

Supplementary Materials: Supplementary Materials: Effects of Dietary Zearalenone on Oxidative Stress, Cell Apoptosis, and Tight Junction in the Intestine of Juvenile Grass Carp (*Ctenopharyngodon idella*)

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Table S1. Correlation coefficient of parameters in the PI, MI, and DI of juvenile grass carp.

Independent Parameters	Dependent Parameters	PI		MI		DI	
		Correlation Coefficients	<i>p</i>	Correlation Coefficients	<i>p</i>	Correlation Coefficients	<i>p</i>
CuZnSOD mRNA level	CuZnSOD activity	+0.957	<0.01	+0.941	<0.01	+0.749	=0.086
MnSOD mRNA level	MnSOD activity	+0.580	=0.227	+0.917	<0.05	+0.905	<0.05
CAT mRNA level	CAT activity	+0.987	<0.01	+0.902	<0.05	+0.964	<0.01
GPx1a mRNA level	GPx activity	+0.955	<0.01	+0.890	<0.05	+0.840	<0.05
GPx1b mRNA level		+0.745	=0.089	+0.928	<0.01	+0.885	<0.05
GPx4a mRNA level		+0.888	<0.05	+0.911	<0.05	+0.992	<0.01
GPx4b mRNA level		+0.927	<0.01	+0.934	<0.01	+0.962	<0.01
GSTR mRNA level	GST activity	+0.965	<0.01	+0.981	<0.01	+0.985	<0.01
GSTO1 mRNA level		+0.865	<0.05	+0.870	<0.05	+0.993	<0.01
GSTO2 mRNA level		+0.742	=0.091	+0.876	<0.05	+0.827	<0.05
GR mRNA level	GR activity	+0.974	<0.01	+0.991	<0.01	+0.981	<0.01
Nuclear Nrf2 protein level	CuZnSOD mRNA level	+0.944	<0.01	+0.923	<0.01	+0.970	<0.01
	MnSOD mRNA level	+0.929	<0.01	+0.936	<0.01	+0.944	<0.01
	CAT mRNA level	+0.942	<0.01	+0.917	<0.01	+0.911	<0.05
	GPx1a mRNA level	+0.755	=0.082	+0.848	<0.05	+0.824	<0.05
	GPx1b mRNA level	+0.803	=0.054	+0.861	<0.05	+0.883	<0.05
	GPx4a mRNA level	+0.975	<0.01	+0.931	<0.01	+0.863	<0.05
	GPx4b mRNA level	+0.976	<0.01	+0.764	=0.077	+0.927	<0.01
	GSTR mRNA level	+0.963	<0.01	+0.911	<0.05	+0.990	<0.01
	GSTO1 mRNA level	+0.883	<0.05	+0.821	<0.05	+0.869	<0.05
	GSTO2 mRNA level	+0.876	=0.05	+0.704	=0.119	+0.722	<0.05

