

Polyphenol-rich fermented hempseed ethanol extracts improve obesity, oxidative stress, and neural health in high-glucose diet-induced *Caenorhabditis elegans*

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Supplementary

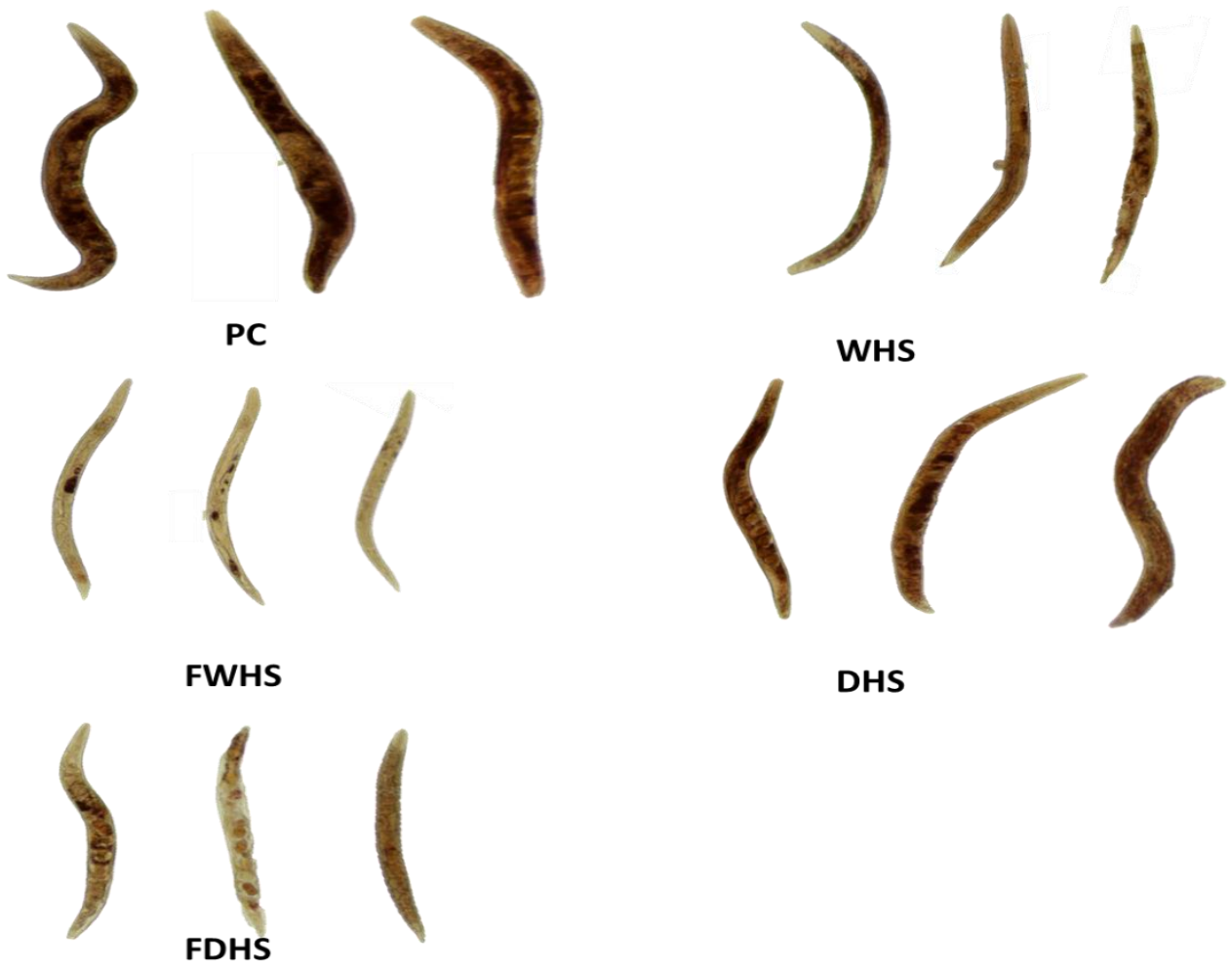
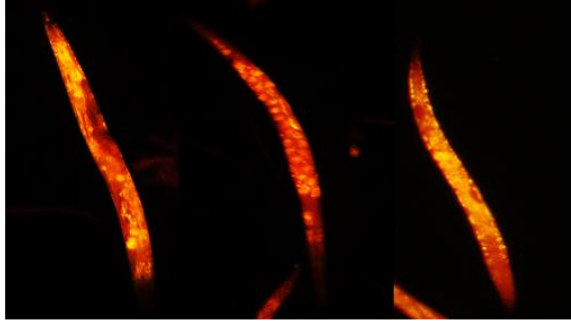


