

**Table S1.** Formulation and proximate composition of experimental diets.

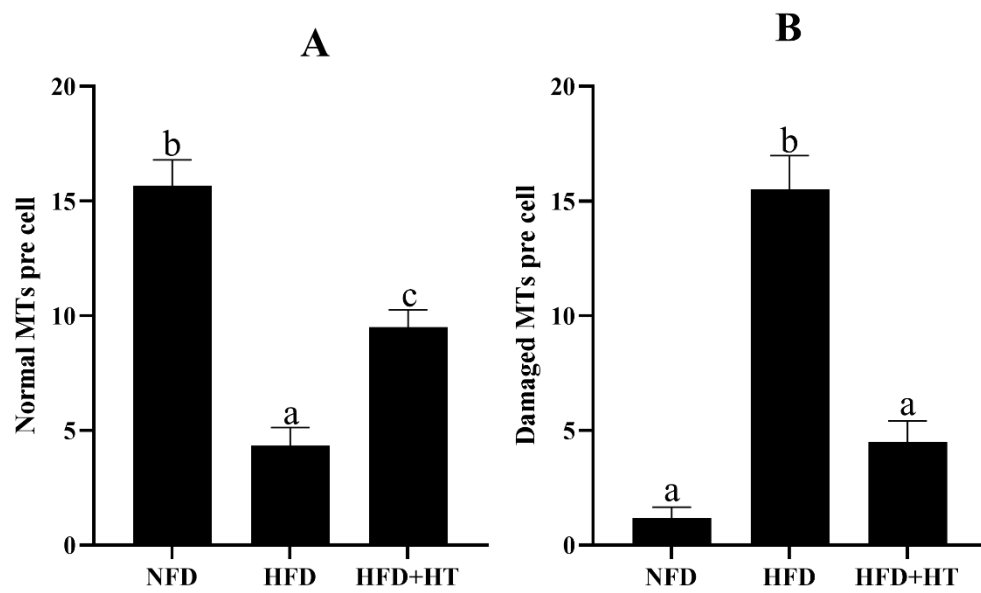
Ingredients (g/kg)	NFD	HFD	NFD+HT	HFD+HT
Fish meal	268.5	268.5	268.5	268.5
Poultry meal	84.7	84.7	84.7	84.7
Gluten flour	73	87.5	73	87.5
Soybean meal	250	250	250	250
$\alpha$ -starch	30	30	30	30
Wheat Flour	201.1	125.1	200.9	124.9
Fish oil	19.3	50	19.3	50
Soybean oil	19.3	50	19.3	50
Soybean lecithin	20	20	20	20
Premix <sup>1</sup>	13.5	13.5	13.5	13.5
Calcium biphosphate	20.8	20.8	20.8	20.8
Hydroxytyrosol	-	-	0.2	0.2
<b>Proximate composition (g/kg)</b>				
Protein	440	440	440	440
Lipid	100	160	100	160

<sup>1</sup>Premix supplied the following minerals (g/kg) and vitamins (IU or mg/kg): CuSO<sub>4</sub>·5H<sub>2</sub>O, 2.0 g; FeSO<sub>4</sub>·7H<sub>2</sub>O, 25 g; ZnSO<sub>4</sub>·7H<sub>2</sub>O, 22 g; MnSO<sub>4</sub>·4H<sub>2</sub>O, 7 g; Na<sub>2</sub>SeO<sub>3</sub>, 0.04 g; KI, 0.026 g; CoCl<sub>2</sub>·6H<sub>2</sub>O, 0.1 g; Vitamin A, 900000 IU; Vitamin D, 200000 IU; Vitamin E, 4500 mg; Vitamin K3, 220 mg; Vitamin B1, 320 mg; Vitamin B2, 1090 mg; Niacin, 2800 mg; Vitamin B5, 2000 mg; Vitamin B6, 500 mg; Vitamin B12, 1.6 mg; Vitamin C, 5000 mg; Pantothenate, 1000 mg; Folic acid, 165 mg; Choline, 60000 mg.

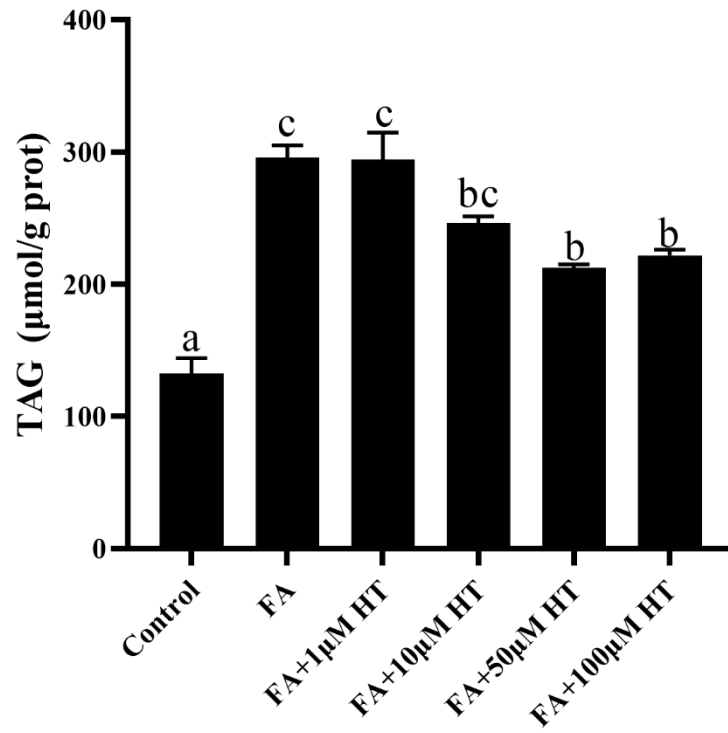
**Table S2.** Sequences of primers used for RT-qPCR.

