Figure S1. UHPLC-QTOF-MS chromatograms of *Prunus domestica* L. extract in (A) positive and (B) negative ionization modes.

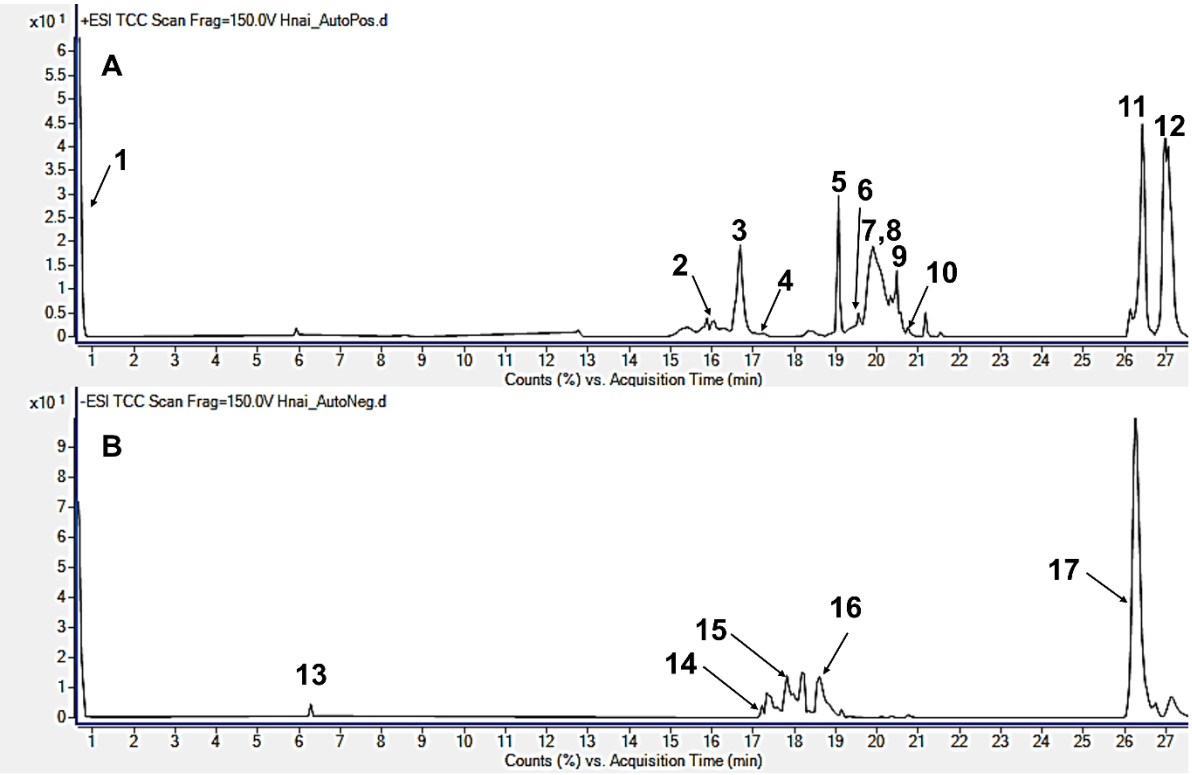


Table S1. Chemical profile of *Prunus domestica* L. extract identified by UHPLC-QTOF-MS in positive and negative ionization modes.

