

Supplementary data

Structural characterization and osteogenic activity *in vitro* of novel polysaccharides from the rhizome of *Polygonatum sibiricum*

Supplementary Tables

Table S1

GC-MS analysis of PSP50-2-1.

PMAA	Type of linkage	Molar ratios	Mass fragments (m/z)
2,5-di- <i>O</i> -acetyl-1,3,4,6-tetra- <i>O</i> -methyl-D-mannitol	D-Fruf-(2→	3.0	43, 45, 71, 87, 101, 129, 145, 161
1,5-di- <i>O</i> -acetyl-2,3,4,6-tetra- <i>O</i> -methyl-D-glucitol	D-Glcp-(1→	1.0	43, 45, 71, 87, 99, 101, 117, 129, 145, 161, 205
1,2,5-tri- <i>O</i> -acetyl-3,4,6-tri- <i>O</i> -methyl-D-galactitol	→2)-D-Galp-(1→	1.9	43, 45, 71, 87, 99, 129, 161, 189, 205
1,2,5,6-tetri- <i>O</i> -acetyl-3,4-di- <i>O</i> -methyl-D-galactitol	→2,6)-D-Galp-(1→	4.1	43, 45, 71, 87, 99, 129, 190, 233

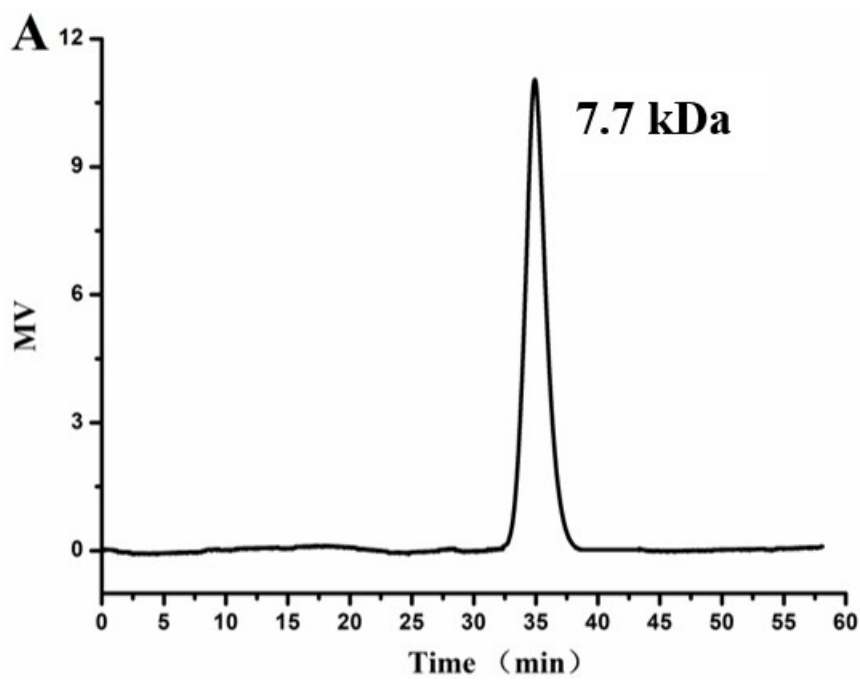
Table S2

¹H and ¹³C NMR chemical shifts of PSP50-2-1 were recorded in D₂O.

Sugar residue	H1	H2	H3	H4	H5	H6
	C1	C2	C3	C4	C5	C6
<i>β</i> -D-Fruf-(2→	3.58/3.59	-	4.10	3.60	3.97	3.86/3.87
A	62.3	104.1	76.8	75.1	80.1	62.9
→2)- <i>β</i> -D-Galp-(1→	4.37	4.07	3.60	3.86	4.04	3.56/3.58
B	103.6	77.5	72.0	68.8	74.7	62.6
→2, 6)- <i>β</i> -D-Galp-(1→	4.56	4.01	3.70	3.85	3.86	3.85/3.86

D	104.3	76.5	73.3	68.5	73.7	69.7
α -D-Glcp-(1→	4.53	3.59	3.70	3.60	3.65	3.58/3.59
E	96.4	72.4	73.3	71.8	72.5	62.1

Supplementary Figs



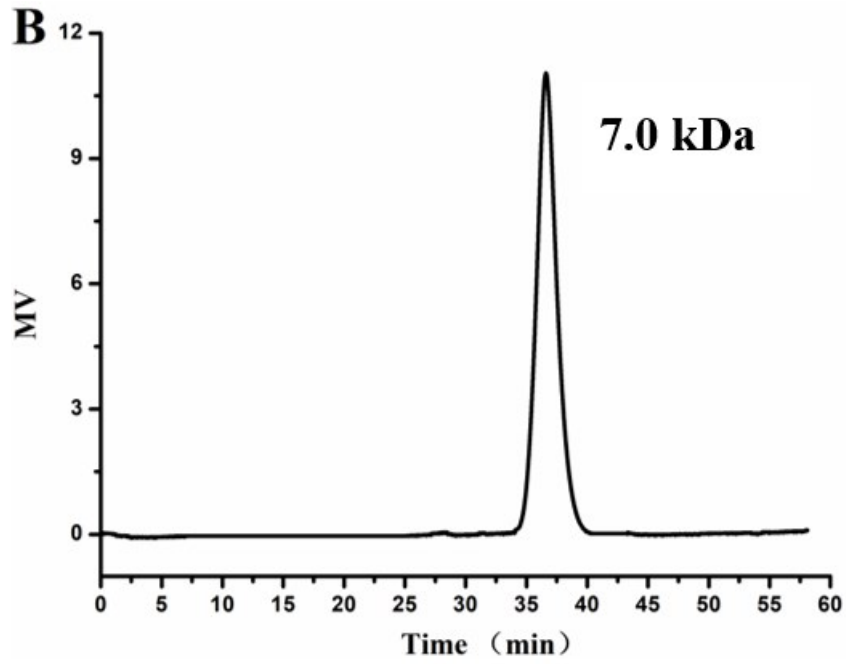
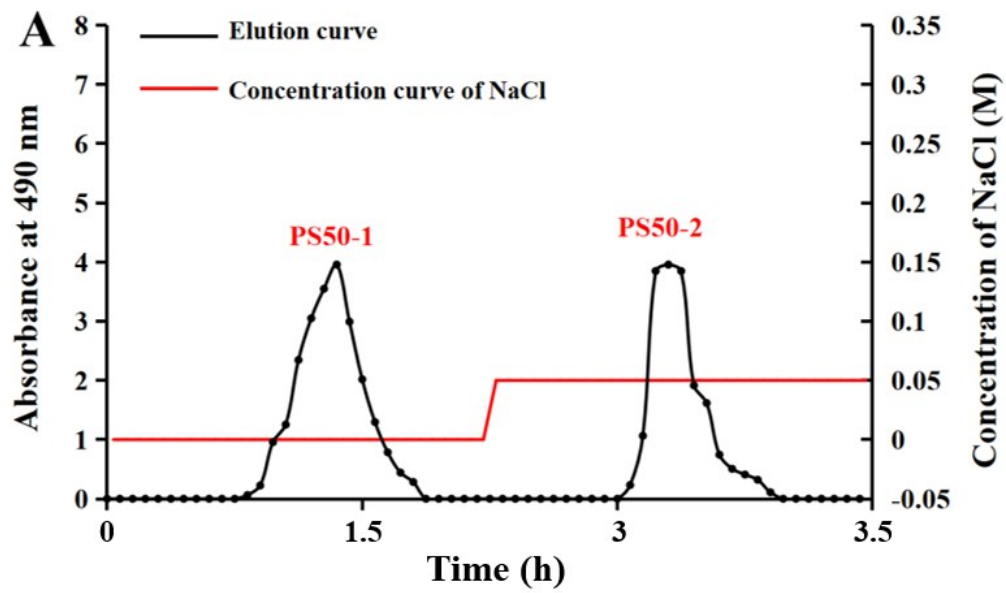