Target gene	Forward (5'-3')	Reverse (5'-3')
PINK1 <sup>1</sup>	CTGTGAAAGCCCGGTACACT	TGATGTGGAACCTTTGGGGCA
Mu1l1 <sup>1</sup>	GCTGCCGTGATACGAGTCAT	ACGTTGGACAAGGACTGGAC
Atg5 <sup>1</sup>	TCAGTCGCTGCCATTAGAGC	TCTCGTCACCTGCGAAAAC
$\beta$ -actin <sup>1,a</sup>	TCGAGCACGGTATTGTGACC	TCAGGTGCAACTCTCAGCTC
PINK1 <sup>2</sup>	TCGGGAAAGGTTGTAACGCA	TTCGGGTTCAAGTCCACCAA
Parkin <sup>2</sup>	GGCTGTCCTGATTCGCTCAT	TGAAGAACACACTCCTCCGC
$\beta$ -actin <sup>2,a</sup>	GCCATGGATGAGGAAATCGC	TCTGGGTCGTCCAACAATGG

<sup>1</sup>Primers for spotted seabass<sup>2</sup>Primers for zebrafish<sup>a</sup>Reference gene

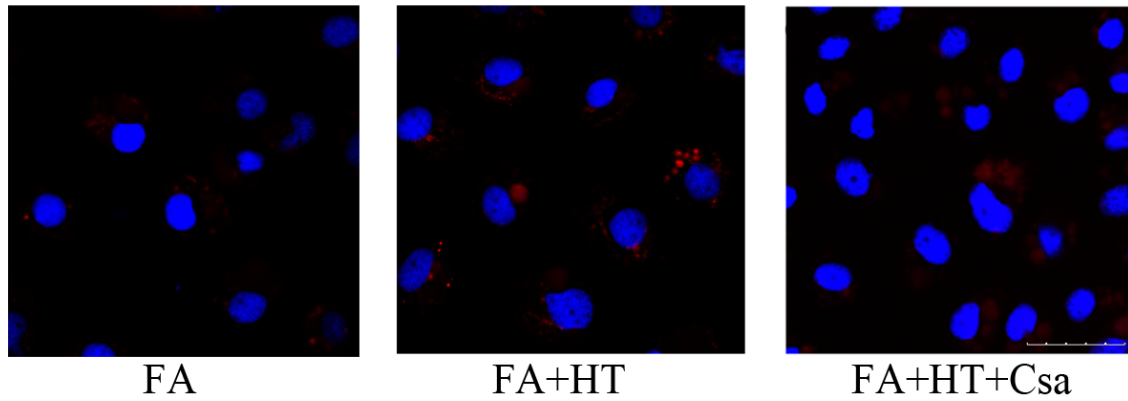


**Figure S1.** The number of normal mitochondria (A) and damaged mitochondria (B) in the liver TEM images of spotted seabass (*L. maculatus*) fed the test diets for 8 weeks. Values are shown as mean  $\pm$  SE (n=6). Different letters indicate significant difference differences among groups ( $P < 0.05$ ). NFD: normal fat diet (10% fat), HFD: high fat diet (16% fat), NFD+HT: NFD supplemented with 200 mg/kg of hydroxytyrosol (HT), HFD+HT: HFD supplemented with 200 mg/kg of HT.



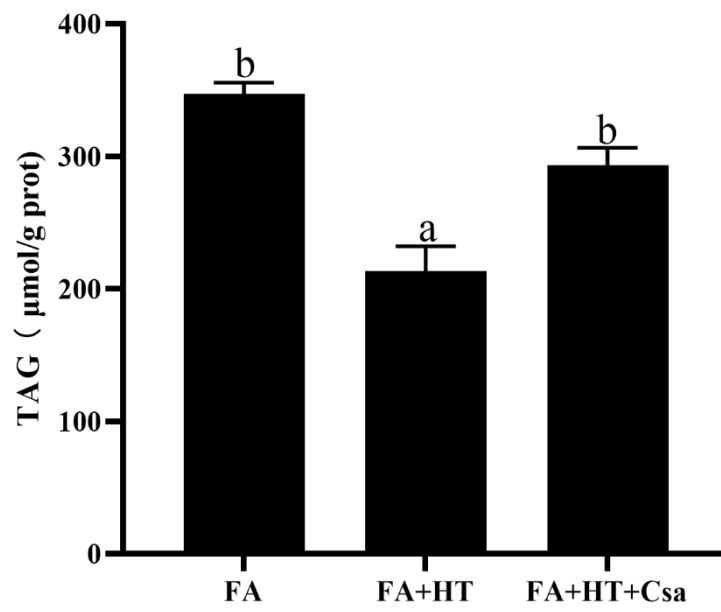
**Figure S2.** TAG content in ZFL cells (mean  $\pm$  SE, n=3). Control group: LDF medium, FA group: FA medium (LDF medium with 0.25 mM oleic acid and 0.25 mM palmitic acid), FA+HT group: FA medium adding different HT concentration. All values are exhibited as mean  $\pm$  SE. Different letters show significant differences ( $P < 0.05$ ).

Mtphagy Dye/Hoechst 33342



**Figure S3.** Staining of the mitochondrial autophagosome by Mtphagy Dye (red) in ZFL cell line.

Nuclei are highlighted with Hoechst 33342. Scale bar = 25  $\mu$ m



**Figure S4.** TAG content in ZFL cell line. All values are exhibited as mean  $\pm$  SE. Different letters show significant differences ( $P < 0.05$ ).