Electronic Supplementary Information

The neuroprotective and antioxidant profiles of selenium-containing polysaccharides from the fruits of *Rosa laevigata*

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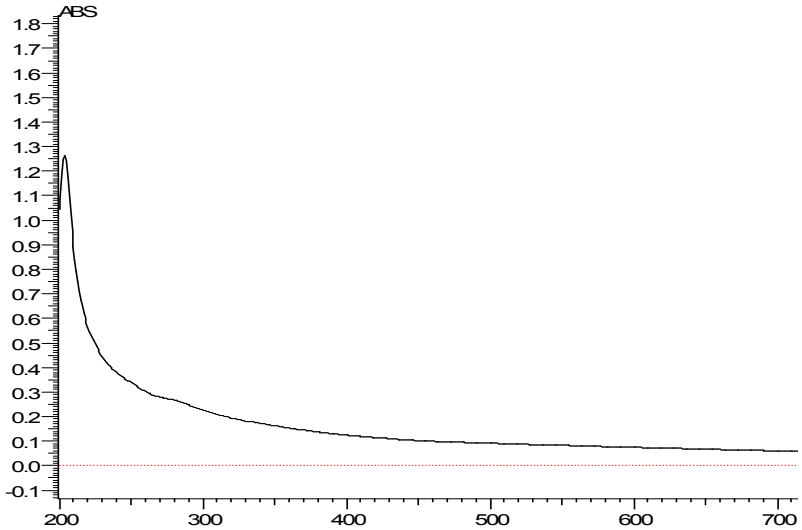
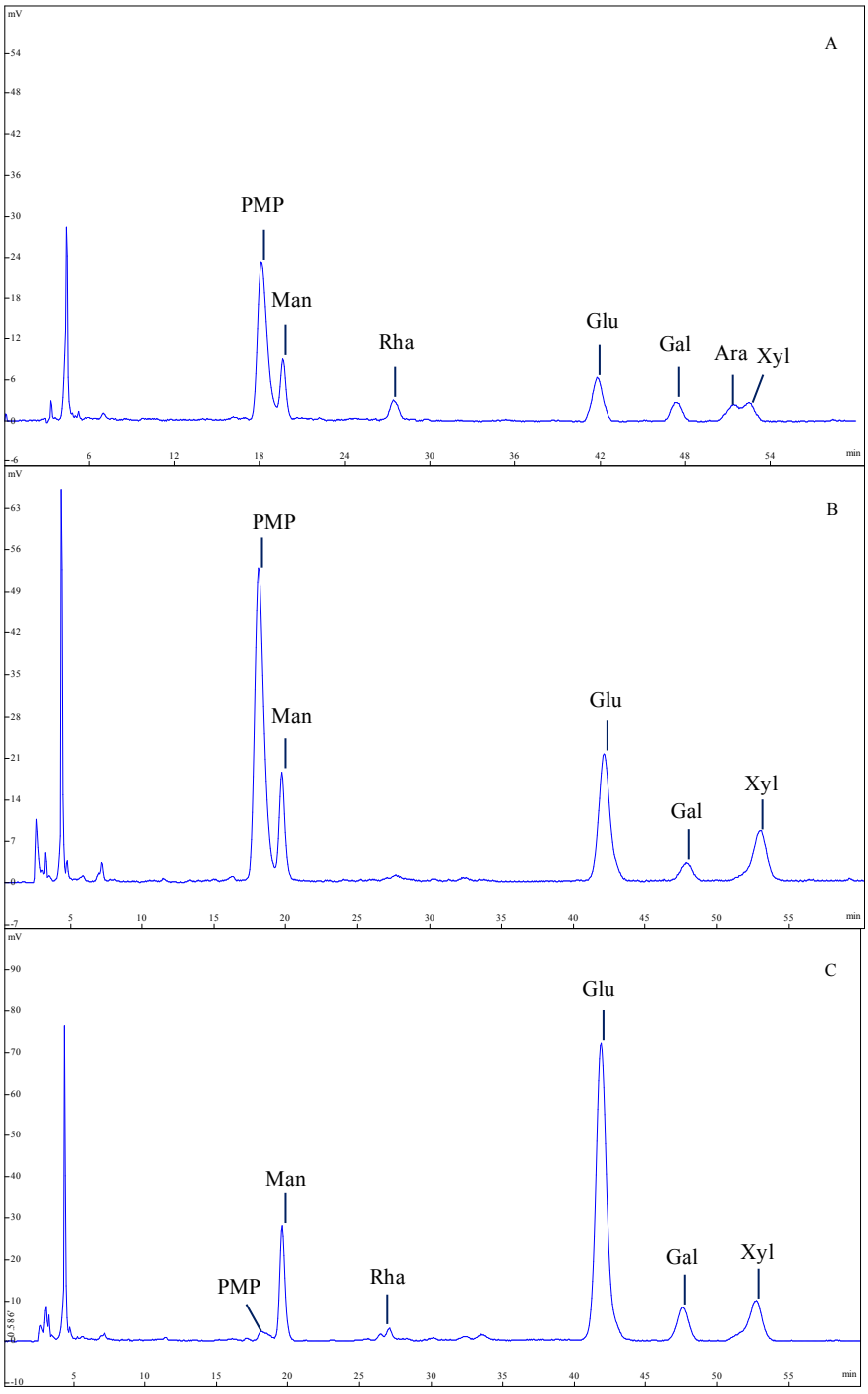
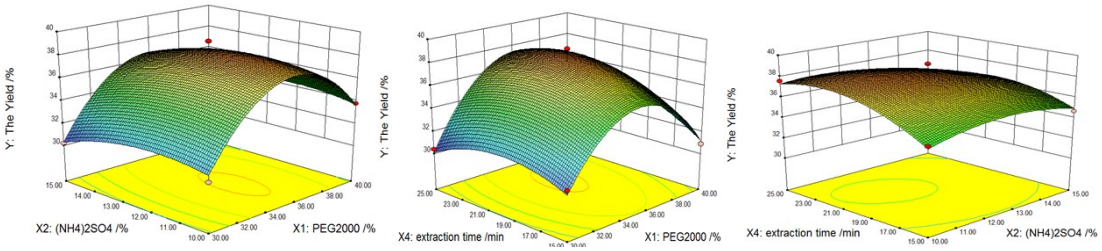
SI-Fig.1. UV spectra of the crude RLFPs.



