

Supplementary Tables

Table S1. Results of Methylation analysis of SPm, SPm-Ds, SPm-R and SPm-RDs.

Methylated alditol acetate	Molar percent ratios				Linkage pattern
	SPm	SPm-Ds	SPm-R	SPm-RDs	
1,2,5-Tri-O-acetyl-3,4-di-O-methyl-rhamnitol	23.70	35.18	21.68	32.20	→2)-Rhap-(1→
1,3,5-Tri-O-acetyl-2,4-di-O-methyl-rhamnitol	36.12	52.02	33.52	48.20	→3)-Rhap-(1→
1,2,3,5-Tetra-O-acetyl-4-O-methyl-rhamnitol	33.68	6.30	30.92	5.72	→2,3)-Rhap-(1→
1,5-Di-O-acetyl-2,3,4,6-tetra-O-methyl-glucitol	nd ^a	nd ^a	7.86	7.86	GlcP-(1→
1,5-Di-O-acetyl-2,3,4-tri-O-methyl-xylitol	nd ^a	6.50	nd ^a	6.02	XylP-(1→
1,4,5-Tri-O-acetyl-2,3-di-O-methyl-xylitol	6.50	nd ^a	6.02	nd ^a	→4)-XylP-(1→

^aNot detected

Table S2. Chemical shifts assignments of NMR spectra of SPm.

Sugar residues	Chemical shifts (ppm)					
	H1/C1	H2/C2	H3/C3	H4/C4	H5/C5	H6/C6
A: →3)-Rhap(2SO ₄)-(1→	5.49/100.74	4.72/78.42	4.10/78.42	3.66/73.29	3.81/70.81	1.38/18.36
B: →2)-Rhap(3SO ₄)-(1→	5.34/100.74	4.30/80.84	4.55/79.00	3.66/73.29	3.81/70.81	1.38/18.36
C: →2,3)-Rhap-(1→	5.29/100.74	4.30/80.84	4.10/78.42	3.60/73.29	3.81/70.81	1.38/18.36
D: →2)-Rhap-(1→	5.26/100.74	4.30/80.84	3.96/70.81	3.60/73.29	3.81/70.81	1.38/18.36
E: →3)-Rhap-(1→	5.08/103.32	4.20/70.81	3.96/78.42	3.66/73.29	3.81/70.81	1.38/18.36

Supplementary Figure Legends

Figure S1. HPGPC chromatogram, HPLC chromatogram and IR spectrum of SPm. (a) HPGPC chromatogram of SPm on a Shodex OHpak SB-804 HQ column and the standard curve of molecular weight. (b) HPLC chromatogram for monosaccharide composition analysis of SPm (Man: D-mannose, GlcN: D-glucosamine, Rha: L-rhamnose, GlcA: D-glucuronic acid, GalA: D-galacturonic acid, Glc: D-glucose, Gal: D-galactose, Xyl: D-xylose, Ara: L-arabinose, Fuc: L-fucose). (c) IR spectrum of SPm.

Figure S2. NMR spectra of SPm. (a) ^1H NMR spectrum. (b) ^{13}C NMR spectrum. (c) ^1H - ^1H COSY spectrum. (d) ^1H - ^{13}C HSQC spectrum. (e) ^1H - ^1H NOESY. A-E correspond to $\rightarrow 3$)- α -L-Rhap(2SO₄)-(1 \rightarrow , $\rightarrow 2$)- α -L-Rhap(3SO₄)-(1 \rightarrow , $\rightarrow 2,3$)- α -L-Rhap-(1 \rightarrow , $\rightarrow 2$)- α -L-Rhap-(1 \rightarrow and $\rightarrow 3$)- α -L-Rhap-(1 \rightarrow , respectively. Rhap: rhamnopyranose.