Figure 1. Oil red fluorescence images of *C. elegans* supplemented with glucose



PC



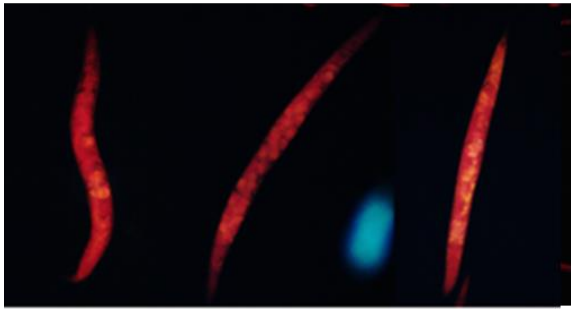
WHS



FWHS

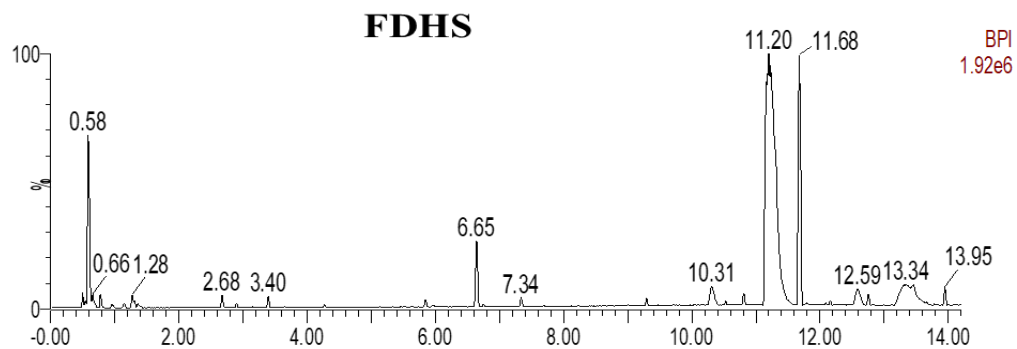
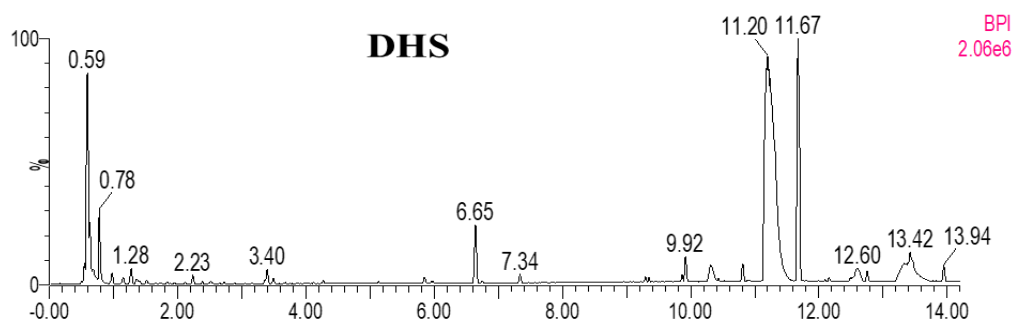
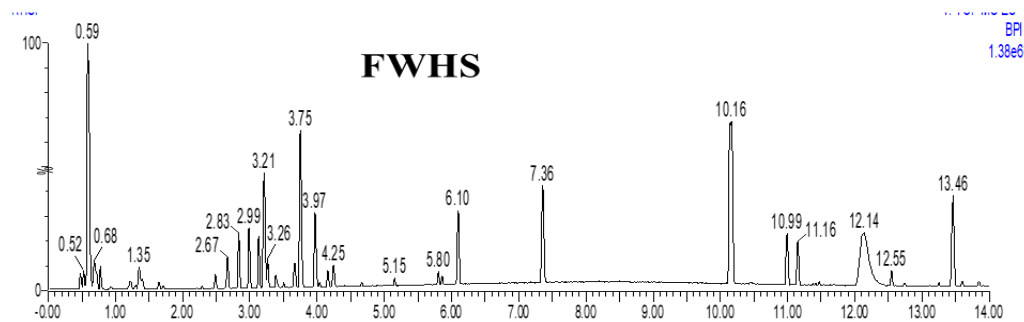
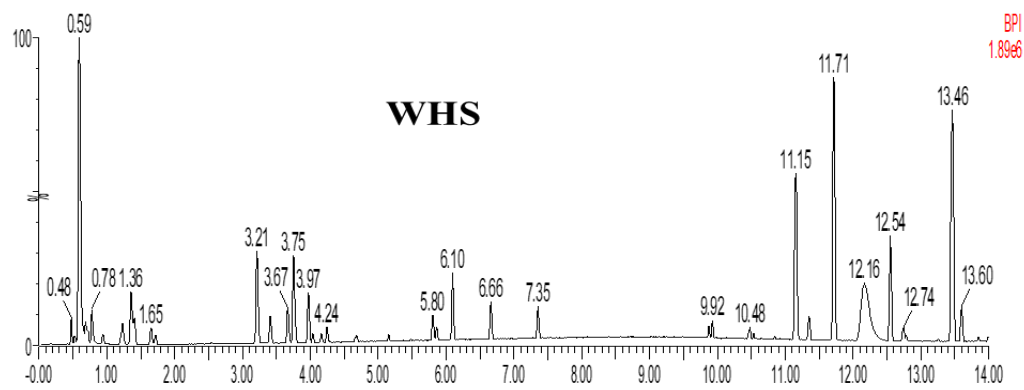