Fig. S1 HPGPC chromatogram of PSP50-2-1 (A) and PSP50-2-2 (B).



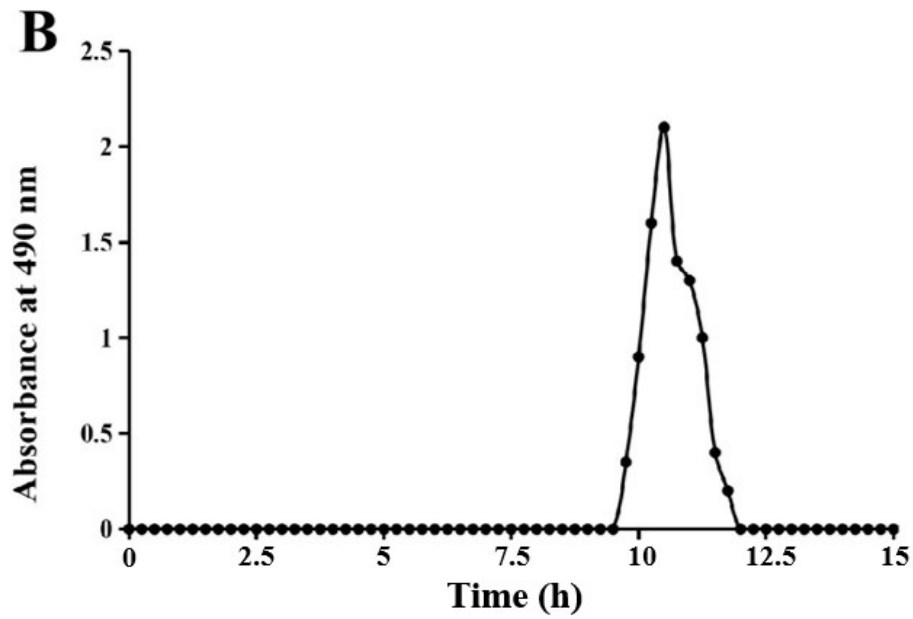
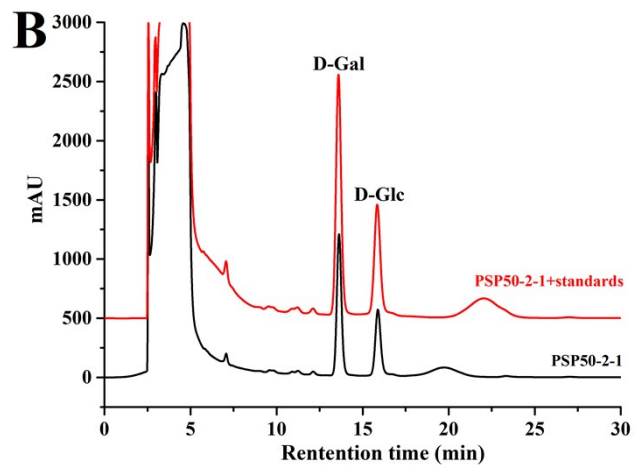
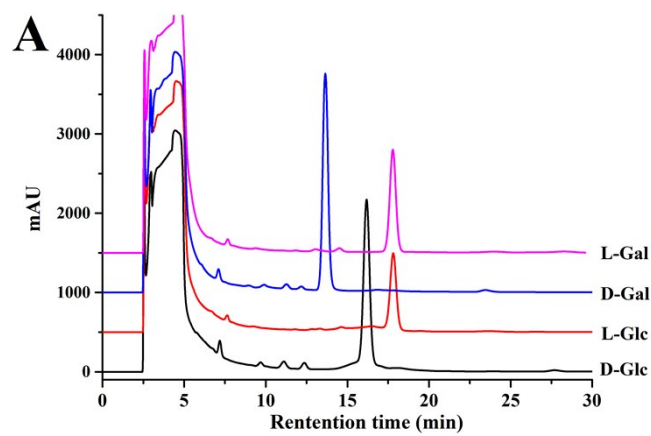


Fig. S2 (A) Elution curve profile of PS50 on DEAE-52 cellulose column. (B) Elution curve profile of the subfraction PS50-2 on Sephacryl S-100 column.



