

Supplemental materials

Table S1. Composition and nutrition content of experimental diets, as fed basis.

Items	Control diet	High-energy low-protein diet
Ingredients, %		
Corn	62.92	64.37
Soybean meal	26.23	18.50
Limestone	8.89	9.00
Chicken fat	-	6.00
Premix ¹	1.96	2.13
Total	100.00	100.00
Nutrient levels ²		
ME, MJ/kg	11.03	12.75
Crude protein, %	16.20	13.00
Ca, %	3.44	3.50
Total P, %	0.54	0.50
Available P, %	0.36	0.34
Lys, %	0.79	0.74
Met, %	0.36	0.35

¹ The premix provided the followings per kg of diets: VA 8,000 IU, VD 2,200 IU, VE 30 IU, VK 2 mg, thiamine 1 mg, riboflavin 5.5 mg, calcium pantothenate 13 mg, niacin 36 mg, pyri-doxine 8 mg, biotin 0.5 mg, folic acid 0.5 mg, VB12 0.02 mg, Mn 65 mg, I 1 mg, Fe 60 mg, Cu 8 mg, Zn 66 mg, Se 0.3 mg, CaH₃PO₄ 130 g, and NaCl 30 g.

² Nutrient levels were calculated values.

Table S2. The primers used for qRT-PCR assays.

Gene name	Primer sequence (5'~3')	Annealing temperature (°C)	Product size (bp)
PGC-1 α	F: TTCGGGCTGAACTGAATAAG R: CACTGTCATCAAAGAGACCATC	60	171
NRF-1	F: TGATGGCACTGTCCCTC R: CCAGTTCTGCTCCACCTCTC	59	142
NRF-2	F: ATCACGAGCCCTGAAACCAA R: GGCTGCAAAATGCTGGAAAA	59	143
TFAM	F: CAGGATGATAAGGTTTCGGTA R: TGGGCAGTGTCTCAGTCTTCTT	58	125
UCP-1	F: CGAACTGCCCAATTAGCCAA R: TAATTCCAACACCACCTGCC	60	190
mt-ATP8	F: ATCCTCACTACTGTCATCTTAAC R: AGTATGATGGAGAATCATGG	59	133
β -actin	F: ATCCGGACCCTCCATTGTC R: AGCCATGCCAATCTCGTCTT	58	120

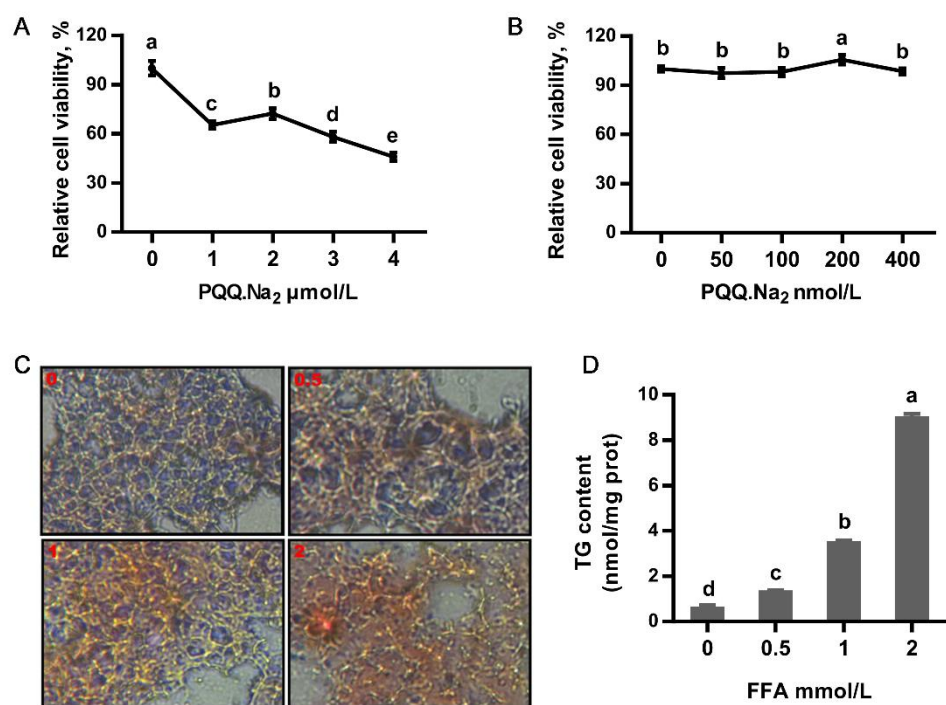


Figure S1. PQQ.Na₂ and FFA treatments on primary hepatocytes of hens. (A-B) Relative cell viability of primary hepatocytes treated with Pyrroloquinoline quinone disodium (PQQ.Na₂). (C) Oil Red O staining of primary hepatocytes treated with free fatty acid (FFA). (D) The triglyceride (TG) content of cells in C. Line nodes or bars without same small letters mean significant difference ($P < 0.05$).