Supplementary materials

The supplementary file containing Supplementary eTables 1-10, Supplementary eMethods 1-7, Supplementary eFigures 1-8, and Reference are provided.

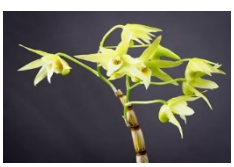
Supplementary eTables:

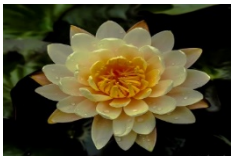
Supplementary eMethods:

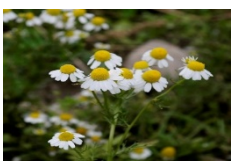
Supplementary eFigures:

Reference

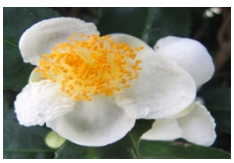
eTable 1. Supporting information of 30 common edible flowers.

Number	Scientific name	Common name	Botanical family	Coloration	Edible part
1	*Hibiscus sabdariffa* L.	Roselle	Malvaceae	Red  Source: by Hazel Chiang	Calyces
2	*Eucommia ulmoides* Oliver.	Male flower of *Eucommia ulmoides*	Eucommiaceae	Green  Source: by Paco Garin	Male flower
3	*Carthamus tinctorius* L.	Safflower	Asteraceae	Orange red  Source: by Krzysztof Kozłowski	Tubular flower
4	*Erigeron breviscapus* (Vant.) Hand.-Mazz.	Fleabane flower	Asteraceae	Blue or pinkish purple  Source: by Colleen Prieto	Flower
5	*Citrus aurantium* L.	Bitter/sour orange 6flower	Rutaceae	White  Source: by Sebastiao Pereira-Nunes	Petal or flower bud
6	*Dendrobium candidum* Kimura et Migo.	Flower of *Dendrobium officinale*	Orchidaceae	Yellow  Source: by Naoki Takebayashi	Flower

Number	Scientific name	Common name	Botanical family	Coloration	Edible part
7	*Lonicera japonica* Thunb.	Japanese honeysuckle, Golden and silver honeysuckle, Jin Yin Hua	Caprifoliaceae	White, yellow-green  Source: by Unni Henning	Flower or flower bud
8	*Tagetes erecta* L.	African marigold, Aztec marigold	Asteraceae	Bright yellow, brownish yellow, orange to brown  Source: by Stephen Nelson	Corolla or flower
9	*Nelumbo nucifera* Gaertn.	Sacred water lotus	Nelumbonaceae	Red, pink or white  Source: by Ebroh	Petal or flower bud
10	*Eriobotrya japonica* (Thunb.) Lindl.	Loquat flower	Rosaceae	Yellowish white  Source: by sante boschian pest	Flower
11	*Trollius chinensis* Bunge.	Nasturtium, Chinese globeflower	Ranunculaceae	Yellow, orange, red  Source: by Chien Hung	Flower
12	*Nymphaea tetragona* Georgi.	Water lily, pygmy Waterlily	Nymphaeaceae	Red, pink, yellow, purple or white  Source: by Ian Dunbar-Reid	Petal or flower bud

Number	Scientific name	Common name	Botanical family	Coloration	Edible part
13	*Rosa rugosa* Thunb.	Rugosa rose	Rosaceae	White, purple, red, or pink  Source: by Andreas Rockstein	Petal or flower bud
14	*Hemerocallis citrina* Baroni.	Daylily	Liliaceae	Large yellow, red or orange  Source: by hmxxyy	Flower bud
15	*Dolichos lablab* L.	Flower of *Dolichos lablab*	Leguminosae	Yellowish white or yellowish brown  Source: by Dinesh Valke	Petal
16	*Prunus × yedoensis* Matsum.	Cherry blossom	Rosaceae	White, pink  Source: by Dinesh Valke	Petal
17	*Prunus persica*	Peach blossom	Rosaceae	White, pink, red  Source: by John Freshney	Flower
18	*Matricaria recutita*	Chamomile	Asteraceae	White and yellow  Source: by Mauricio Mercadante	Flower

Number	Scientific name	Common name	Botanical family	Coloration	Edible part
19	*Sophora japonica* L.	Flos Sophorae Immaturus, Huai mi	Fabaceae	Yellow-white  Source: by Bart Omeu	Flower or flower bud
20	*Rosa chinensis* Jacq.	Chinese rose, monthly rose, rosa chinensis	Rosaceae	Red or pink  Source: by Ron Dilley	Petal or flower bud
21	*Chrysanthemum morifolium* Ramat.	Florist's daisy, Hardy garden mum	Asteraceae	Yellow-white  Source: by Shihmei Barger	Corolla or flower
22	*Osmanthus fragrans* Lour.	Sweet-scented osmanthus, Sweet olive	Oleaceae	White, pale yellow, yellow or orange-yellow  Source: by Kamujp	Four-lobed corolla
23	*Michelia alba* DC.	White champaca	Magnoliaceae	White  Source: by yvone042488	Petal
24	*Lilium brownii var.* viridulum Baker	Lily	Liliaceae	White, yellow, pink or red  Source: by David Fenn	Petal

Number	Scientific name	Common name	Botanical family	Coloration	Edible part
25	*Calendula officinalis* L.	Pot marigold	Asteraceae	Yellow or orange  Source: by Anna Muratore	Corolla or flower
26	*Crocus sativus* L.	Saffron, Fan Hong Hua	Iridaceae	Light blue, red purple or white  Source: by Jindrich Shejbal	Stigmata of flower
27	*Armeniaca mume Sieb. var.* mume f. viridicalyx (Makino) T. Y. Chen	Flosmume	Rosaceae	White  Source: by Crystal LIU	Fower bud
28	*Paeonia suffruticosa* Andr.	Tree peony	Ranunculaceae	Rose, mauve, pink or white  Source: by kesha poole	Petal
29	*Jasminum sambac* (L.) Aiton	Jasmine	Oleaceae	White  Source: by Anna Muratore	Petal or flower bud
30	*Camellia sinensis* (Linn.) O. Kuntze	Tea blossom, tea flower	Theaceae	White  Source: by Jindrich Shejbal	Petal or flower bud

All images of flowers are sourced from www.flickr.com

eTable 2. List of the *C.elegans* strains used in this study.

Strain name	Genotype
N2	Wild-type Bristol
IR1511	N2;Ex001[p_{myo-3} DsRed::LGG-1;p_{dct-1} DCT-1::GFP]
CF1553	muIs84 [(pAD76) *sod-3p*::GFP + *rol-6*(su1006)]
DA2123	adIs2122 [*lgg-1p*::GFP::*lgg-1* + *rol-6*(su1006)]
TJ356	zIs356 [*daf-16p*::*daf-16a/b*::GFP + *rol-6*(su1006)]
RW1596	stEx30 [*myo-3p*::GFP::*myo-3* + *rol-6*(su1006)]
SJ4103	zcIs14 [*myo-3*::GFP(mit)]
CF1038	*daf-16*(*mu86*) I.
DA465	*eat-2*(*ad465*) II.
TJ1052	*age-1*(*hx546*) II.
TK22	*mev-1*(*kn1*) III.
MQ130	*clk-1*(*qm30*) III.
GR2245	*skn-1*(*mg570*) IV.

The information presented in this table is provided from Caenorhabditis Genetics Center.

eTable 3. List of the primers used in this study for qPCR analysis.

Gene name	Primer sequences	
	Forward	**Reverse**
act-1	CTACGAACTTCCTGACGGACAAG	CCGGCGGACTCCATACC
daf-16	GAGGAGCACAGCTTCCAGAAT	ATTGAGCTCCGCCTCCAATG
sir-2.1	CGATGCACCCGAAACAAACA	TTCTGCCTTACAGGAGCACG
sod-3	GCAATCTACTGCTCGCACTG	TTCGAAACAGCCTCGTGAAGT
skn-1	TCAACCGTCCAATGGGTCTC	GTGCCCTTCTCTCCAGCAAT
hsp-16.2	GGAACGCCAATTTGCTCCAG	AGATTCGAAGCAACTGCACC
drp-1	AGCCCACCAATGAGCTTGTC	GAGCACTGACCGCTCTTTCT
eat-3	TGATGCGTTTAGAGCAGCCA	TGAAGAAGCATACGCAGGCA
lgg-1	CGTGCCGAAGGAGACAAGAT	CTTCCTCGTGATGGTCCTGG
dct-1	TGGTATGTCAGAATCGTGGGTG	ACGGACAGTCTTTGGAGGTG
hsp-6	ACAGGCCGTTACCAACTCTG	TGTTGACGGTGGTTCCCAAA
nhr-65	TGGACGAAATGCTTGGCTTG	ACGTTGAAAAGCTCCGCGAT
mev-1	CGCAGTTTTGCCGTTCGATT	AGAAGGCGGAGCATCTGTG

eTable 4. Summary of the wild-type *C.elegans* lifespan experiments treated with ethanolic extracts of 30 edible flowers.