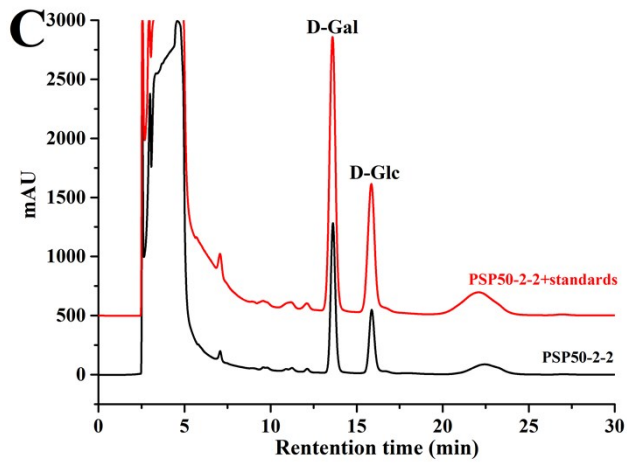
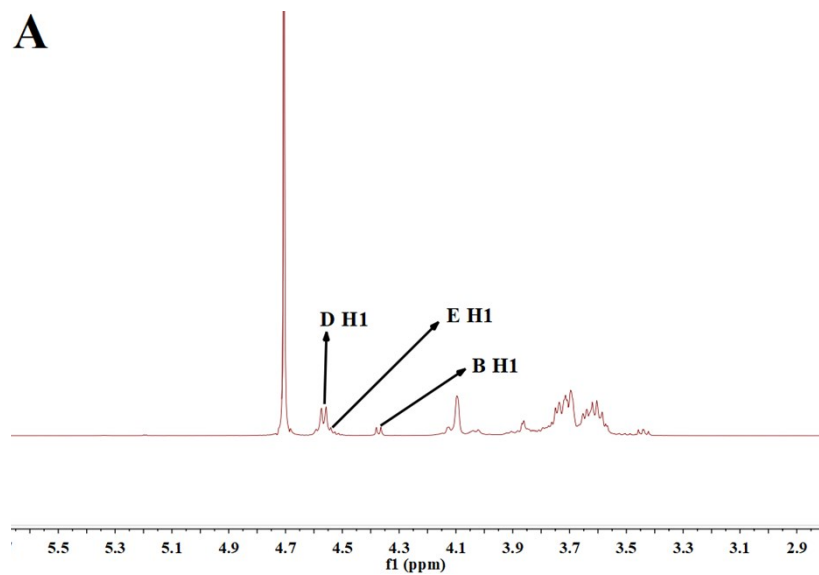
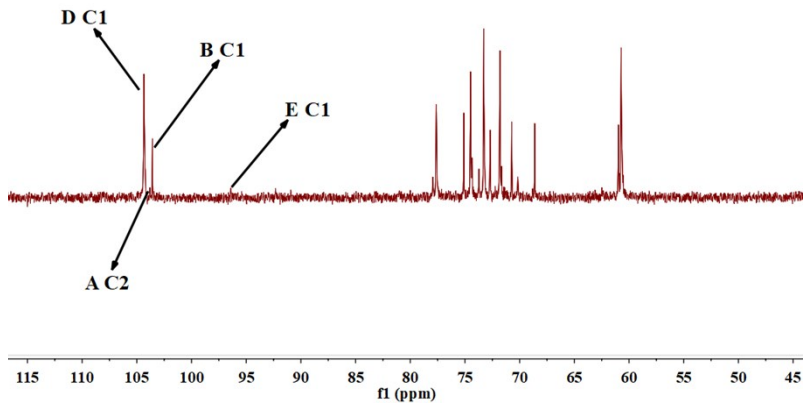
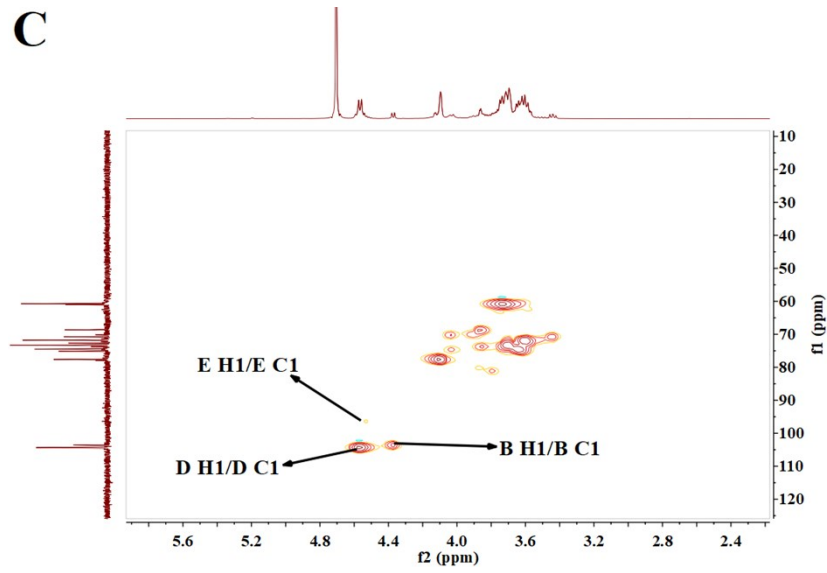
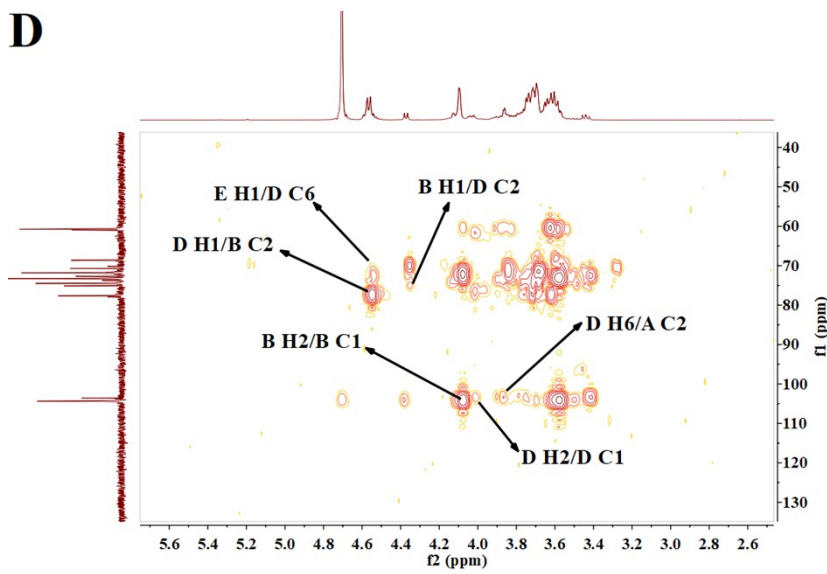


