

Table S1. Nutritional composition of feed

Item	Crude protein	Crude lipid	Crude fibre	Ash	Water	Phosphorus	Sodium chloride	Calcium	Lysine	Methionine
Content (%)	≥ 45	≥ 4.0	≤ 8.0	≤ 22.0	≤ 10.0	≥ 1.2	≤ 3.0	≥ 2.5	≥ 2.5	≥ 1.2

Table S2. Breeding environment data

Item	Group 1	Group 2	Group 3	Group 4	Group 5
Light intensity (lx)	21.04 ± 2.72 ^{Aa}	18.44 ± 3.00 ^{ABb}	15.75 ± 2.88 ^{BCc}	13.43 ± 2.35 ^{CDd}	11.15 ± 2.01 ^{De}
Temperature (°C)	22.31 ± 0.30	22.40 ± 0.41	22.32 ± 0.25	22.38 ± 0.41	22.36 ± 0.50
Dissolved oxygen (mg L ⁻¹)	8.54 ± 0.02	8.54 ± 0.01	8.58 ± 0.09	8.54 ± 0.02	8.55 ± 0.02
NH ₄ ⁺ (mg L ⁻¹)	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
NO ₂ ⁻ (mg L ⁻¹)	-	-	-	-	-

Note: Different lowercase letters represent significant differences, while the same uppercase letter represents no significant differences.

Table S3. The stress related indicators and digestive enzymes of *Siniperca chuatsi* before hunger

Tissue	total protein ($\mu\text{g mL}^{-1}$)	ACP (King unit g ⁻¹ prot)	AKP (King unit g ⁻¹ prot)	LDH (U g ⁻¹ prot)	SOD (U mg ⁻¹ prot)	CAT (U mg ⁻¹ prot)	GPT (U g ⁻¹ prot)	GOT (U g ⁻¹ prot)	Protease (U ml ⁻¹)	Lipase (U g ⁻¹ prot)	α -amylase (U mg ⁻¹ prot)
Gill	4062.42 ± 231.21	5.89 ± 0.42	4.28 ± 0.45	62.78 ± 1.36	26.93 ± 0.29	42.11 ± 1.27	206.43 ± 5.64	266.64 ± 5.42	na	na	na
Brain	5628.37 ± 169.35	7.73 ± 0.31	4.46 ± 0.17	33.02 ± 0.47	25.86 ± 1.01	24.31 ± 1.25	151.28 ± 2.26	298.34 ± 3.72	na	na	na
Intestine	5552.68 ± 331.64	45.85 ± 0.66	100.22 ± 0.78	42.85 ± 0.66	20.02 ± 0.34	30.59 ± 0.56	122.56 ± 3.72	264.33 ± 3.17	1.51 ± 0.03	651.41 ± 23.15	0.51 ± 0.09
Stom	4162.51 ±	16.43 ±	3.12 ± 0.24	61.34 ±	24.53 ±	20.64 ±	151.42 ±	297.43 ±	1.64 ± 0.11	1165.33 ±	0.42 ± 0.07

ach	215.21	0.23		1.20	0.67	0.96	3.22	6.38		34.27
Kidn	9015.46 ±	10.22 ±	4.73 ± 0.16	40.36 ±	16.42 ±	33.72 ±	76.85 ±	142.21 ±	na	na
ey	178.56	0.11		0.72	0.86	1.12	6.31	2.65		na
Liver	9754.81 ±	12.92 ±	1.47 ± 0.35	12.03 ±	16.36 ±	67.68 ±	86.54 ±	134.61 ±	na	na
	316.11	0.35		0.17	0.11	2.54	2.41	3.97		na
Plas	30451.47 ±	14.37 ±	0.21 ± 0.06	3.27 ± 0.11	3.56 ± 0.09	6.64 ± 0.25	22.23 ±	28.19 ±	na	na
ma	541.33	0.16					1.56	0.77		na

Note: "na" represents there was no relevant data. $n = 5$.