Treatment (vehicle[a] and flower species[b])	Mean lifespan ± SEM (days)	Percentage change (%)	Median lifespan (days)	Percentage change (%)	No. death/ censored (no. trial)	*P*-value against vehicle
Vehicle control	15.80 ± 0.28	/	16.00	/	354/36 (3)	/
1 *H. sabdariffa* flower	17.80 ± 0.19	12.66	18.50	15.63	384/36 (3)	< 0.0001
2 *E. ulmoides* male flower	17.79 ± 0.31	12.59	19.00	15.79	372/48 (3)	< 0.0001
3 *C. tinctorius* flower	17.73 ± 0.25	12.22	18.00	12.50	360/60 (3)	< 0.0001
4 *E. breviscapus* flower	17.45 ± 0.19	10.44	18.00	12.50	306/84 (3)	0.0012
5 *C. aurantium* flower	17.21 ± 0.21	8.92	18.00	12.50	342/78 (3)	0.0001
6 *D. candidum* flower	17.10 ± 0.27	7.10	18.00	12.50	354/66 (3)	0.0016
7 *L. japonica* flower	17.23 ± 0.45	9.05	17.00	6.25	336/84 (3)	0.0044
8 *T. erecta* flower	17.15 ± 0.22	8.54	17.00	6.25	408/72(3)	0.0043
9 *N. nucifera* flower	16.79 ± 0.21	6.27	17.00	6.25	234/186 (3)	0.0073
10 *E. japonica* flower	16.70 ± 0.43	5.70	18.00	12.50	444/36 (3)	0.0012
11 *T. chinensis* flower	16.52 ± 0.22	4.56	17.00	6.25	324/96 (3)	0.0159
12 *N. tetragona* flower	16.48 ± 0.18	4.30	17.00	6.25	378/42 (3)	0.0474
13 *R. rugosa* flower	16.25 ± 0.28	2.85	17.00	6.25	360/60 (3)	0.1038
14 *H. citrina* flower	16.00 ± 0.21	1.27	17.00	6.25	300/120 (3)	0.0695
15 *D. lablab* flower	15.83 ± 0.39	0.19	17.00	6.25	426/54 (3)	0.6673
16 *P.× yedoensis* flower	16.91 ± 0.67	7.03	16.00	0.00	330/90 (3)	0.0120
17 *P. persica* flower	16.07 ± 0.47	1.71	16.00	0.00	276/144 (3)	0.3792
18 *M. recutita* flower	15.93 ± 0.28	0.82	16.00	0.00	348/72 (3)	0.0828
19 *S. japonica* flower	15.58 ± 0.58	-1.39	16.00	0.00	438/42 (3)	0.1812
20 *R. chinensis* flower	15.43 ± 0.64	-2.34	16.00	0.00	282/138 (3)	0.7868
21 *C.morifolium* flower	15.86 ± 0.59	0.38	15.50	-3.13	444/396 (3)	0.1932
22 *O. fragrans* flower	15.38 ± 0.31	-2.66	15.50	-3.13	300/120 (3)	0.9081
23 *M. alba* flower	15.29 ± 0.25	-3.23	15.00	-6.25	390/30 (3)	0.5237
24 *L. brownii* flower	15.26 ± 0.27	-3.42	15.00	-6.25	432/48 (3)	0.9928
25 *C. officinalis* flower	15.21 ± 0.22	-3.73	15.00	-6.25	342/78 (3)	0.4798
26 *C. sativus* flower	14.66 ± 0.19	-7.22	15.00	-6.25	264/156 (3)	0.1388
27 *A. mume* flower	15.02 ± 0.36	-4.94	15.00	-6.25	438/42 (3)	0.1037
28 *P. suffruticosa* flower	13.96 ± 0.16	-11.65	14.00	-12.50	276/144 (3)	0.2153
29 *J. sambac* flower	14.77 ± 0.28	-6.52	15.00	-6.25	342/78 (3)	0.0191
30 *C. sinensis* flower	14.20 ± 0.22	-10.13	14.00	-12.50	420/60 (3)	0.0178

[a] The vehicle control used is based on a sham ethanol extraction. [b] Flowers are numbered according to **eTable 1.** The concentration of each floral extract is 50 mg/mL according to **eMethod 1**. N2 means *C. elegans* Bristol N2 strain wild-type nematodes. *P* values represent comparison with vehicle calculated using log-rank (Mantel-Cox) test by GraphPad Prism.

eTable 5. *In vitro* antioxidant properties of 30 common edible floral extracts.

Flower species[a]	Antioxidant assays[b]			APCI[c]
	DPPH (μmol Vc/g dw)	ABTS (μmol Vc/g dw)	FRAP (μmol Fe^{2+}/ g dw)	
1 *H. sabdariffa* flower	39.51 ± 2.25	114.59 ± 1.86	419.98 ± 7.39	7.09±0.18
2 *E. ulmoides* male flower	77.75 ± 11.77	362.85 ± 7.78	1,072.00 ± 40.71	18.84±0.92
3 *C. tinctorius* flower	100.09 ± 6.58	382.14 ± 20.09	1,065.01 ± 11.63	20.10±0.80
4 *E. breviscapus* flower	163.28 ± 5.12	529.67 ± 11.89	1,559.02 ± 66.97	29.39±0.94
5 *C. aurantium* flower	66.12 ± 3.46	806.57 ± 12.57	768.06 ± 27.08	26.53±0.61
6 *D. candidum* flower	14.36 ± 0.77	84.26 ± 2.45	156.65 ± 3.75	3.59±0.11
7 *L. japonica* flower	91.55 ± 4.98	206.90 ± 1.04	827.49 ± 10.66	14.07±0.29
8 *T. erecta* flower	377.02 ± 7.67	818.68 ± 7.90	3,108.23 ± 36.77	55.11±0.74
9 *N. nucifera* flower	360.16 ± 13.22	814.06 ± 9.32	2,190.62 ± 50.71	47.99±1.08
10 *E. japonica* flower	25.18 ± 2.02	68.10 ± 0.85	199.10 ± 4.63	3.93±0.13
11 *T. chinensis* flower	206.89 ± 7.48	532.48 ± 6.67	1,453.16 ± 23.03	30.41±0.60
12 *N. tetragona* flower	484.20 ± 13.17	1,056.35 ± 39.44	3,649.24 ± 76.88	68.52±1.96
13 *R. rugosa* flower	317.12 ± 8.44	559.39 ± 39.88	2,358.81 ± 69.03	41.60±1.73
14 *H. citrina* flower	8.03 ± 1.00	53.84 ± 1.47	131.69 ± 4.23	2.47±0.10
15 *D. lablab* flower	10.85 ± 1.10	66.44 ± 1.28	125.75 ± 3.17	2.83±0.09
16 *P.× yedoensis* flower	113.39 ± 0.86	309.18 ± 4.87	955.30 ± 25.84	18.17±0.33
17 *P. persica* flower	24.97 ± 0.97	105.82 ± 0.47	254.15 ± 6.90	5.18±0.10
18 *M. recutita* flower	126.14 ± 9.65	419.05 ± 18.33	1,693.53 ± 31.08	26.32±1.01
19 *S. japonica* flower	22.02 ± 2.45	134.57 ± 2.66	245.34 ± 7.23	5.67±0.21
20 *R. chinensis* flower	278.46 ± 8.05	569.03 ± 14.17	1,947.33 ± 46.88	37.47±0.97
21 *C.morifolium* flower	79.19 ± 10.63	200.61 ± 4.45	751.21 ± 14.13	12.92±0.61
22 *O. fragrans* flower	192.19 ± 7.65	669.28 ± 9.75	1,767.19 ± 29.77	35.18±0.73
23 *M. alba* flower	39.11 ± 1.32	121.61 ± 1.79	402.14 ± 6.14	7.12±0.14
24 *L. brownii* flower	18.20 ± 2.20	57.63 ± 2.00	202.76 ± 13.28	3.44±0.22
25 *C. officinalis* flower	28.66 ± 6.00	169.93 ± 8.71	512.99 ± 14.78	8.60±0.54
26 *C. sativus* flower	15.16 ± 0.61	90.86 ± 3.91	285.65 ± 9.99	4.67±0.18
27 *A. mume* flower	258.67 ± 8.42	755.84 ± 5.27	2,539.31 ± 55.63	45.12±0.83
28 *P. suffruticosa* flower	836.56 ± 13.20	1,403.44 ± 32.29	4,409.24 ± 262.76	95.49±3.08
29 *J. sambac* flower	28.49 ± 3.15	129.07 ± 4.56	341.11 ± 10.49	6.45±0.30
30 *C. sinensis* flower	368.70 ± 8.96	678.79 ± 10.68	2,133.15 ± 52.04	44.80±0.96