Fig. S3 (A) HPLC chromatograms of derivatives of standard monosaccharides. (B) HPLC chromatograms of PSP50-2-1 derivatives and PSP50-2-1 derivatives mixed with D-galactose and D-glucose. (C) HPLC chromatograms of PSP50-2-2 derivatives and PSP50-2-2 derivatives mixed with D-galactose and D-glucose.



B**C****D**

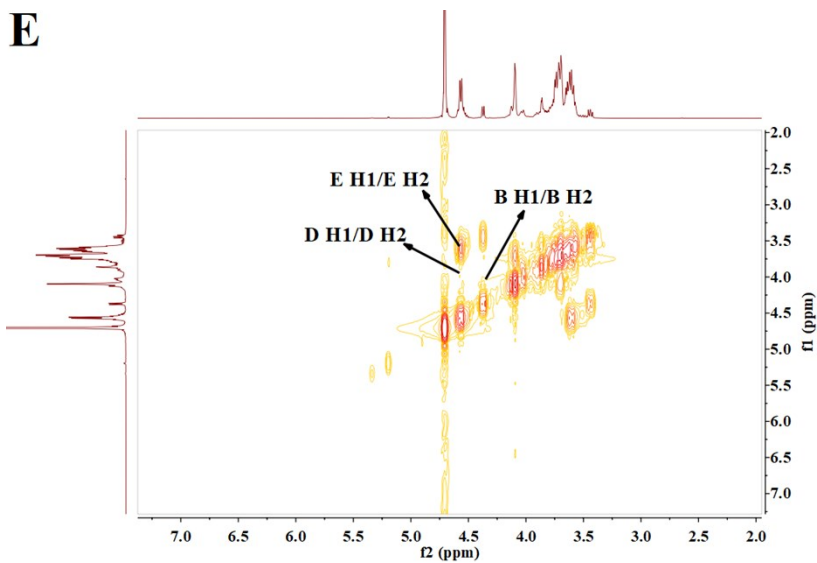
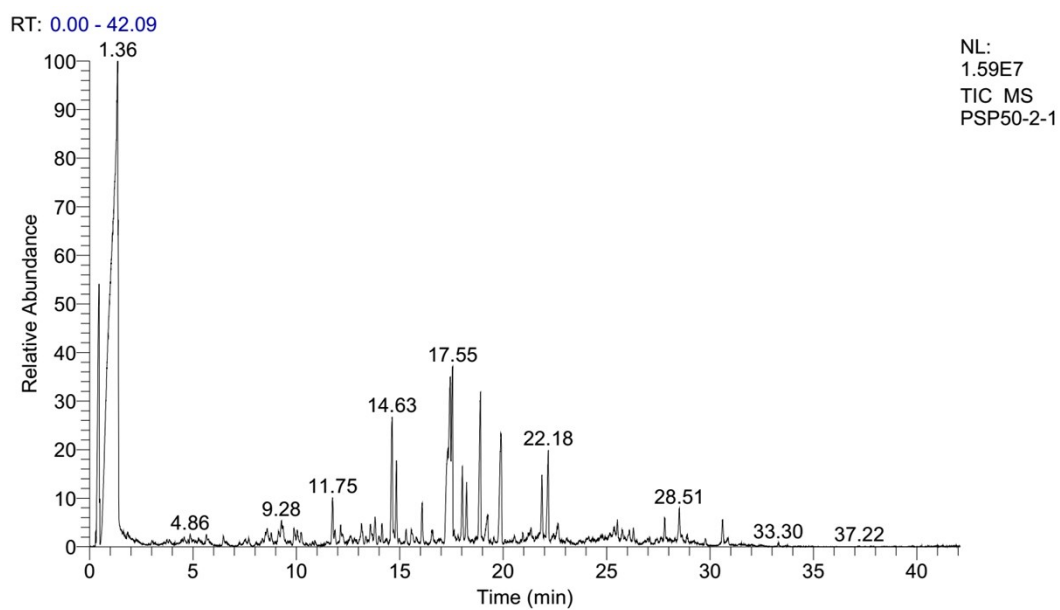
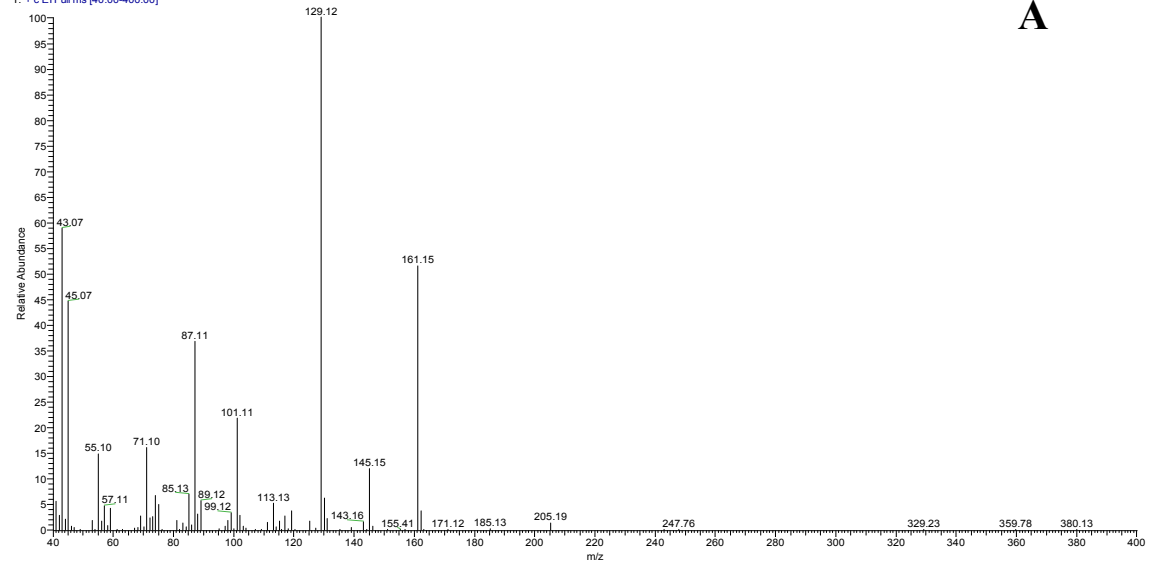