No.	t_R (min)	mass	*m/z*	Chemical formular	Compounds name	Class
Positive mode						
1	0.646	342.116	360.1498	C12 H22 O11	Sucrose	Sugar
2	16.01	320.1269	343.1163	C17 H20 O6	Oleacein	Phenolic
3	16.68	270.2558	288.2896	C17 H34 O2	Hexadecanoic acid	saturated fatty acid
4	17.23	210.2344	228.2683	C15 H30	(*E*)-7-Pentadecene	long-chain unsaturated fatty acid
5	19.06	204.0783	205.0857	C12 H12 O3	Anofinic acid	benzopyran
6	19.55	286.2146	309.2038	C16 H30 O4	Adipic acid	dicarboxylic acid
7	19.86	256.2401	274.274	C16 H32 O2	Palmitic acid	saturated fatty acid
8	20.27	289.2618	290.2688	C16 H35 N O3	Lauric acid	saturated fatty acid
9	20.48	278.2607	296.2946	C19 H34 O	2-Pentadecylfuran	pentadecyl furan
10	20.74	376.2978	394.3316	C24 H40 O3	Lithocholic acid	Triterpene
11	26.43	270.2558	288.2896	C17 H34 O2	Ethyl pentadecanoate	long-chain fatty ester
12	27.10	226.2294	244.2632	C15 H30 O	Pentadecanal	long-chain fatty aldehyde
Negative mode						
13	6.280	290.0791	289.0718	C15 H14 O6	Catechin	Phenolic
14	17.21	294.1829	293.1756	C17 H26 O4	Myrsinone	1,4-benzoquinone
15	17.83	380.1628	379.1559	C23 H24 O5	Mangostinone	Xanthone
16	18.54	234.1617	233.1544	C15 H22 O2	Dihydro isoalantolactone	Ssquiterpene lactone
17	26.28	380.1626	379.1553	C23 H24 O5	Garcinone A	Xanthone

Table S2: Exploration time of rats in the novel object recognition (NOR) test during familiarization and choice trials, with p-values and effect sizes (Cohen's d, 95% CI).

Group	Exploration time (s)				p-value (NO vs FO)	Cohen's d [95% CI]	Interpretation
	Familiarization trial		Choice trial				
	Location A	Location B	Familiar object (FO)	Novel object (NO)			
Vehicle	18.8 ± 3.2	13.3 ± 2.9	16.9 ± 2.5	37.9 ± 4.9 *	0.008	1.82 [0.85, 2.67]	Very large
D-gal	13.4 ± 2.2	13.5 ± 4.0	9.0 ± 2.0	4.3 ± 0.5	0.121 (n.s.)	–1.09 [–1.90, –0.28]	Large (negative)
PD 75 mg	17.3 ± 1.7	14.1 ± 2.7	16.2 ± 2.1	39.7 ± 4.1 **	0.004	2.11 [1.12, 2.85]	Very large
PD 100 mg	17.4 ± 2.1	14.9 ± 1.9	10.6 ± 2.8	41.6 ± 4.4 **	0.002	2.49 [1.35, 3.27]	Very large
PD 150 mg	17.0 ± 1.3	17.1 ± 4.5	11.0 ± 2.5	40.4 ± 5.5 **	0.003	2.36 [1.21, 3.09]	Very large
D-gal + PD 75 mg	19.9 ± 3.8	12.8 ± 3.6	12.7 ± 3.9	35.7 ± 2.9 **	0.006	1.67 [0.76, 2.45]	Large
D-gal + PD 100 mg	23.4 ± 4.4	11.9 ± 2.4	8.7 ± 2.0	39.6 ± 5.7 **	0.003	2.22 [1.18, 3.00]	Very large
D-gal + PD 150 mg	21.3 ± 5.1	13.9 ± 6.7	4.9 ± 1.4	40.3 ± 11.7 *	0.012	1.56 [0.65, 2.33]	Large

*p□0.05, and **p□0.01 significant difference compared to familiar location

FO: Familiar object; NO: Novel object; NOR: Novel object recognition; D-gal: D-galactose; PD: *Prunus domestica* L.

Table S3: Preference index (PI) in the novel object recognition (NOR) test, with p-values and effect sizes (Cohen's d, 95% CI)

Group	PI (Mean ± SEM)	p-value vs. 50%	Cohen's d [95% CI]	Interpretation
Vehicle	68.38 ± 5.24*	0.004	1.53 [0.63, 2.28]	Large
D-gal	36.09 ± 6.97	0.082 (n.s.)	–0.58 [–1.28, 0.10]	Medium (negative)
PD 75 mg	71.28 ± 3.04***	0.001	2.11 [1.12, 2.87]	Very large
PD 100 mg	80.68 ± 4.47**	<0.001	2.73 [1.58, 3.46]	Very large
PPD 150 mg	78.80 ± 4.94**	<0.001	2.47 [1.35, 3.19]	Very large
D-gal + PD 75 mg	75.47 ± 6.31**	0.002	1.99 [1.05, 2.73]	Large
D-gal + PD 100 mg	82.30 ± 3.10***	<0.001	3.00 [1.89, 3.72]	Very large
D-gal + PD 150 mg	87.93 ± 3.76***	<0.001	2.85 [1.73, 3.59]	Very large