[a] Flowers are abbreviated and numbered according to **eTable 1**. [b] DPPH, free radical scavenging properties by 2, 2-diphenyl-1-picrylhydrazyl radical; ABTS, free radical scavenging activities against ABTS radical cations (2,2'-Azino-bis (3-ethylbenzothiazoline-6-sulfonic acid); FRAP, ferric reducing antioxidant power; [c] APCI, antioxidant potency composite index.

eTable 6. Correlations between edible flowers' antioxidant potency composite index (APCI) and effects on nematode mean and median lifespan.

	APCI	mean lifespan	median lifespan
APCI	1	/	/
mean lifespan	-0.20	1	/
median lifespan	-0.20	0.93***	1

*** Correlation is significant at the 0.001 level.

eTable 7. Summary of the *C.elegans* lifespan experiments treated with EUFE or active components.

Strains	Treatment	Mean lifespan ± SEM (days)	Percentage change (%)	Median lifespan (days)	No. death/ censored (no. trial)	*P*-value against control[a]
N2	Day 0: Control	15.96 ± 0.37	/	16.00	342/48 (3)	/
	EUFE-25 μg/mL	17.12 ± 0.46	7.27	17.00	510/75 (3)	0.0159
	EUFE-50 μg/mL	17.97 ± 0.37	12.59	18.00	528/57 (3)	<0.0001
	EUFE-100 μg/mL	18.93 ± 0.24	18.61	19.00	408/177 (3)	<0.0001
	EUFE-200 μg/mL	17.81 ± 0.22	11.59	18.00	510/75(3)	<0.0001
	EUFE-500 μg/mL	16.78 ± 0.69	5.14	17.00	498/87 (3)	0.1154
	Day 5: EUFE-100 μg/mL	18.10 ± 0.21	13.41	18.00	486/54 (3)	<0.0001
	Day 9: EUFE-100 μg/mL	17.36 ± 0.39	8.77	17.00	480/60 (3)	0.0009
daf-16(mu86) I.	Control	13.64 ± 0.37	/	14.00	522/63 (3)	/
	EUFE-100 μg/mL	13.84 ± 0.12	1.48	14.00	504/81(3)	0.5732
	Aucubin-100 μM	13.78 ± 0.28	1.07	14.00	540/45 (3)	0.5657
	Geniposide-100 μM	14.07 ± 0.33	3.18	14.00	504/81 (3)	0.2727
	Geniposidic acid-100 μM	15.60 ± 0.37	14.41	16.00	477/108 (3)	0.0003
	Asperuloside-100 μM	13.88 ± 0.21	1.74	14.00	504/81 (3)	0.4773
	Chlorogenic acid-100 μM	13.76 ± 0.43	0.92	14.00	495/90 (3)	0.7000
mev-1(kn1) III.	Control	11.57 ± 0.49	/	11.00	522/63 (3)	/
	EUFE-100 μg/mL	11.89 ± 0.46	2.77	11.00	486/99 (3)	0.5620
	Aucubin-100 μM	11.87 ± 0.28	2.61	11.50	486/99 (3)	0.5252
	Geniposide-100 μM	11.85 ± 0.24	2.43	12.00	540/45 (3)	0.4385
	Geniposidic acid-100 μM	13.44 ± 0.53	16.18	13.00	531/54 (3)	0.0018
	Asperuloside-100 μM	11.95 ± 0.36	3.27	12.00	513/72 (3)	0.6268
	Chlorogenic acid-100 μM	12.79 ± 0.44	10.53	13.00	423/112 (3)	0.0331
eat-2(ad465) II.	Control	20.75 ± 0.52	/	19.00	204/36 (2)	/
	EUFE-100 μg/mL	23.57 ± 0.64	13.64	22.50	216/24 (2)	0.0091
skn-1(mg570) IV.	Control	12.56 ± 0.52	/	13.00	200/40 (2)	/
	EUFE-100 μg/mL	14.44 ± 0.34	14.99	15.00	208/32 (2)	0.0010
age-1(hx546) II.	Control	19.20 ± 0.85	/	19.00	220/20 (2)	/
	EUFE-100 mg/mL	21.74 ± 0.86	13.23	21.50	200/40 (2)	0.0008
clk-1(qm30) III.	Control	19.29 ± 0.53	/	19.00	220/20 (2)	/
	EUFE-100 mg/mL	21.47 ± 0.28	11.27	22.50	232/8 (2)	0.0016
N2	Control	15.65 ± 0.52	/	16.00	486/54 (3)	/
	Aucubin-100 μM	17.91 ± 0.45	14.44	18.00	486/54 (3)	<0.0001
	Geniposide-100 μM	17.31 ± 0.25	10.62	17.00	522/18 (3)	0.0005
	Geniposidic acid-100 μM	18.30 ± 0.31	16.97	19.00	504/36 (3)	<0.0001
	Asperuloside-100 μM	18.69 ± 0.47	19.44	19.00	495/45 (3)	<0.0001
	Chlorogenic acid-100 μM	16.77 ± 0.20	7.19	17.00	477/63 (3)	0.0177

[a] The vehicle control used is sterile water. N2 means *C. elegans* Bristol N2 strain wild-type nematodes. *P* values represent comparison with vehicle calculated using log-rank (Mantel-Cox) test by GraphPad Prism.

eTable 8. Determination of total phenolic, flavonoid, and terpenoid contents in 12 edible flowers with lifespan-promoting effects.

Flower species[a]	total phenolic (mg chlorogenic acid equivalent (CAE) /g DW)	total flavonoid (mg rutin equivalent (RE) /g DW)	total terpenoid (mg linalool equivalent (LE) /g DW)
1 *H. sabdariffa* flower	10.16 ± 0.68	2.83 ± 0.12	4.52± 0.14
2 *E. ulmoides* male flower	19.91 ± 0.99	8.60 ± 0.19	16.43 ± 0.17
3 *C. tinctorius* flower	23.94 ± 1.54	4.12 ± 0.18	20.36 ± 0.42
4 *E. breviscapus* flower	24.55 ± 0.66	15.42 ± 0.16	16.87 ± 0.18
5 *C. aurantium* flower	26.50 ± 0.72	4.00 ± 0.10	12.87 ± 0.11
6 *D. candidum* flower	7.80 ± 0.33	3.89 ± 0.13	12.35 ± 0.17
7 *L. japonica* flower	26.59 ± 0.46	32.18 ± 0.11	10.24 ± 0.13
8 *T. erecta* flower	35.37 ± 0.51	10.91 ± 0.16	6.85 ± 0.40
9 *N. nucifera* flower	37.68 ± 0.61	15.00 ± 0.15	10.69 ± 0.11
10 *E. japonica* flower	7.38 ± 0.22	6.72 ± 0.11	4.89 ± 0.13
11 *T. chinensis* flower	25.28 ± 0.49	19.35 ± 0.16	4.50 ± 0.09
12 *N. tetragona* flower	74.26 ± 1.53	12.81 ± 0.15	2.91 ± 0.18

[a] Flowers are abbreviated and numbered according to **eTable 1**. Values are expressed as mg of equivalent per gram of dry flower.

eTable 9. Correlations between 12 edible flowers' total phenolic, flavonoid, and terpenoid contents and effects on nematode mean lifespan.

	mean lifespan	total phenolic	total flavonoid	total terpenoid
mean lifespan	1	/	/	/
total phenolic	-0.46	1	/	/
total flavonoid	-0.32	0.30	1	/
total terpenoid	0.64*	-0.26	-0.15	1

*Correlation is significant at the 0.05 level.

eTable 10. Chemical constituents qualitatively identified from EUFE by UHPLC-QE-MS.