Fig. S4 ^1H (A), ^{13}C (B), HSQC (C), HMBC (D) and ^1H - ^1H COSY (E) spectra of PSP50-2-1.

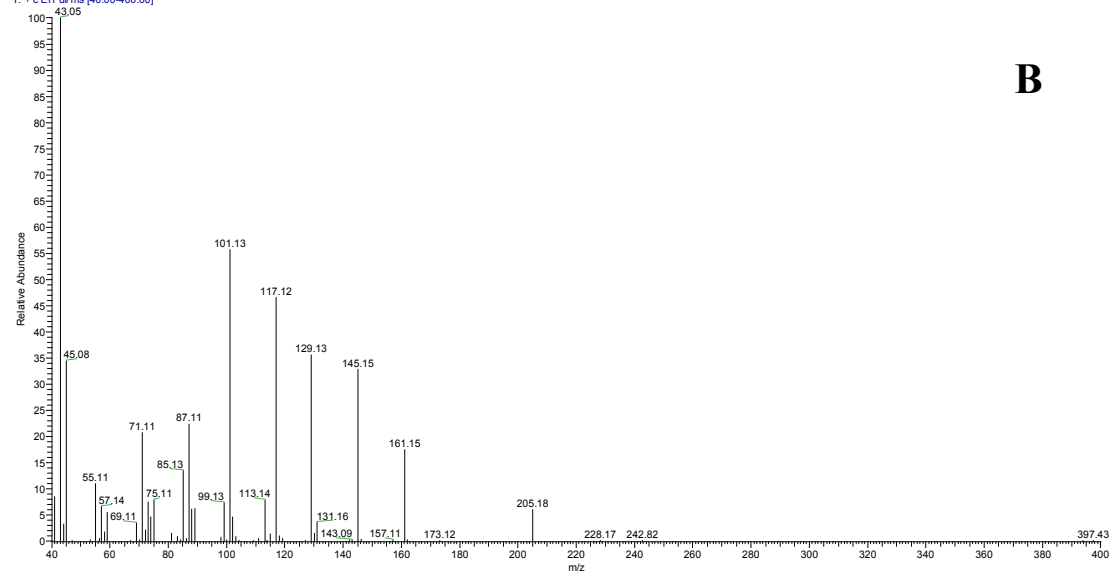


PSP50-2-1 #2882 RT: 14.63 AV: 1 NL: 8.90E5
T: + c EI Full ms [40.00-400.00]