	GR mRNA level	+0.944	<0.01	+0.926	<0.01	+0.918	<0.05
	Keap1a mRNA level	−0.976	<0.01	−0.930	<0.05	−0.988	<0.01
Caspase-9 mRNA level	Apaf-1 mRNA level	+0.947	<0.01	+0.990	<0.01	+0.961	<0.01
	Bax mRNA level	+0.976	<0.01	+0.954	<0.01	+0.975	<0.01
	Bcl-2 mRNA level	−0.977	<0.01	−0.965	<0.01	−0.973	<0.01
	Mcl-1 mRNA level	−0.990	<0.01	−0.854	<0.05	−0.961	<0.01
JNK mRNA level	Apaf-1 mRNA level	+0.973	<0.01	+0.976	<0.01	+0.915	<0.05
	Bax mRNA level	+0.993	<0.01	+0.983	<0.01	+0.947	<0.01
	Bcl-2 mRNA level	−0.986	<0.01	−0.880	<0.05	−0.964	<0.01
	Mcl-1 mRNA level	−0.993	<0.01	−0.964	<0.01	−0.968	<0.01
FasI mRNA level	Caspase-8 mRNA level	+0.970	<0.01	+0.983	<0.01	+0.960	<0.01
P38 MAPK mRNA level	FasL mRNA level	+0.922	<0.01	+0.987	<0.01	+0.909	<0.05
	ZO-1 mRNA level	−0.968	<0.01	−0.979	<0.01	−0.951	<0.01
	ZO-2 mRNA level	−0.878	<0.05	−0.884	<0.05	−0.951	<0.01
	Occludin mRNA level	−0.773	=0.071	+0.702	=0.120	+0.790	=0.061
	Claudin-b mRNA level	−0.962	<0.01	−0.986	<0.01	−0.988	<0.01
	Claudin-c mRNA level	−0.997	<0.01	−0.575	=0.232	−0.992	<0.01
	Claudin-f mRNA level	−0.811	=0.05	−0.928	<0.01	−0.938	<0.01
MLCK mRNA level	Claudin-3c mRNA level	−0.654	=0.158	−0.984	<0.01	−0.992	<0.01
	Claudin-7a mRNA level	−0.872	<0.05	−0.982	<0.01	−0.975	<0.01
	Claudin-7b mRNA level	−0.951	<0.01	−0.874	<0.01	−0.961	<0.01
	Claudin-11 mRNA level	−0.767	=0.075	−0.827	<0.05	−0.980	<0.01
	Claudin-12 mRNA level	+0.955	<0.01	+0.962	<0.01	+0.990	<0.01
	Claudin-15a mRNA level	+0.949	<0.01	+0.976	<0.01	+0.972	<0.01
	Claudin-15b mRNA level	+0.991	<0.01	+0.991	<0.01	+0.995	<0.01

Table S2. Real-time PCR primer sequences ¹.

Target Gene	Primer Sequence Forward (5'→3')	Primer Sequence Reverse (5'→3')	Temperature (°C)	Accession Number
CuZnSOD	CGCACTTCAACCCTTACA	ACTTTCCTCATTGCCTCC	61.5	GU901214
MnSOD	ACGACCCAAGTCTCCCTA	ACCCTGTGGTTCTCCTCC	60.4	GU218534
CAT	GAAGTTCTACACCGATGAGG	CCAGAAATCCCAAACCAT	58.7	FJ560431
GPx1a	GGGCTGGTTATTCTGGGC	AGGCGATGTCATTCTGTTTC	61.5	EU828796
GPx1b	TTTTGTCTTGAAGTATGTCCGTC	GGGTCGTTTCATAAAGGGCATT	60.3	KT757315
GPx4a	TACGCTGAGAGAGGTTTACACAT	CTTTTCCATTGGGTTGTTC	60.4	KU255598
GPx4b	CTGGAGAAATACAGGGGTACG	CTCCTGCTTCCGAACTGGT	60.3	KU255599
GSTP1	ACAGTTGCCCAAGTTCCAG	CCTCACAGTCGTTTTTCCA	59.3	KM112099
GSTP2	TGCCTTGAAGATTATGCTGG	GCTGGCTTTTATTTACCCT	59.3	KP125490
GSTO1	GGTGCTCAATGCCAAGGGAA	CTCAAACGGGTCGGATGGAA	58.4	KT757314
GSTO2	CTGCTCCCATCAGACCCATT	TCTCCCTTTTCTTGCCATA	61.4	KU245630
GR	GTGTCCAACCTCTCCTGTG	ACTCTGGGGTCCAAAACG	59.4	JX854448
Nrf2	CTGGACGAGGAGACTGGA	ATCTGTGGTAGGTGGAAC	62.5	KF733814
Keap1a	TTCCACGCCCTCCTCAA	TGTACCCTCCCGCTATG	63.0	KF811013
Keap1b	TCTGCTGTATGCGGTGGGC	CTCCTCCATTCATCTTCTCG	57.9	KJ729125
caspase-3	GCTGTGCTTCATTTGTTTG	TCTGAGATGTTATGGCTGTC	55.9	JQ793789
caspase-7	GCCATTACAGGATTGTTTACC	CCTTATCTGTGCCATTGCGT	57.1	KT625601
caspase-8	ATCTGGTTGAAATCCGTGAA	TCCATCTGATGCCCATACAC	59.0	KM016991
caspase-9	CTGTGGCGGAGGTGAGAA	GTGCTGGAGGACATGGGAAT	59.0	JQ793787
Apaf1	AAGTTCTGGAGCCTGGACAC	AACTCAAGACCCACAGCAC	61.4	KM279717
Bax	CATCTATGAGCGGGTTCGTC	TTTATGGCTGGGGTCACACA	60.3	JQ793788.1
FasL	AGGAAATGCCCCGACAAATG	AACCGCTTTCATTGACCTGGAG	61.4	KT445873
Bcl-2	AGGAAAATGGAGGTTGGGAT	CTGAGCAAAAAAGGCGATG	60.3	JQ713862.1
Mcl-1	TGGAAAGTCTCGTGGTAAAGCA	ATCGCTGAAGATTCTGTTGCC	58.4	KT757307
JNK	ACAGCGTAGATGTGGGTGATT	GCTCAAGGTTGTGGTCATACG	62.3	KT757312
ZO-1	CGGTGTCTTCGTAGTCGG	CAGTTGGTTTGGGTTTCAG	59.4	KJ000055
ZO-2b	TACAGCGGGA CTCTAAAATGG	TCACACGGTCTGTTCTCAAAG	60.3	KM112095
occludin	TATCTGTATCACTACTGCGTCG	CATTCACCCAATCCTCCA	59.4	KF193855
claudin-b	GAGGGAATCTGGATGAGC	ATGGCAATGATGGTGAGA	57.0	KF193860
claudin-c	GAGGGAATCTGGATGAGC	CTGTTATGAAAGCGGCAC	59.4	KF193859
claudin-f	GCTGGAGTTGCCTGTCTTATTC	ACCAATCTCCCTCTTTTGTGTC	57.1	KM112097