No.	t_R (min)	Chemical formula	Ion mode	Theoretical Mass (Da)	Real Mass (Da)	Mass Errors (mmu)	MS^E fragmentation (m/z)	Relative abundance	Possible compounds	Sources and references
1	1.26	$C_{15}H_{26}O_9$	$[M-H]^-$	349.1504	349.1504	0	349.1395/187.0915/161.0396/89.0255/71.0138/59.0132	2.17E8	Eucommioside	mzCloud, (1)
2	1.56	$C_{16}H_{22}O_{11}$	$[M-H]^-$	389.1089	389.1095	0.6	389.0971/227.0477/209.0375/183.0587/165.0486/147.0384	5.31E8	Deacetylasperulosidic acid	mzCloud, (1)
3	1.58	$C_{17}H_{26}O_{11}$	$[M-H]^-$	405.1402	405.1406	0.4	405.1413/315.1096/243.0900/225.0798/144.0237	3.91E8	8-O-Acetylharpagide	mzCloud, (1)
4	1.62	$C_{15}H_{22}O_9$	$[M-H]^-$	345.1191	345.1189	-0.2	299.0677/183.0588/165.0486/137.0180	3.48E8	Aucubin	mzCloud, (1)
5	1.97	$C_{16}H_{22}O_{10}$	$[M-H]^-$	373.1140	373.1144	0.4	373.1023/211.0530/123.0390/71.0138	1.80E9	Geniposidic acid	mzCloud, (1)
	1.99		$[M+H]^+$	375.1286	375.1278	-0.8	195.0652/177.0545/149.0597/121.0650/93.0704	1.44E9		
6	1.98	$C_{11}H_{14}O_5$	$[M-H]^-$	225.0768	225.0762	-0.6	225.0802/181.0909/82.0306	2.18E9	Genipin	mzCloud, (2)
7	2.36	$C_{19}H_{26}O_{12}$	$[M-H]^-$	445.1351	445.1356	0.5	445.1219/401.1328/302.1703/161.0396	2.14E8	Gaultherin	mzCloud, (1)
8	2.54	$C_{18}H_{24}O_{12}$	$[M-H]^-$	431.1195	431.1197	0.2	431.1061/269.0579/251.0474/225.0686/59.0132	2.28E8	Asperulosidic acid	mzCloud, (1)
9	2.68	$C_{16}H_{18}O_9$	$[M-H]^-$	353.0878	353.0876	-0.2	353.0768/191.0486	2.12E8	Chlorogenic acid	mzCloud, (1)
	2.71		$[M+H]^+$	355.1024	355.1020	-0.4	163.0389/135.0441/89.0391	5.04E8		
10	3.01	$C_{18}H_{22}O_{11}$	$[M-H]^-$	413.1089	413.1089	0	413.0974/191.0274/147.0386	1.61E9	Asperuloside	mzCloud, (1)
	3.03		$[M+H]^+$	415.1235	415.1219	-1.6	253.0707/193.0497/175.0391/147.0441/119.0494/91.0548	5.52E8		

No.	t_R (min)	Chemical formula	Ion mode	Theoretical Mass (Da)	Real Mass (Da)	Mass Errors (mmu)	MS^E fragmentation (m/z)	Relative abundance	Possible compounds	Sources and references
11	3.15	$C_{16}H_{18}O_9$	$[M-H]^-$	353.0878	353.0879	0.1	353.0765/191.0485/85.0246	1.99E8	Cryptochlorogenic acid	mzCloud, (1)
	3.18		$[M+H]^+$	355.1024	355.1020	-0.4	355.1707/163.0389/135.0441/89.0392	1.97E8		
12	3.33	$C_{15}H_{10}O_7$	$[M+H]^+$	303.0499	303.0494	-0.5	303.0495/229.0494/153.0181/137.0233	7.61E8	Quercetin	mzCloud, (1)
13	**3.51**	$C_{26}H_{28}O_{16}$	$[M-H]^-$	595.1305	595.1313	0.8	595.1305/300.0274/271.0249/255.0299/243.0297	9.60E8	Peltatoside	mzCloud
			$[M+H]^+$	597.1450	597.1447	-0.3	303.0496/229.0493/153.0181/85.0290	5.65E8		
14	3.54	$C_{17}H_{24}O_{10}$	$[M+Na]^+$	411.1262	411.1251	-1.1	411.1257/249.0732/217.0468/203.0529	7.40E8	Geniposide	mzCloud, (3)
15	**3.58**	$C_{27}H_{30}O_{16}$	$[M-H]^-$	609.1461	609.1456	-0.5	609.1461/300.0274/271.0249/255.0299/243.0297	1.16E9	Rutin	mzCloud, (1)
16	3.60	$C_{21}H_{20}O_{11}$	$[M+H]^+$	449.1078	449.1071	-0.7	449.1098/303.0497/287.0548/153.0180/85.0290	5.50E8	Astragalin/Kaempferol 3-O-glucoside	mzCloud, (1)
17	3.87	$C_{15}H_{10}O_6$	$[M+H]^+$	287.0550	287.0546	-0.4	287.0547/153.0182/121.0286	4.49E8	Kaempferol	mzCloud, (1)
18	3.92	$C_{16}H_{12}O_7$	$[M+H]^+$	317.0656	317.0650	-0.6	317.0653/302.0418/285.0389/153.0182	4.76E8	Isorhamnetin	mzCloud
19	**3.94**	$C_{28}H_{32}O_{16}$	$[M-H]^-$	623.1618	623.1615	-0.3	623.1621/314.0432/299.0197/271.0250/243.0297/151.0025	6.72E8	Isorhamnetin 3-O-neohesperidoside	mzCloud
			$[M+H]^+$	625.1763	625.1748	-1.5	317.0654/302.0419/153.0182/85.0290	3.49E8		

No.	t_R (min)	Chemical formula	Ion mode	Theoretical Mass (Da)	Real Mass (Da)	Mass Errors (mmu)	MS^E fragmentation (m/z)	Relative abundance	Possible compounds	Sources and references
20	4.03	$C_{15}H_{12}O_6$	$[M-H]^-$	287.0561	287.0562	0.1	287.0460/150.9968/135.0385/107.0164/65.0029	1.25E8	Eriodictyol	mzCloud
21	4.08	$C_{27}H_{30}O_{15}$	$[M-H]^-$	593.1512	593.1512	0	593.1514/285.0405/255.0299/227.0346	1.79E8	Kaempferol-3-O-rutinoside	mzCloud, (1)
			$[M+H]^+$	595.1657	595.1649	-0.8	287.0548/85.0290/71.0498	1.59E8		
22	4.27	$C_{21}H_{20}O_{11}$	$[M+H]^+$	449.1078	449.1071	-0.7	287.0548/153.0182	3.20E8	Kaempferol-7-O-glucoside	mzCloud
23	4.55	$C_{23}H_{22}O_{12}$	$[M+H]^+$	491.1184	491.1178	-0.6	287.0548/187.0601/153.0182/109.0288	2.04E8	6''-O-Acetylastragalin	mzCloud, (1)
24	4.67	$C_{15}H_{10}O_5$	$[M-H]^-$	269.0455	269.0459	0.4	269.0368/225.1416/150.9975/137.0909/117.0289/85.0304	1.67E8	Apigenin	mzCloud
25	4.90	$C_{21}H_{20}O_{12}$	$[M-H]^-$	463.0882	463.0881	-0.1	463.0889/300.0274/271.0249/255.0299/151.0025	1.17E9	Quercetin-3β-D glucoside/isoquercetin	mzCloud, (1)
	4,91		$[M+H]^+$	465.1028	465.1020	-0.8	303.0497/229.0495/153.0181/85.0290	3.04E8		
26	4.95	$C_{15}H_{12}O_5$	$[M-H]^-$	271.0612	271.0613	0.1	271.0519/177.0118/165.0124/119.0441/107.0164	4.43E8	Naringenin	mzCloud, (1)
27	5.03	$C_{15}H_{12}O_5$	$[M-H]^-$	271.0612	271.0613	0.1	271.0520/150.9968/119.0441/107.0164	1.12E8	Naringeninchalcone	mzCloud
28	5.28	$C_9H_{16}O_4$	$[M-H]^-$	187.0976	187.0967	-0.9	187.0900/168.9837/125.0912	6.79E7	Eucommiol	mzCloud, (1)

eMethod 1. The specific preparation process of floral ethanolic extracts and EUFE.