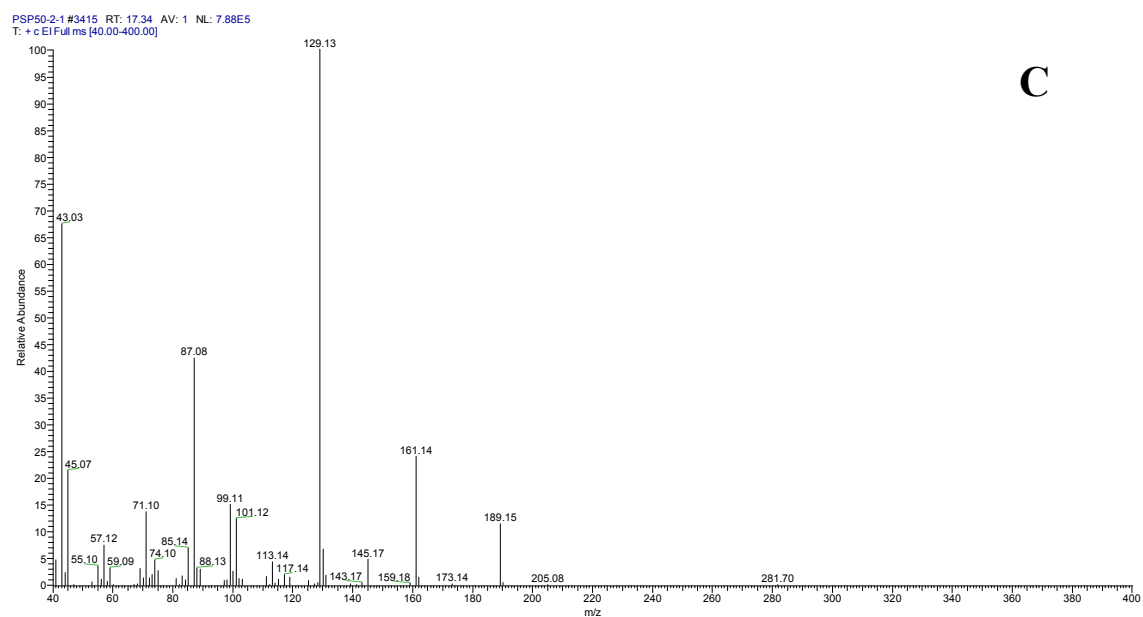


A

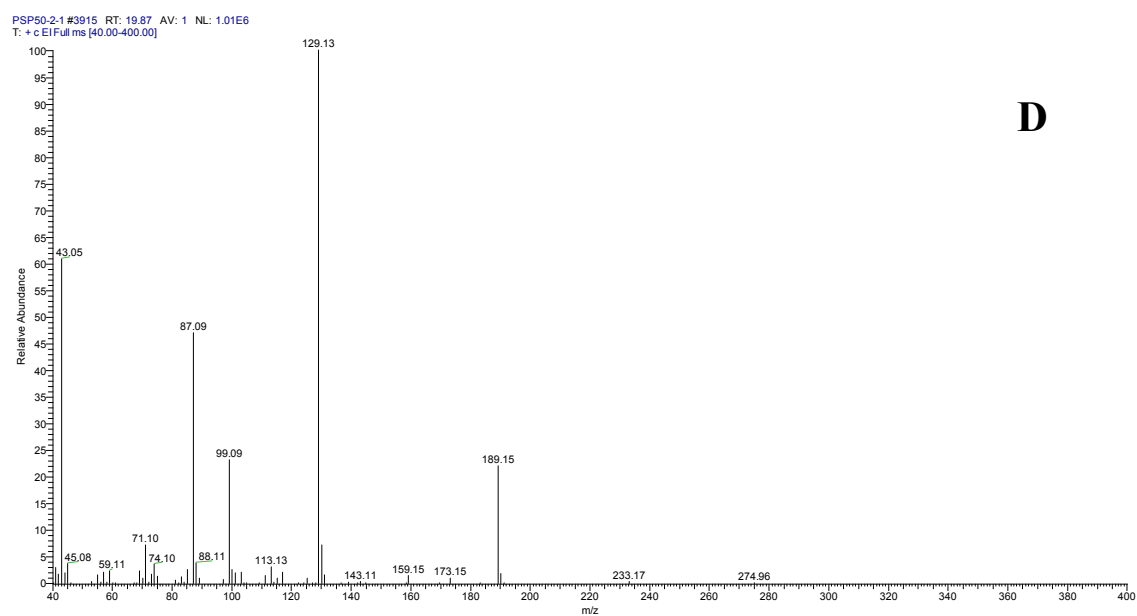
PSP50-2-1 #3163 RT: 16.06 AV: 1 NL: 2.17E5
T: + c EI Full ms [40.00-400.00]



B



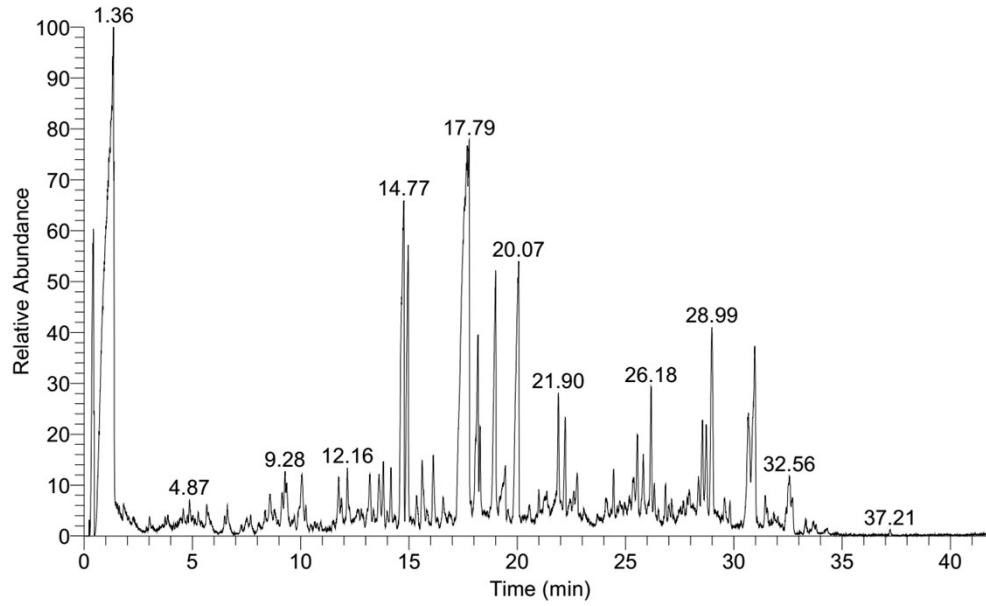
C



D

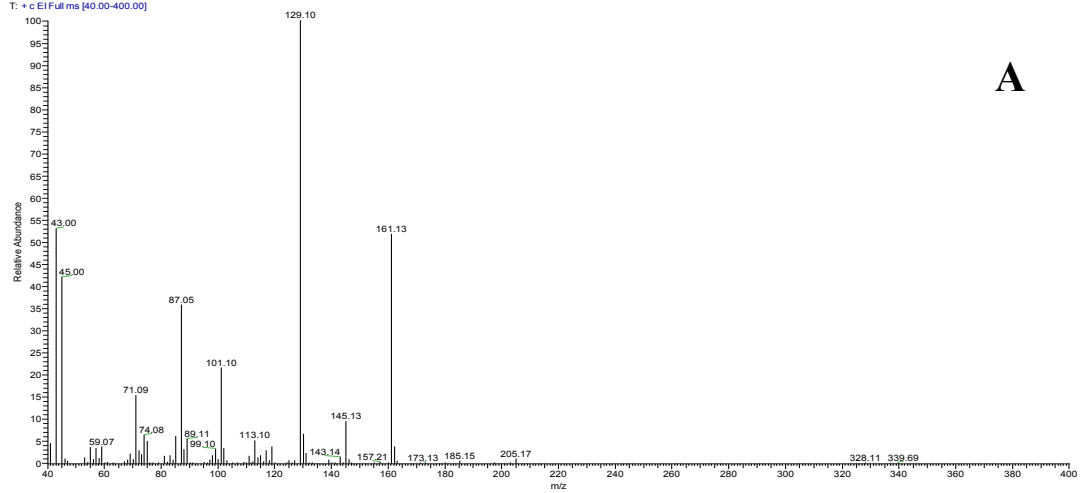
Fig. S5 (A) 2,5-di-*O*-acetyl-1,3,4,6-tetra-*O*-methyl-D-mannitol. (B) 1,5-di-*O*-acetyl-2,3,4,6-tetra-*O*-methyl-D-glucitol. (C) 1,2,5-tri-*O*-acetyl-3,4,6-tri-*O*-methyl-D-galactitol. (D) 1,2,5,6-tetri-*O*-acetyl-3,4-di-*O*-methyl-D-galactitol.