SI-Fig.2. HPLC-UV chromatogram of the PMP-monosaccharide deriratives. (A) Derivatized standard monosaccharides; (B) Se-RLFP-1; (C) Se-RLFP-2.



SI-Fig. 3 Response surface plots showing effects of between two factors of PEG2000 (X1, %), $(NH_4)_2SO_4$ (X_2, %)and extraction time (X4, min) on the yield of RLMPs



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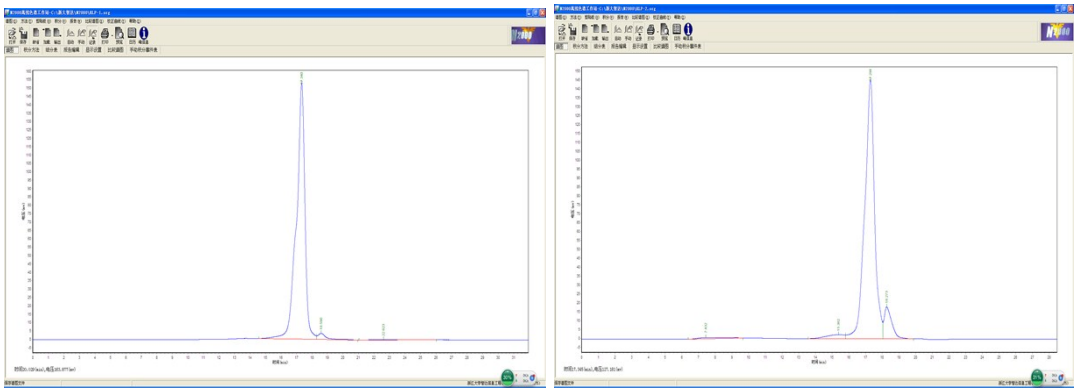
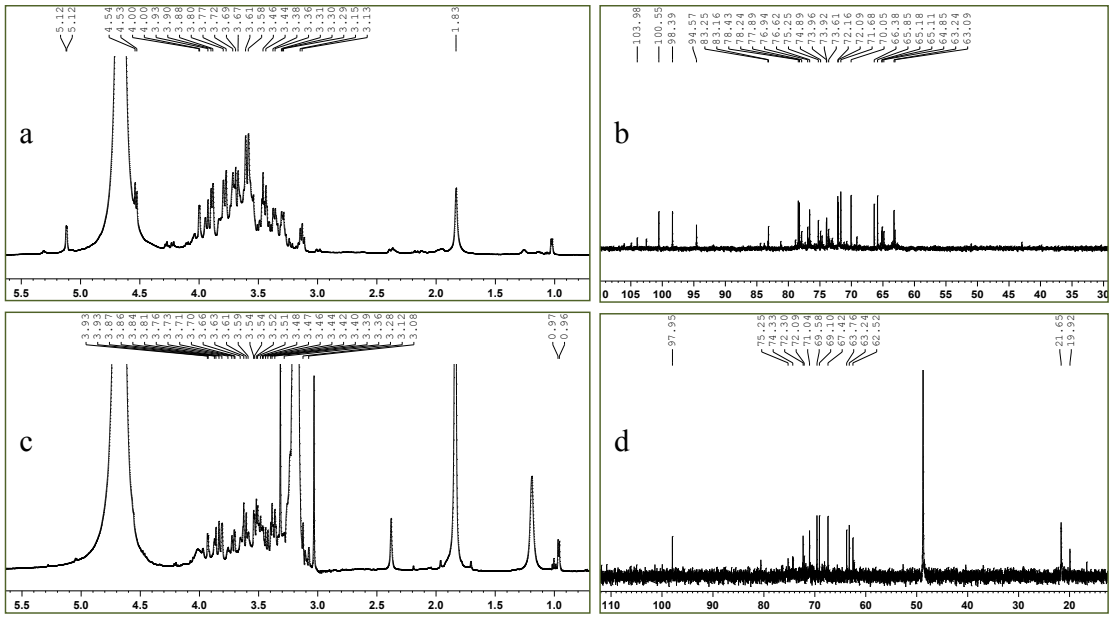
SI-Fig. 4.HPGPC chromatograms of Se-RLFP-1 and Se-RLFP-2