After drying, removing the inedible parts, and grinding, floral powders were extracted. All extractions were performed in triplicates and stored at −80°C. Each sample (1.0 g) was weighed and extracted thrice with 80% aqueous ethanol solution (1:10, w/v) via the ultrasonic-assisted procedure (40°C, 500 w, 1 h). After centrifugation, the supernatants were pooled, combined, and blown by a nitrogen stream to remove ethanol. The remaining solution was re-dissolved using ultrapure water to 20 mL and filtered by a 0.22 μm filter membrane. The concentration of the resulting solution was 50 mg dry flower equivalents per millilitre (50 mg/mL). Since ethanol might have a relatively small residual effect, we used the vehicle solution based on a sham ethanol extraction experiment. For EUFE, we adopted the similar extraction method but more male flowers were used, ethanol solvent was removed with the rotatory evaporator and obtained extracts were lyophilized. The extract solution concentrations were presented in μg EUFE/mL.

eMethod 2. The specific process of synchronization and administration in *C.elegans*.

Synchronization: the young adult worms with intensive eggs were cleaned and collected by M9 buffer, then lysed with alkaline lysate for 5 min. The alkaline lysate consists of 50% 10-fold dilutions of sodium hypochlorite solution (NaOCl, 6~14% active chlorine basis, Macklin) and 50% 1 M sodium hydroxide solution. After centrifugation and washing 2~3 times with M9 to remove the lysis solution, their eggs were transferred into blank NGM plates and developed into L1 or L4 larvae at 20°C.

Administration: after 20 min under UV exposure, 60 mm NGM-plates with sufficient food were followed by the addition of the corresponding concentration of vehicle or sample solution (150 μL) on the surface and placed at 4°C for storage after air-drying on super-clean table.

eMethod 3. The detailed calculation of the antioxidant potency composite index (APCI).

The antioxidant potency composite index (APCI) was calculated according to the following formula:

$$\mathrm{APCI} = \frac{\mathrm{DPPH}_{\mathrm{index}} + \mathrm{ABTS}_{\mathrm{index}} + \mathrm{FRAP}_{\mathrm{index}}}{3}$$

Taking $\mathrm{DPPH}_{\mathrm{Index}}$ as an example, the calculation method was as follows：

$$\mathrm{DPPH}_{\mathrm{index}} = \frac{\text{DPPH value of sample}}{\text{DPPH maximum value of among 30 kinds of floral extracts}} \times 100$$

The calculation method of $\mathrm{ABTS}_{\mathrm{index}}$ and $\mathrm{FRAP}_{\mathrm{index}}$ was similar. According to the above, 30 edible floral extracts 'APCI were summarised in **eTable 5**.

eMethod 4. The detailed procedures of diet preference assay.

100 μL OP50 solution was added on the two sides of an NGM plate (10 cm in diameter). After the solution was air-dried, the vehicle or EUFE was covered on top of the lawn. After dried, a drop of M9 buffer that collected 80 L1-staged worms was plated in the middle of the plate, as shown in **eFigure 1A**. The worms located in either lawn were individually counted after 8 h at 20°C.

eMethod 5. The detailed procedures of microscopic fluorescence imaging.

Differently treated worms were anesthetized by using the M9 buffer with 5 mM levamisole and placed

at 1% agarose pads on thin glass slides. Under nonsaturating exposure conditions, the images were captured by using the Zeiss LSM 880 confocal microscope equipped with 10x air, 40x water- and 63x oil-immersion objectives (Carl Zeiss Inc., Germany).

Preparation of slides carrying samples. The slides (50 mm × 24 mm × 0.15 mm) were immersed in 1% agarose TAE Buffer that had warmed to clarity and quickly withdrawn to place on a clean plane for cooling. Then we used the blade to retain the agarose pad for one side on the middle part of the slides. The agarose pad was about 0.1~0.2 mm in thickness. M9 buffer with different anesthetized nematode strains (each at least 20 worms, using 5 mM levamisole hydrochloride to anesthetize) was dropped on the above pad and covered with a circular cover glass (13 mm diameter) for microscopic observation. Air bubbles should be avoided.

Muscle and mitochondrial morphologies. Since muscle and mitochondrial morphology cannot be well quantified, we emphasized the single-blindness of image capture, i.e., related photographers were not aware of the specific group settings. Both observations with the GFP channel, i.e., the excitation and emission wavelengths were 488 nm and 510~540 nm. For muscle fiber observation, we used the 40x water-immersion objective. Laser intensity was 5.0% for GFP imaging with a master gain of 630. An 8-bit digitization depth was used to acquire images, with constant detector offsets and master gain. Worms were pre-treated with vehicle or 100 μg/mL EUFE for 1 and 5 d, and the photos of the head, midbody, and tail were taken respectively. For mitochondrial observation, treatment duration was 1 and 3 days. The other differences were that we used the 63x oil-immersion objective and set the master gain was 480. All the snapshots were taken from the same part of *C. elegans*: muscles from the upper part of the worm, excluding the regions of the esophagus and vulva.

Lipofuscin level. The wild-type worms were treated with vehicle or EUFE for 1, 5, and 9 d and their lipofuscin autofluorescence was detected using 488 nm ex / 500~560 nm em wavelengths. Except for the 10x air-immersion objective, other acquisition conditions were the same as in muscle fiber observation. And changes in nematode body size on 5 and 9 days resulted in different scale bars for the corresponding stitched images. Image quantification of fluorescence intensity was done densitometrically by tracing around each animal's intestine and determining mean pixel intensity using the Fiji software (https://imagej.net/Fiji/Downloads).

Intracellular localization of DAF-16. To investigate the effect of EUFE on the intracellular distribution of DAF-16, the TJ356 strain was selected. In this strain, the DAF-16 gene and the gene coding for the GFP have been fused. The intracellular distribution of DAF-16::GFP was assessed as 'cytosolic', 'intermediate', and 'nuclear' as shown in **Figure 4A**. Pileup maps represented the percentage in corresponding categories. Under the 10x air-immersion objective, the laser intensity was 10.0% for GFP imaging with a master gain of 630, and 8-bit digitization depth was used. And treatment duration of EUFE was 1 and 3 days.

Expression of LGG-1. Three days after the treatment, the DA2123 strain worms were captured for comparison of LGG-1 protein expression between groups. The extent of LGG-1 expression was indicated by counting the numbers of LGG-1::GFP positive puncta regions in the lateral epidermal seam cells of the whole worm. Acquisition conditions were the same as in DAF-16 observation.

Expression of SOD3. Three days after the treatment, the CF1553 strain worms were captured for comparison of SOD3 protein expression between groups. Acquisition conditions were the same as in DAF-16 observation. And the expression of SOD3 was compared by the mean relative fluorescence intensity of the pharynx and the tail. The values were measured using the Fiji software by selecting a region of interest (ROI).

Mitophagy detection. DsRed was excited with a 561 nm laser (650 nm emission filter). Treatment duration was one day for the vehicle, EUFE, and the positive control CCCP (a mitophagy inducer). Under the 63x oil-immersion objective, the laser intensity was 5.0% for GFP imaging with a master gain of 630 and 60.0% for DsRed imaging with a master gain of 650. Digitization depth of 8 bits was used for acquiring images, while detector offset and master gain were kept constant. All the snapshots were taken from the same part of *C. elegans*: muscles from the mid-body of the worm, excluding the regions of the esophagus and vulva. Colocalization analysis was performed by using the Colocalization Plugin integrated into the Fiji software.