DHS



FDHS

Figure 2. Oil red fluorescence images of *C. elegans* supplemented with glucose



Supplementary figure 3. Obtained UHPLC-Q-TOF-MS/MS² chromatograms

Supplementary Table 1. *Caenorhabditis elegans* primers for detection of gene expression

Gene name	Forward primer	Reverse primer
Daf-16	CCAGACGGAAGGCTTAAACT	ATTCGCATGAAACGAGAATG
sod-1	ACGCTCGTCACGCTTTAC	TCTTCTGCCTTGTCTCCG
sod-2	GGCATCAACTGTCGCTGT	ACAAGTCCAGTTGTTGCC
Fat-6	CAACTTCCATCACACATTCCC	TCCTCGTTGAATATCACATCC
Fat-7	TTTCCACCACACATTCCCAC	TCTTCACTTCCGTGATTGGC
β -actin 2	ATCGTCCTCGACTCTGGAGAT	TCACGTCCAGCCAAGTCAAG
Ace-1	AGTGGGCTCCTGTTTCGAGAA	CCAATAGAAAATCACCATCGACAA
Ace-2	CAATAATCAACTCATGGGCATCA	TTTTTCGCGAGACGAAACGA

Supplementary Table 2. Effects of fermentation on antioxidant capacity of hempseed ethanol extracts

	DPPH (%)				ABTS (%)			
	50 µg/mL	100 µg/mL	200 µg/mL	400 µg/mL	50 µg/mL	100 µg/mL	200 µg/mL	400 µg/mL
WHS	1.00 ± 0.44	3.96 ± 0.24	6.36 ± 1.01	7.30 ± 1.30	0.11 ± 0.11	2.37 ± 0.20	5.64 ± 0.39	14.00 ± 0.51
FWHS	7.39 ± 4.09	11.96 ± 5.24	20.68 ± .79	29.51 ± 7.26	11.11 ± 0.44	24.26 ± 0.18	48.22 ± 0.20	78.27 ± 0.63
DHS	3.26 ± 1.89	3.32 ± 1.16	4.71 ± 1.11	5.98 ± 0.79	0.59 ± 0.62	1.00 ± 0.51	2.24 ± 0.20	2.10 ± 0.51
FDHS	3.95 ± 2.12	6.52 ± 1.13	11.99 ± 2.41	17.99 ± 1.91	3.46 ± 0.30	7.90 ± 0.58	16.24 ± 0.17	30.18 ± 0.83
BHA	26.41 ± 3.09	45.63 ± 2.65	60.34 ± 0.72	86.25 ± 1.94	81.51 ± 0.58	96.94 ± 0.16	≥99.99	99.99
AA	81.81 ± 2.16	91.88 ± 0.46	95.67 ± 0.05	≥99.99	95.14 ± 0.04	≥99.99	≥99.99	99.99

Absorbance measurement: absorbance recorded at 700nm. 1) The positive controls employed were butylated hydroxyanisole (BHA) and ascorbic acid (AA), respectively. Different hempseed samples included WHS (whole hempseed), FWHS (fermented whole hempseed), DHS (dehulled hempseed), and FDHS (fermented dehulled hempseed).

Supplementary Table 3. Correlation between polyphenols and antioxidant and lipase inhibition capacity

Polyphenol	Parameter	Pearson's r	p
TPC	ABTS	0.988	0.012
	DPPH	0.936	0.064
	Lipase	0.959	0.041
Quercetin	ABTS	0.585	0.415
	DPPH	0.502	0.498
	Lipase	0.761	0.239
N-trans-feruloyltyramine	ABTS	0.660	0.340
	DPPH	0.510	0.490
	Lipase	0.779	0.221
Apigenin	ABTS	0.891	0.109
	DPPH	0.777	0.223
	Lipase	0.880	0.120
Rutin	ABTS	-0.341	0.659
	DPPH	-0.480	0.520
	Lipase	-0.134	0.866
<i>p</i> -coumaric acid	ABTS	-0.018	0.982
	DPPH	-0.131	0.869
	Lipase	-0.167	0.833
Gallic acid	ABTS	0.939	0.061
	DPPH	0.871	0.129
	Lipase	0.869	0.131
Naringin	ABTS	0.939	0.061
	DPPH	0.871	0.129
	Lipase	0.869	0.131
Ferulic acid	ABTS	-0.787	0.213
	DPPH	-0.642	0.358
	Lipase	-0.838	0.162
Kaempferol	ABTS	0.524	0.476
	DPPH	0.677	0.323
	Lipase	0.370	0.630
Genistein	Lipase	0.880	0.120
	ABTS	0.256	0.744
	DPPH	0.072	0.928
Catechin	Lipase	0.421	0.579
	ABTS	-0.545	0.455
	DPPH	-0.375	0.625
Caffeic acid	Lipase	-0.674	0.326
	ABTS	-0.474	0.526
	DPPH	-0.283	0.717
	Lipase	-0.577	0.423