*p < 0.05, **p < 0.01, ***p < 0.001 vs. 50% chance level. VH: vehicle; D-gal: D-galactose; PD: *Prunus domestica* L.

Table S4: Two-way ANOVA results for SOD activity in hippocampus and prefrontal cortex, with F-values, p-values, and effect sizes (partial η^2).

Brain region	Factor	df	F	p-value	η^2_p
Hippocampus	D-gal (main)	1,37	49.21	<0.0001	0.571
	Dose (main)	3,37	8.898	0.0001	0.419
	Interaction	3,37	2.869	0.0495	0.189
Prefrontal cortex	D-gal (main)	1,38	48.06	<0.0001	0.558
	Dose (main)	3,38	17.26	<0.0001	0.577
	Interaction	3,38	4.174	0.0119	0.248

Supplementary File S1: Sample Size and Power Calculation

To determine the minimum number of animals required per group for adequate statistical power in comparing the mean values between the *Control* and *D-gal* groups using a **two-sample, two-sided t-test (**data from Zhao et al. (2019**))**.

Assumptions and Parameters

Parameter	**Description**	**Symbol**
Significance level (two-sided)	α	0.01
Corresponding critical value	$Z_{\alpha/2}$	2.58
Desired power	1−β	0.80
Corresponding Z value	Z_{β}	0.84
Control group mean	—	63.44
D-gal group mean	—	40.22
Control group SD	SD_1	17.42
D-gal group SD	SD_2	12.50

Formula Used For a two-sample, two-sided t-test (assuming equal variances):

$$N = \frac{(Z_{\alpha/2} + Z_{\beta})^2 \cdot 2\sigma^2}{\Delta^2}$$

where:
σ = pooled standard deviation
Δ = expected difference between means

Step 1. Calculate the Pooled Standard Deviation (σ)

$$\sigma^2 = \frac{SD_1^2 + SD_2^2}{2}$$
$$= \frac{17.42^2 + 12.50^2}{2} = \frac{303.4564 + 156.25}{2} = \frac{459.7064}{2} = 229.8532$$
$$\sigma = \sqrt{229.8532} \approx 15.16$$

Step 2. Calculate the Mean Difference (Δ)

$$\Delta = 63.44 - 40.22 = 23.22$$

Step 3. Substitute into the Sample Size Formula

$$(Z_{\alpha/2} + Z_{\beta}) = 2.58 + 0.84 = 3.42$$
$$(Z_{\alpha/2} + Z_{\beta})^2 = 3.42^2 = 11.6964$$
$$2\sigma^2 = 2 \times 229.8532 = 459.7064$$
$$\Delta^2 = 23.22^2 = 539.1684$$
$$N = \frac{11.6964 \times 459.7064}{539.1684} = \frac{5376.91}{539.17} \approx 9.97$$
$$\boxed{N = 10 \text{ animals per group (rounded up)}}$$

Step 4. Calculate the Effect Size (Cohen's d)

$$d = \frac{\Delta}{\sigma} = \frac{23.22}{15.16} \approx 1.53$$

This corresponds to a **large effect size** according to Cohen's convention.

Summary

Parameter	Symbol	Value
Significance level (two-sided)	α	0.01
Power	1−β	0.80
Pooled SD	σ	15.16
Mean difference	Δ	23.22
Effect size (Cohen's d)	d	1.53

- Sample size was rounded **upward** to ensure adequate statistical power.
- An additional **10–20% of animals** were included to compensate for potential attrition or experimental loss.
- The calculation assumes **equal variance** and **normal distribution** between groups.
- If actual variances differ substantially, Welch's correction and a revised power analysis may be required.