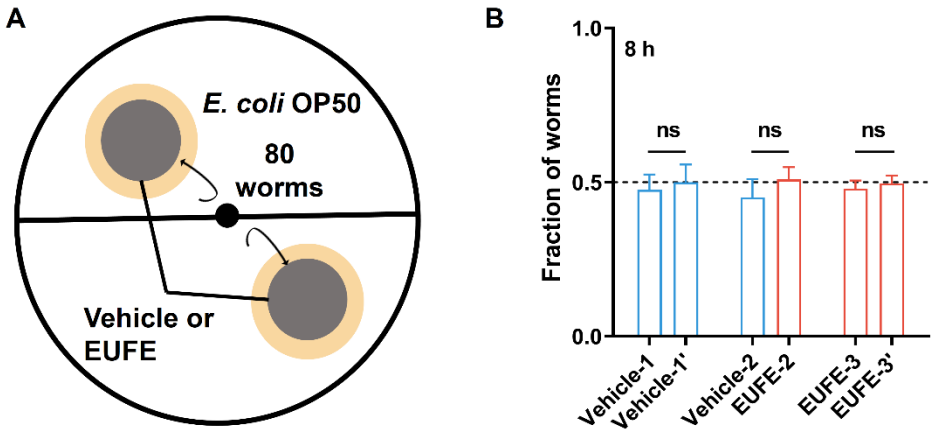
eMethod 6. The detailed procedures of transmission electron microscopy.

Worms were fixed using 2.5% glutaraldehyde overnight (0.1 M, pH 7.4 phosphate buffer). After fixation, samples were rinsed with the buffer, post-fixed with 1% osmium tetroxide for 1-2 hours, rinsed again with the buffer, dehydrated by an ethanol series and acetone, infiltrated in a mixture of acetone and Spurr embedding agent, and embedded in 100% Spurr overnight and cured at 70°C for 36 h. Ultrathin sections (70~90 nm) were taken with the ultramicrotome Leica EM UC7 (Leica Microsystems Gmbh, Vienna, Austria) and transferred on 200-mesh copper grids. Grids were stained with lead citrate and uranyl acetate (saturated solution in 50% (v/v) ethanol). Sections were viewed by the Hitachi H-7650 (Hitachi, Tokyo, Japan). Images were obtained from representative sections taken from more than 10 worms in each group.

eMethod 7. The specific procedures of qualitative and quantitative analysis of EUFE.

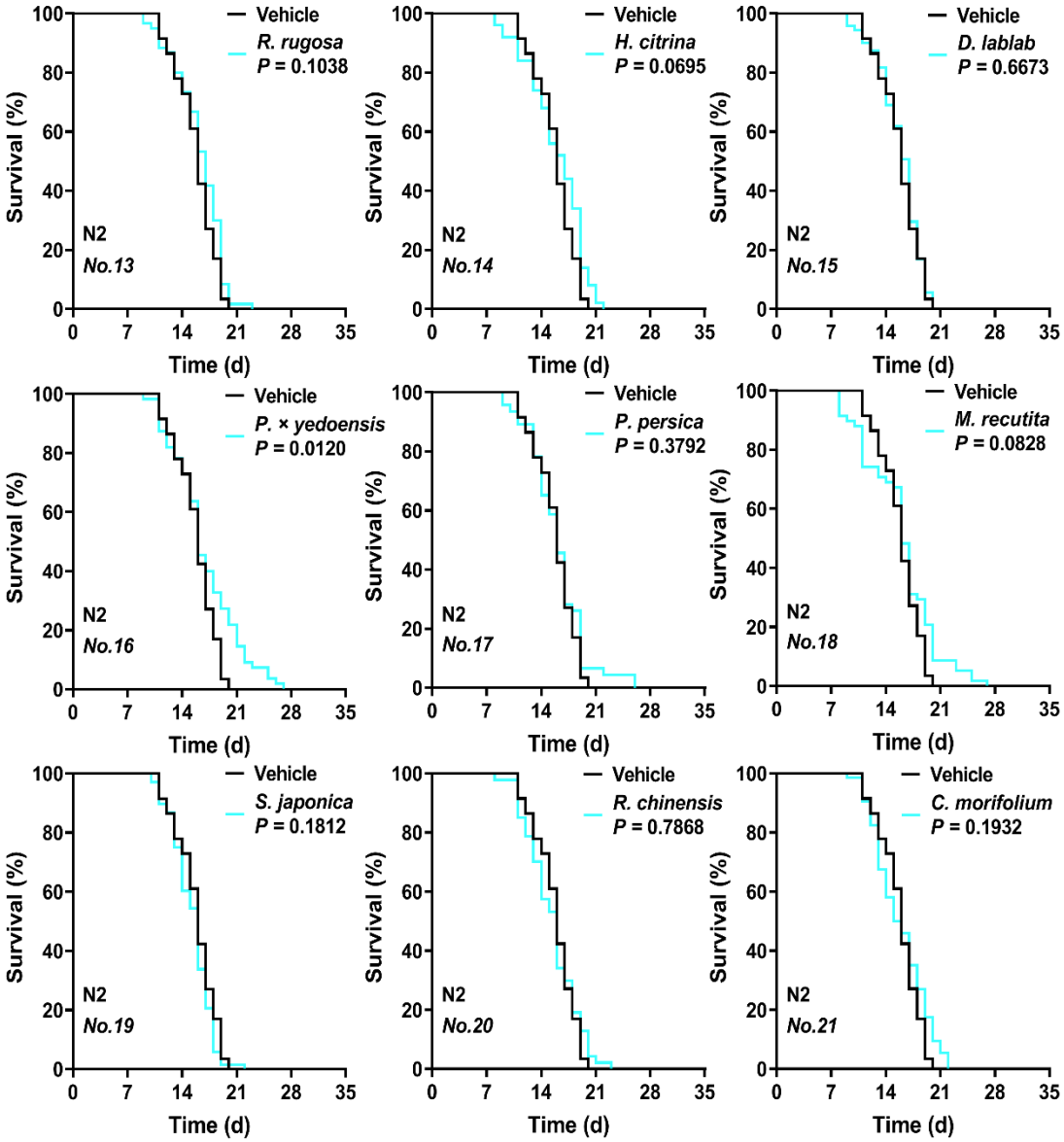
For qualitative analysis, instrument control, data acquisition or analysis were performed by the Xcalibur software. Moreover, the raw data files were uploaded to Compound Discoverer™ and compound identification was achieved by matching with the mzCloud mass spectral library and manual validation. 10 μL of the extract solution were injected into the UHPLC system and chromatographic separation was conducted on a UHPLC BEH C_{18} column (2.1× 100 mm, 1.7 μm) (Waters, USA) at 40°C. 0.1% formic acid in water (A) and 0.1% formic acid in acetonitrile (B) were used as aqueous and organic mobile phases, respectively. A gradient elution system was set up as follows: 0~3 min, 5~25% B; 3~4 min, 25~65% B; 4~10 min, 65% B; 10~10.1 min, 65~5% B; 10.1~13 min, 5% B. The flow rate was 0.3 mL/min. The instrument was operated in negative and positive ion modes to achieve full-scan analysis over an m/z range of 100~1000. And the optimized parameters are indicated below: the sheath gas flow rate (40 L/min); aux gas flow rate (10 L/min); spray voltage (3 kV); capillary temperature (320°C); probe heater temperature (350°C); S-lens RF level (50%).