claudin-7a	ACTTACCAGGGACTGTGGATGT	CACTATCATCAAAGCACGGGT	59.3	KT625604
claudin-7b	CTAACTGTGGTGGTGATGAC	AACAATGCTACAAAGGGCTG	59.3	KT445866
claudin-11	TCTCAACTGCTCTGTATCACTGC	TTTCTGGTTCACCTCCGAGG	62.3	KT445867
claudin-12	CCCTGAAGTGCCCAAA	GCGTATGTCACGGGAGAA	55.4	KF998571
claudin-15a	TGCTTTATTTCTTGGCTTTC	CTCGTACAGGGTTGAGGTG	59.0	KF193857
claudin-15b	AGTGTTCTAAGATAGGAGGGGAG	AGCCCTTCTCCGATTTCAT	62.3	KT757304
MLCK	GAAGGTCAGGGCATCTCA	GGGTCGGGCTTATCTACT	53.0	KM279719
β -actin	GGCTGTGCTGTCCCTGTA	GGGCATAACCCTCGTAGAT	61.4	M25013

¹ CuZnSOD, copper, zinc superoxide dismutase; MnSOD, manganese superoxide dismutase; CAT, catalase; GPx, glutathione peroxidase; GST, glutathione-S-transferase; GR, glutathione reductase; Nrf2, Nuclear factor-erythroid 2-related factor 2; Keap1, Kelch-like-ECH-associated protein 1; caspase, cysteinyl aspartic acid-protease; Apaf-1, apoptotic protease activating factor-1; Bax, Bcl-2 associated X protein; FasL, fas ligand; Bcl-2, B-cell lymphoma protein-2; Mcl-1, myeloid cell leukemia-1; JNK, c-Jun N-terminal protein kinase; ZO, zonula occludens; MLCK, myosin light chain kinase.