RT: 0.00 - 42.10



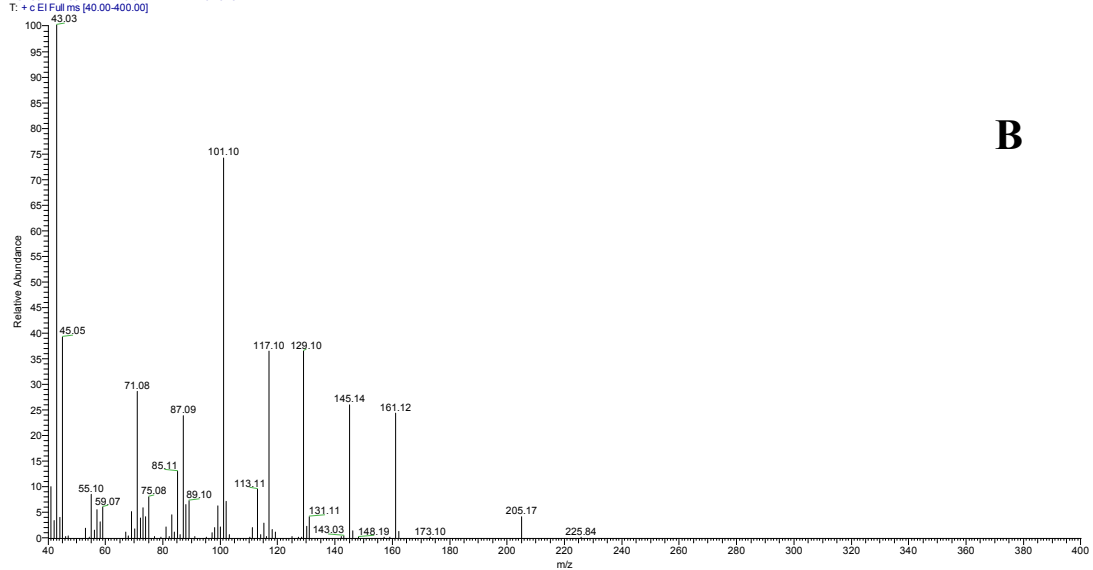
NL:
1.43E7
TIC MS
PSP50-2-2

PSP50-2-2 #2941 RT: 14.93 AV: 1 NL: 1.64E6
T: + c EI Full ms [40.00-400.00]



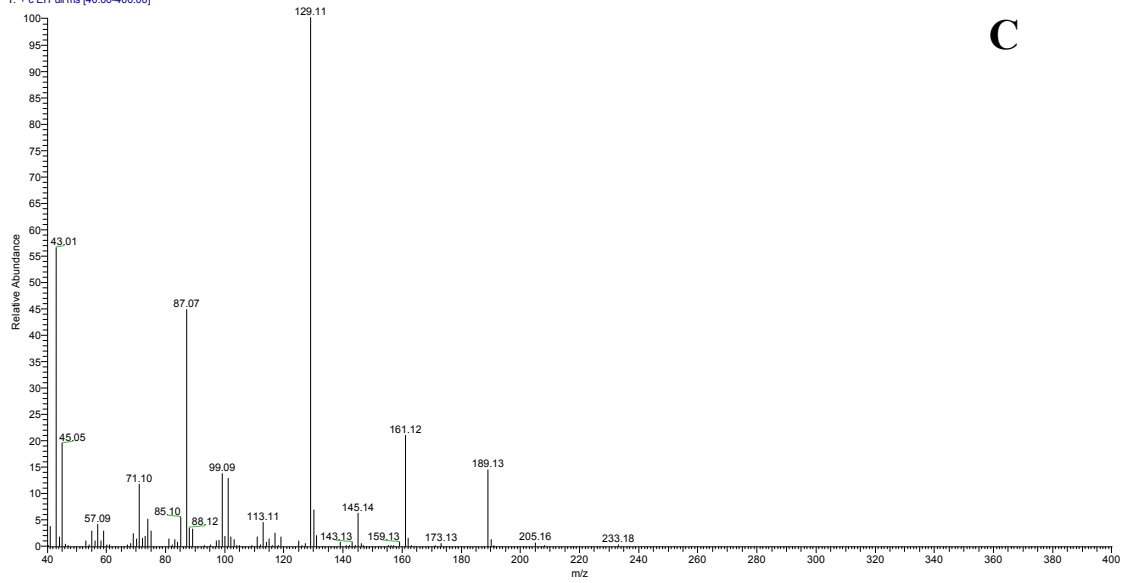
A

PSP50-2-2 #3074 RT: 15.61 AV: 1 NL: 3.76E5
T: + c EI Full ms [40.00-400.00]



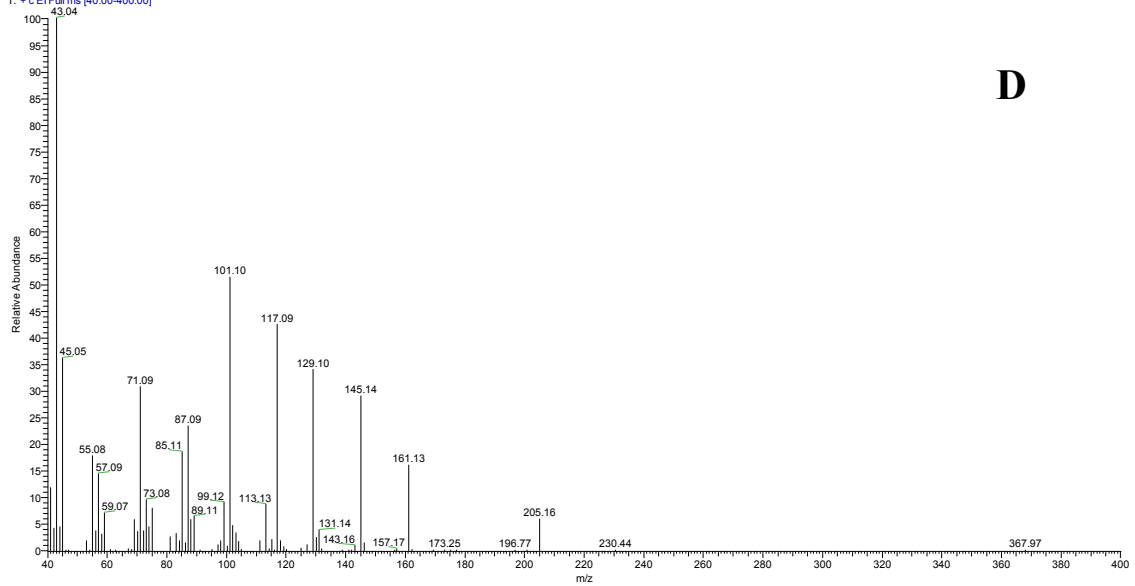
B

PSP50-2-2 #3479 RT: 17.66 AV: 1 NL: 2.67E6
T: + c EI Full ms [40.00-400.00]



