGF-1</i>	NM_001286920	F: CAAGCCACCCAAATCTGCAC R: CCTGTGTTCCCTCGACTTGT	105	57.55 57.30
<i>TLR4</i>	NM_001286933	F: ATTGCGTCCCAGTGACGTT R: AGGGACTTGAATGTGCTCGG	176	56.88 57.71
<i>TLR5</i>	XM_025180981	F: ACCATCTACTCTCCGTTGCC R: GATCCCTCGGTACTCTCCCA	185	56.92 58.43
<i>TLR8</i>	XM_014573456	F: TGCTATCTGCTCCTGTGGTG R: GGGATTTCATGTTGCCTTTCTTT	106	57.21 53.23

β-actin: Beta-actin; *IL-10*: Interleukin-10; *IFN-γ*: interferon-γ *TNF-α*: Tumor necrosis factor-α; *IL-1β*: Interleukin-1β; *IL-8*: Interleukin-8; *IL-15*: Interleukin-15; *IGF-1*: Insulin-like growth factor 1; *TLR4*: Toll-likereceptor4; *TLR5*: Toll-likereceptor5; *TLR8*: Toll-likereceptor8;