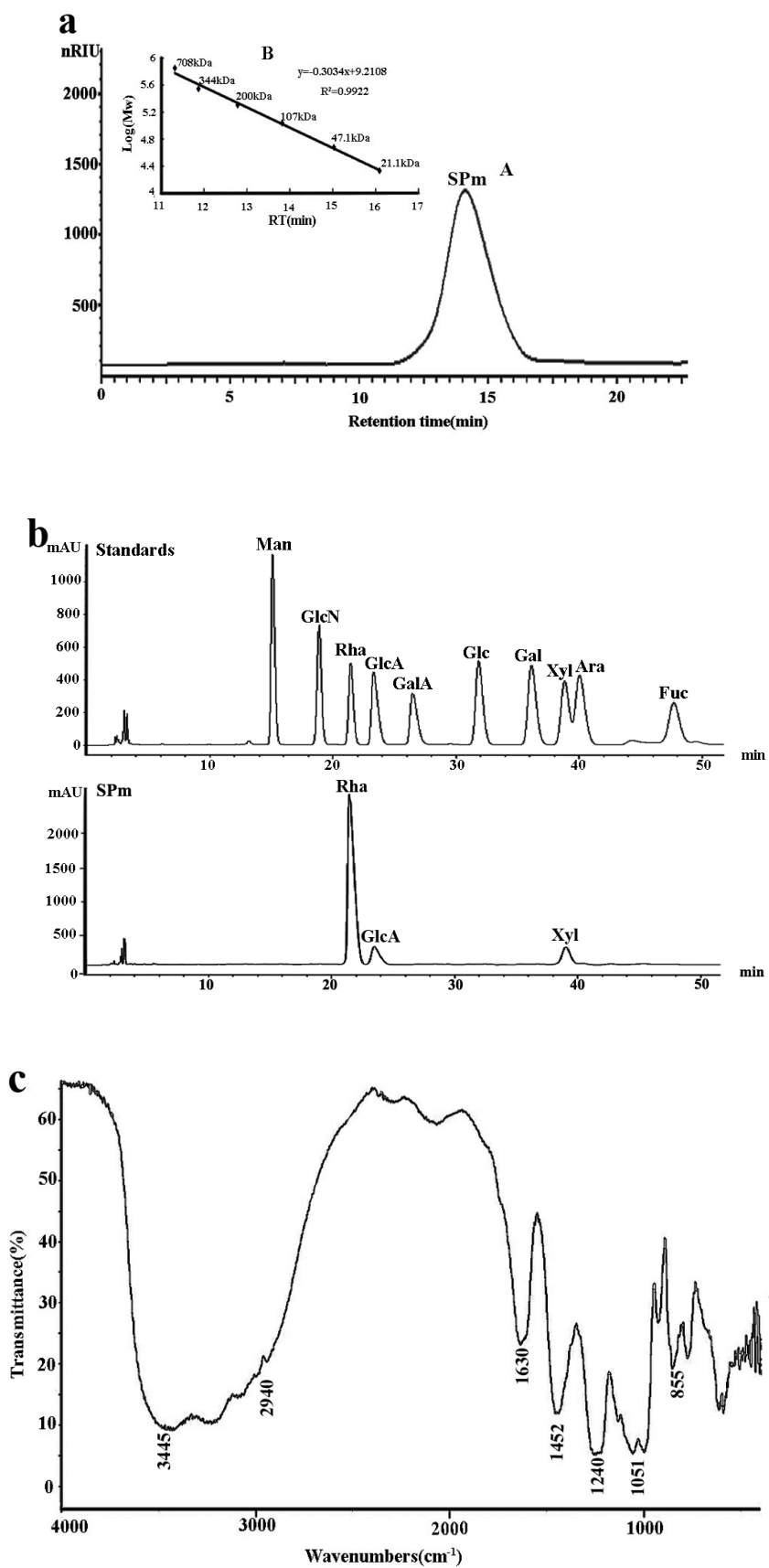
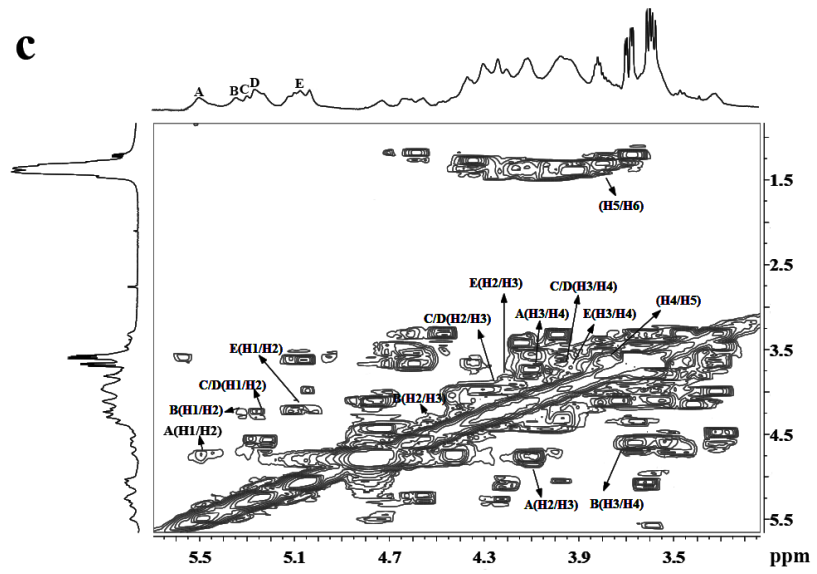