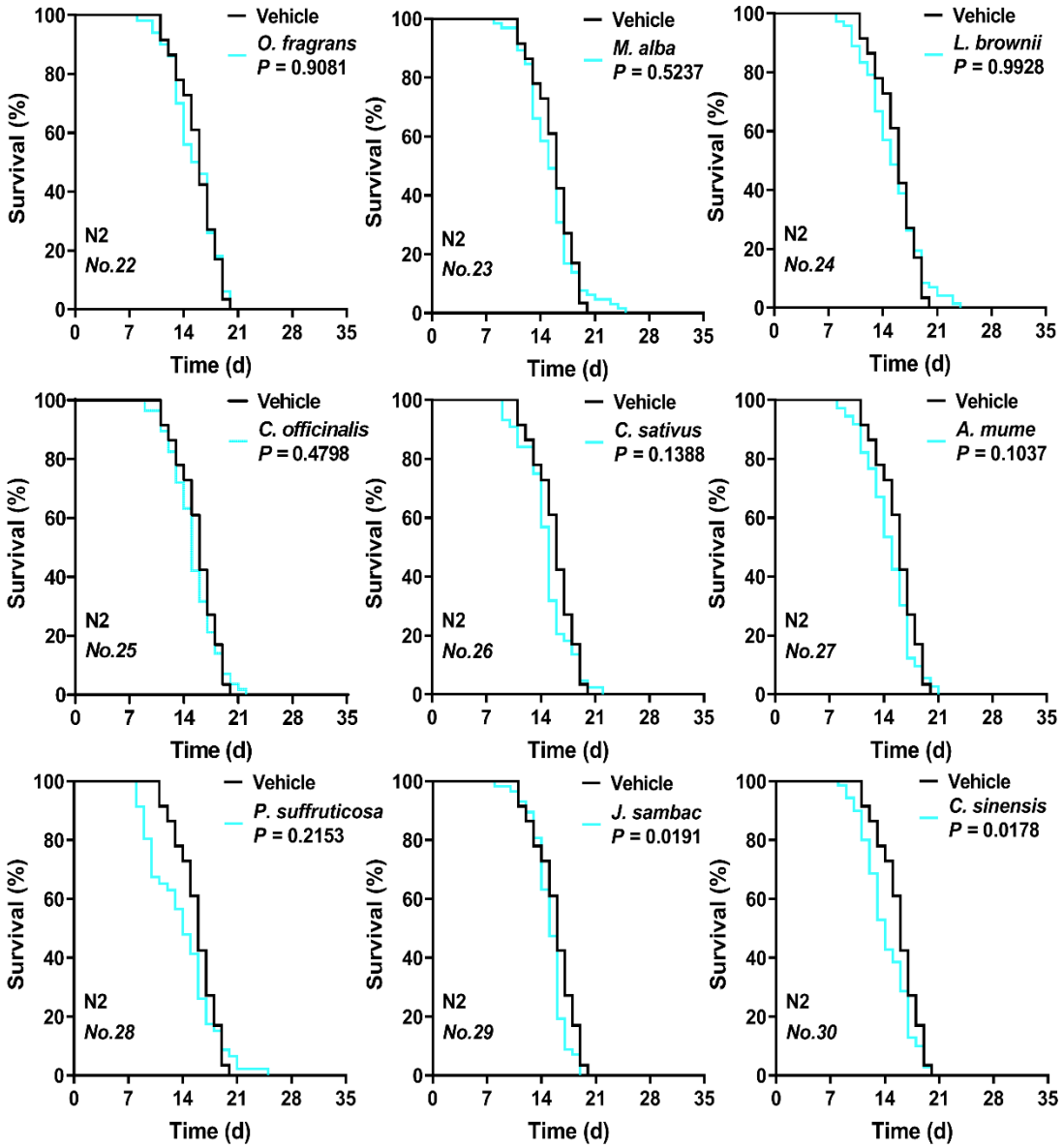
For quantitative analysis, 10 μL of the extract solution was injected into the system and chromatographic separation was conducted on a reverse-phase ODS-2 Hypersil C_{18} column (4.6×250 nm, 5 μm) (Thermo Fisher Scientific, USA) at 30°C. The solvents used were 0.5% phosphoric acid aqueous solution (A) and methanol (B). The linear gradient of phase B was 0~30 min, 5~15%; 30~55 min, 15~30% at a flow rate of 1 mL/min.



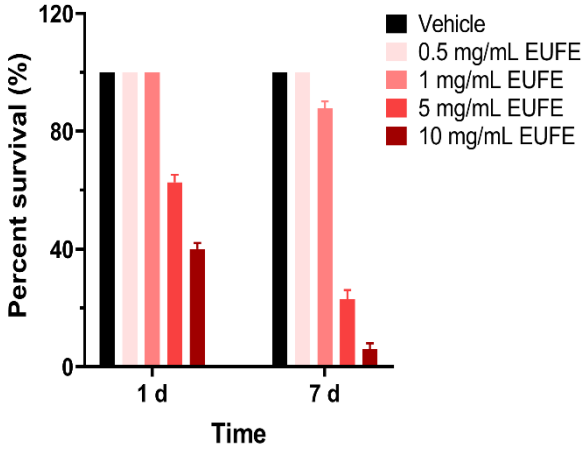
eFigure 1 The scheme and results of diet preference assay in *C.elegans.*

(A) Scheme of the nematode dietary preference assay. EUFE or vehicle was placed on the *E. coli* lawn. (B) Dietary preference (for 8 h) of nematodes treated with EUFE and vehicle. For B, treatments with EUFE at a concentration of 100 μg/mL and statistically non-significant at ns $P > 0.05$ by multiple *t*-test. Each experiment was repeated 3 times.

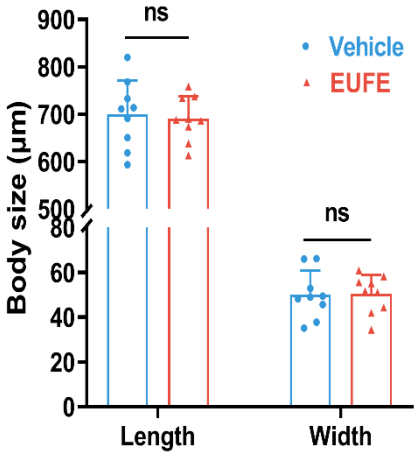

Vehicle
R. rugosa
P = 0.1038
N2
No.13
Survival (%)
Time (d)
Vehicle
H. citrina
P = 0.0695
N2
No.14
Survival (%)
Time (d)
Vehicle
D. lablab
P = 0.6673
N2
No.15
Survival (%)
Time (d)
Vehicle
P. × yedoensis
P = 0.0120
N2
No.16
Survival (%)
Time (d)
Vehicle
P. persica
P = 0.3792
N2
No.17
Survival (%)
Time (d)
Vehicle
M. recutita
P = 0.0828
N2
No.18
Survival (%)
Time (d)
Vehicle
S. japonica
P = 0.1812
N2
No.19
Survival (%)
Time (d)
Vehicle
R. chinensis
P = 0.7868
N2
No.20
Survival (%)
Time (d)
Vehicle
C. morifolium
P = 0.1932
N2
No.21
Survival (%)
Time (d)



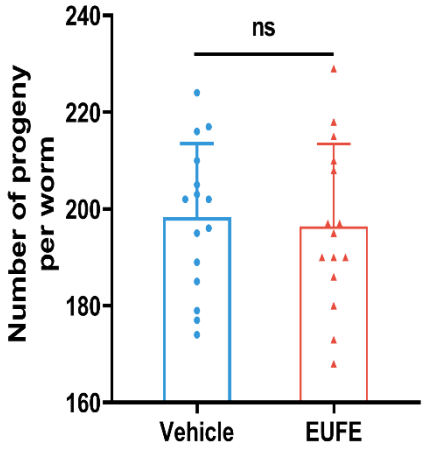
eFigure 2. Effects of ethanolic extracts of 18 edible flowers on *C.elegans* lifespan. The respective survival curves of nematodes treated with the remaining 18 flowers (non-significant or without longevity-promoting effect) (at 50 mg/mL concentration) or with the vehicle. N2 means *C. elegans* Bristol N2 strain wild-type nematodes. Flowers were abbreviated and numbered according to **eTable 1**. See **eTable 4** for more detailed information.