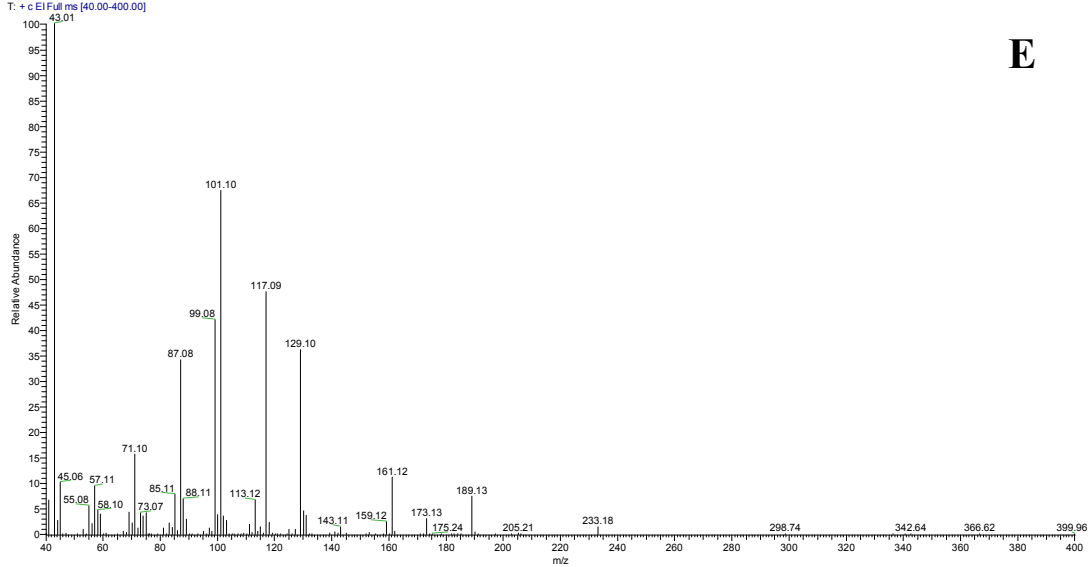
C

PSP50-2-2 #3178 RT: 16.13 AV: 1 NL: 3.71E5
T: + c EI Full ms [40.00-400.00]

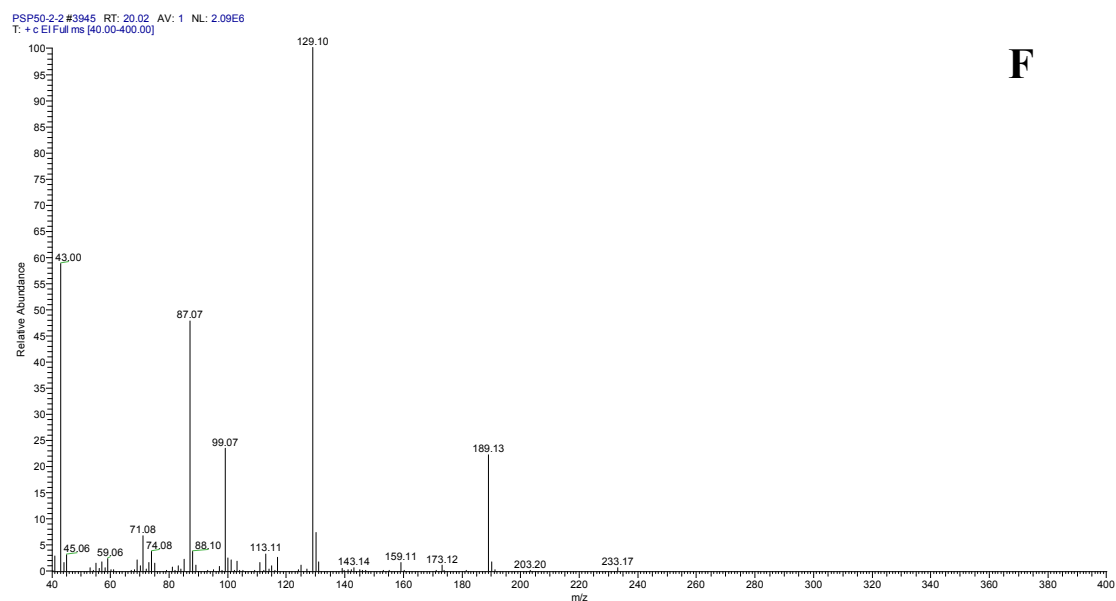


D

PSP50-2-2 #3576 RT: 18.15 AV: 1 NL: 8.73E5
T: + c EI Full ms [40.00-400.00]



E



F

Fig. S6 (A) 2,5-di-*O*-acetyl-1,3,4,6-tetra-*O*-methyl-D-mannitol, (B) 1,5-di-*O*-acetyl-2,3,4,6-tetra-*O*-methyl-D-glucitol, (C) 1,5-di-*O*-acetyl-2,3,4,6-tetra-*O*-methyl-D-galactitol, (D) 1,2,5-tri-*O*-acetyl-3,4,6-tri-*O*-methyl-D-galactitol, (E) 1,5,6-tri-*O*-acetyl-2,3,4-tri-*O*-methyl-D-galactitol, (F) 1,2,5,6-tetri-*O*-acetyl-3,4-di-*O*-methyl-D-galactitol.