Se-RLFP-1:17.340 Se-RLFP-2:17.298



SI-Fig. 5. ^{1}H and ^{13}C NMR spectrum of Se-RLFP-1 (a and b) and Se-RLFP-2 (c and d).



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46 **SI-Table 1** Actual level of variables tested with the Plackett-Burman design

No.	Factors	Low level(-1)	Low level(1)
X_1	PEG2000/%	10	20
X_2	$(NH_4)_2SO_4$/%	15	20
X_3	microwave power/W	200	600
X_4	extraction time/min	10	25
X_5	extraction times	1	3
X_6	ratio of liquid to raw material/(g/mL)	40	80

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49 **SI-Table 2** Analysis of partial regression coefficient and significance factor

Factors	regression coefficient	E (x_i)	Sum of Squares	contribution/%	order of importance
Intercept	22.11				
X_1	1.39	2.77	92.24	24.61	2
X_2	-4.08	-8.17	200.17	53.40	1
X_3	-0.71	-1.42	6.04	1.61	6
X_4	1.56	3.13	29.30	7.82	3
X_5	-0.26	-0.53	0.83	0.22	10
X_6	0.33	0.67	1.34	0.36	8
X_7	1.29	2.58	19.94	5.32	4
X_8	0.16	0.32	0.31	0.083	11
X_9	0.33	0.66	1.30	0.35	9
X_{10}	-0.71	-1.42	6.01	1.60	7
X_{11}	-1.20	-2.40	17.35	4.63	5

SI-Table 3 The design and results of steepest ascent test

No.	step	X_1, PEG2000 %	X_2, $(NH_4)_2SO_4$ %	X_4, extraction time min	The yield mg/g
1	X	25	17.5	10	172.32
2	X+1h_1	30	15	15	192.44
3	X+2h_2	35	12.5	20	233.48
4	X+3h_3	40	10	25	203.78

h_1=5 % h_2=-2.5 % h_3=5 min

54 **SI-Table 4** Factors and level of Box-Behnken design

Factors	Level		
	-1	0	1
X_1, PEG2000 /%	30	35	40
X_2, $(NH_4)_2SO_4$ /%	10	12.5	15
X_4, extraction time /min	15	20	25

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SI-Table 5 Predicted and experimental values of the responses at optimum conditions

Optimum condition			The yield (Y; %)	
PEG2000 (X_1;%)	$(NH_4)_2SO_4$ (X_2; %)	extraction time (X_4; min)	Experimental	Predicted
35.8	11.7	22	258.59±0.17	258.99

SI-Table 6 Analysis of variance for the response surface quadratic model for the yield of RLFPs

Source	Sum of Squares	df	Mean Square	F Value	P-value Prob>F	Significance
Model	147.62	9	16.40	20.51	0.0003	***
X_1	12.30	1	12.30	15.38	0.0057	**
X_2	1.70	1	1.70	2.12	0.1884	
X_4	4.13	1	4.13	5.16	0.0573	
X_1X_2	0.066	1	0.066	0.082	0.7830	
X_1X_4	3.54	1	3.54	4.43	0.0734	
X_2X_4	1.39	1	1.39	1.74	0.2282	
X_1^2	102.95	1	102.95	128.72	<0.0001	***
X_2^2	4.16	1	4.16	5.20	0.0565	
X_4^2	10.07	1	10.07	12.59	0.0094	**
Residual	5.60	7	0.80			
Lack of Fit	1.28	3	0.43	0.40	0.7641	
Pure Error	4.32	4	1.08			
R^2	0.9635					
Adj R^2	0.9165					
C.V.	2.51 %					

*p<0.05, **p<0.01 and ***p<0.001