Formula for calculating enzyme activity

$$\text{Total protein contents (ug ml}^{-1}) = (\text{OD}_a - \text{OD}_b) / (\text{OD}_c - \text{OD}_b) * A * B$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the blank group. OD_c represents the absorbance value of the standard product. A represents the standard product concentration (524 $\mu\text{g/mL}$). B represents the sample dilution ratio.

$$\text{Protease (U ml}^{-1}) = (\text{OD}_a - \text{OD}_b) / (\text{OD}_c - \text{OD}_d) * A * B / C * (D / E / F)$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group. OD_c represents the absorbance value of the standard product. OD_d represents the absorbance value of the blank group. A represents the standard product concentration (50 $\mu\text{g/mL}$). B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/L). D represents the total volume of the reaction solution (0.64 ml). E represents the sampling quantity (0.04 ml). F represents the reaction time (10 min).

$$\text{Lipase (U g}^{-1} \text{ prot}) = (\text{OD}_a - \text{OD}_b) / (\text{OD}_c - \text{OD}_b) * A * B / C$$

Note: OD_a represents the absorbance change value of the sample. OD_b represents the absorbance change value of the blank group. OD_c represents the absorbance change value of the standard product. A represents the standard product activity (45.8 U/L). B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/L).

$$\alpha\text{-amylase (U mg}^{-1}\text{ prot)} = (\text{OD}_b - \text{OD}_a) / \text{OD}_b * (0.4 * 0.5 / 10) * (30/7.5) / A * B / C$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group. A represents the sampling quantity (0.1 ml). B represents the sample dilution ratio. C represents the protein concentration of the sample (mg prot/mL).

$$\text{ACP (King unit g}^{-1}\text{ prot)} = (\text{OD}_a - \text{OD}_b) / (\text{OD}_c - \text{OD}_b) * A * B / C$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the blank control. OD_c represents the absorbance value of the standard product. A represents the standard product concentration (0.1 mg/mL). B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/ml).

$\text{AKP (King unit g}^{-1}\text{ prot)}$: It's the same as ACP's.

$$\text{LDH (U g}^{-1}\text{ prot)} = (\text{OD}_a - \text{OD}_b) / (\text{OD}_c - \text{OD}_d) * A * B / C$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group. OD_c represents the absorbance value of the standard product. OD_d represents the absorbance value of the blank group. A represents the standard product concentration (0.2 μ mol/mL). B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/ml).

$$\text{SOD (U mg}^{-1}\text{ prot)} = A / 0.5 * B / C * D; A (\%) = [(\text{OD}_c - \text{OD}_d) - (\text{OD}_a - \text{OD}_b)] / (\text{OD}_c - \text{OD}_d) * 100\%$$

Note: A represents the inhibition rate of SOD. B represents the sample dilution ratio. C represents the protein concentration of the sample (mg prot/ml). D represents the dilution ratio of the reaction system, which is the total reaction volume/sampling volume (0.24 / 0.02). OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the blank in the experimental group. OD_c represents the absorbance value of the control group. OD_d represents the absorbance value of the blank in control group.

$$\text{CAT (U mg}^{-1}\text{ prot)} = (\text{OD}_b - \text{OD}_a) * 271 / (60 * A) * B / C$$

Note: OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group. A represents the sampling quantity (ml). B represents the sample dilution ratio. C represents the protein concentration of the sample (mg prot/ml).

$$\text{GPT (U g}^{-1} \text{ prot)} = A * 0.482 * B / C; A (\text{U L}^{-1}) = y = a + b * (\text{OD}_a - \text{OD}_b) + c * (\text{OD}_a - \text{OD}_b)^{1.5} + d * (\text{OD}_a - \text{OD}_b)^{2.5} + e * (\text{OD}_a - \text{OD}_b)^3$$

Note: A represents the enzyme activity of the homogenate assay solution. B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/L). y represents the standard curve, $R^2 = 0.99999$, and the a, b, c, d, e are 0.01, 170.62, 1206.07, -4614.65 and 6556.84, respectively. OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group.

$$\text{GOT (U g}^{-1} \text{ prot)} = A * 0.482 * B / C; A (\text{U L}^{-1}) = y = a + b * (\text{OD}_a - \text{OD}_b) + c * (\text{OD}_a - \text{OD}_b)^{2.5} + d * (\text{OD}_a - \text{OD}_b)^3$$

Note: A represents the enzyme activity of the homogenate assay solution. B represents the sample dilution ratio. C represents the protein concentration of the sample (g prot/L). y represents the standard curve, $R^2 = 0.99999$, and the a, b, c and d are 0.02, 303.10, -2060.90 and 14023.06, respectively. OD_a represents the absorbance value of the sample. OD_b represents the absorbance value of the control group.