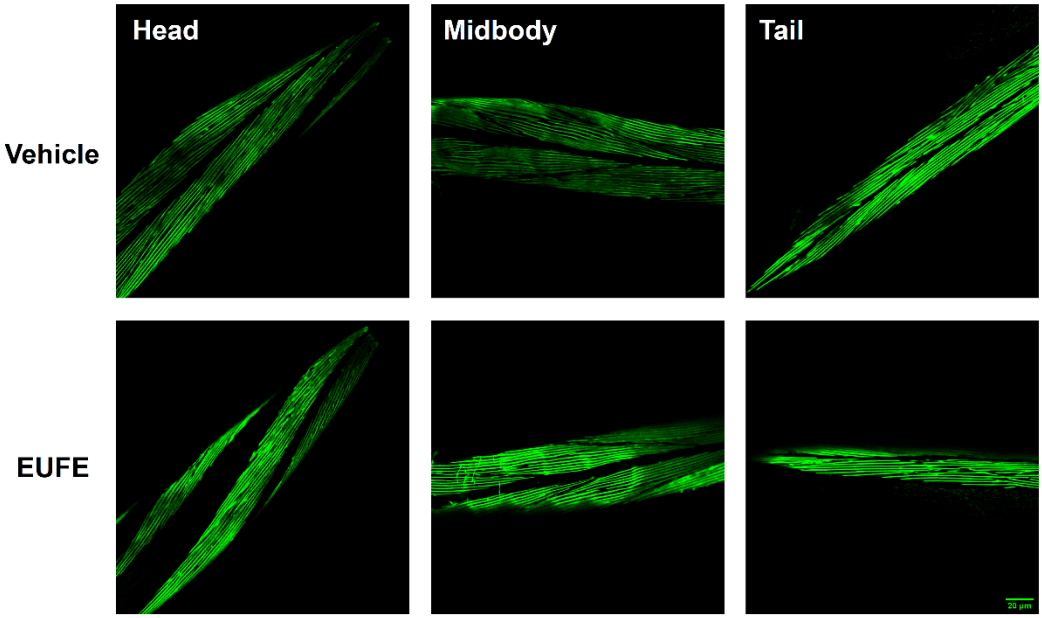
eFigure 3. The survival rate of wild-type nematodes cultured on NGM plates containing 0.5, 1, 5, or 10 mg/mL EUFE or vehicle in 1 d and 7 d.



eFigure 4. The body size (for 1 day) of nematodes treated with EUFE and vehicle. Treatments with EUFE at a concentration of 100 μg/mL and statistically non-significant at ns $P > 0.05$ by the unpaired *t*-test. Each experiment was repeated 3 times.

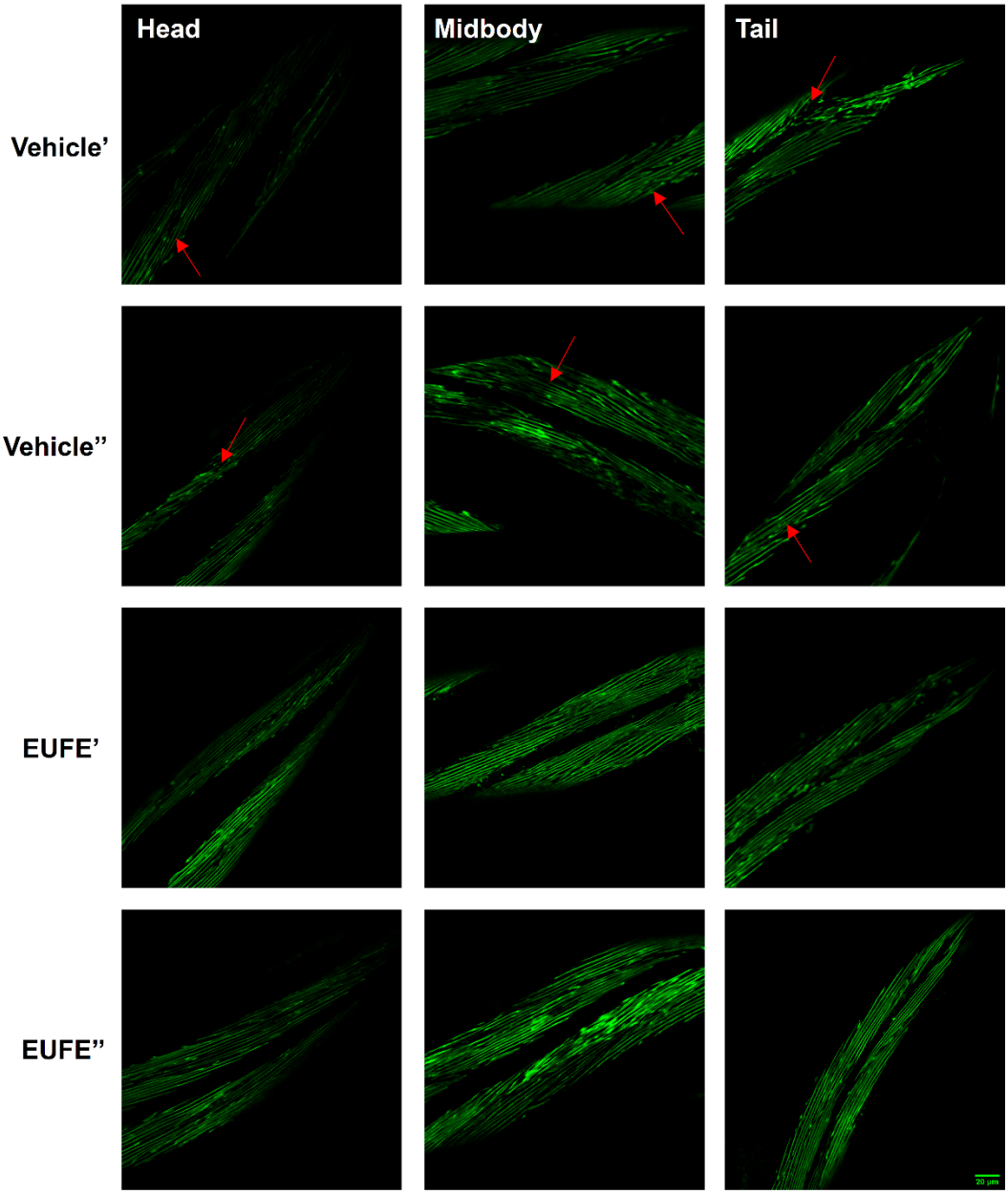


eFigure 5. The reproductive ability (for whole reproductive stage) of nematodes treated with EUFE and vehicle. Treatments with EUFE at a concentration of 100 μg/mL and statistically non-significant at ns $P > 0.05$ by the unpaired t-test. Each experiment was repeated 3 times.



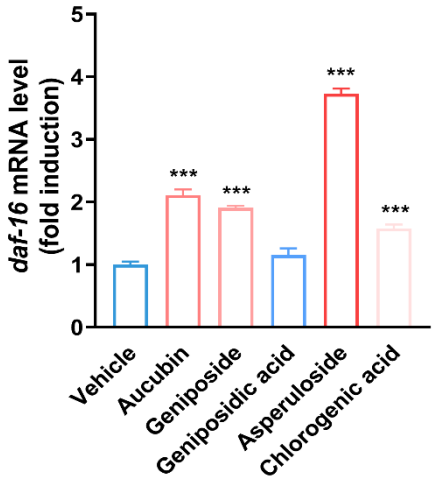
eFigure 6. Representative images of muscle morphology at days 1 of adulthood of p_{myo-3}MYO-3::GFP nematodes treated with EUFE or vehicle.

Scale bar, 20 μm. The captured muscles were located at the head, mid-body, and tail of nematodes. Treatments with EUFE at a concentration of 100 μg/mL.



eFigure 7. Representative images of muscle morphology at days 5 of adulthood of p_{myo-3}MYO-3::GFP nematodes treated with EUFE or vehicle.

Scale bar, 20 μm. The captured muscles were located at the head, mid-body, and tail of nematodes. Treatments with EUFE at a concentration of 100 μg/mL. These images were parallel repeats of Figure 2G.



eFigure 8. Relative mRNA expression of *daf-16* gene in worms after treatment of vehicle or five identified compounds for 1 d. The concentration of each compound was 100 μM. *act-1* mRNA as the loading control. Statistically significant at *** $P < 0.001$ by unpaired *t*-test. Each experiment was repeated 3 times.

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3. Ding Y, Zhang T, Tao J, Guo C, Jin M, Ji G. Determination of geniposide in rat plasma by UPLC-MS. *Asian Journal of Chemistry*. 2013;25(7):3644-3650. doi: 10.14233/ajchem.2013.13691