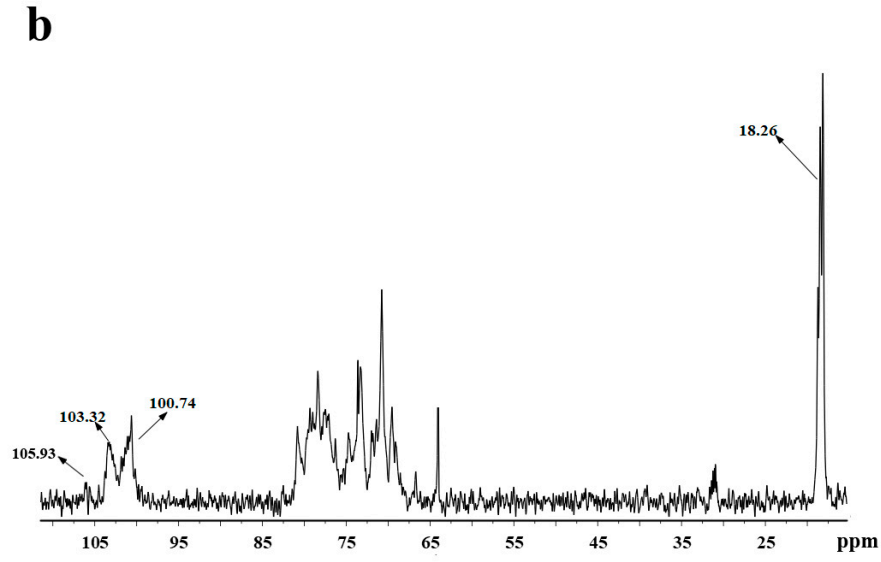
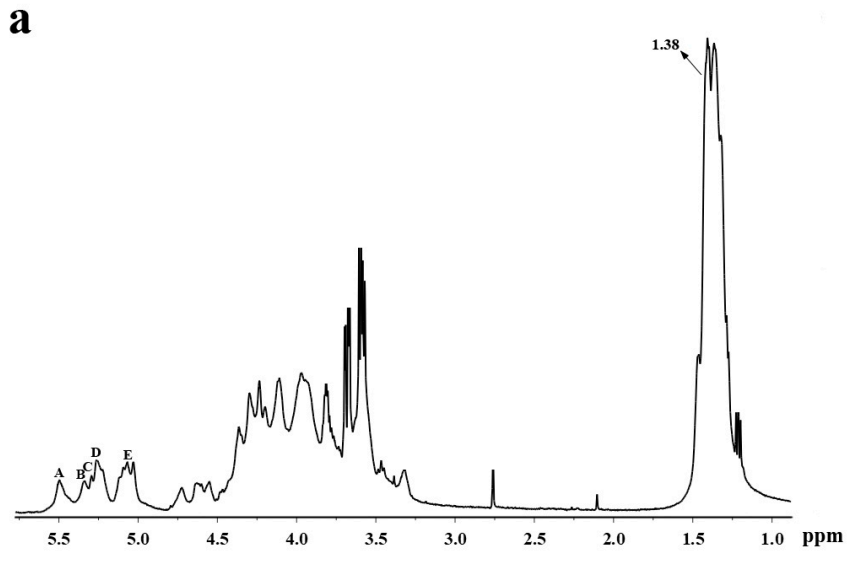


Figure S1



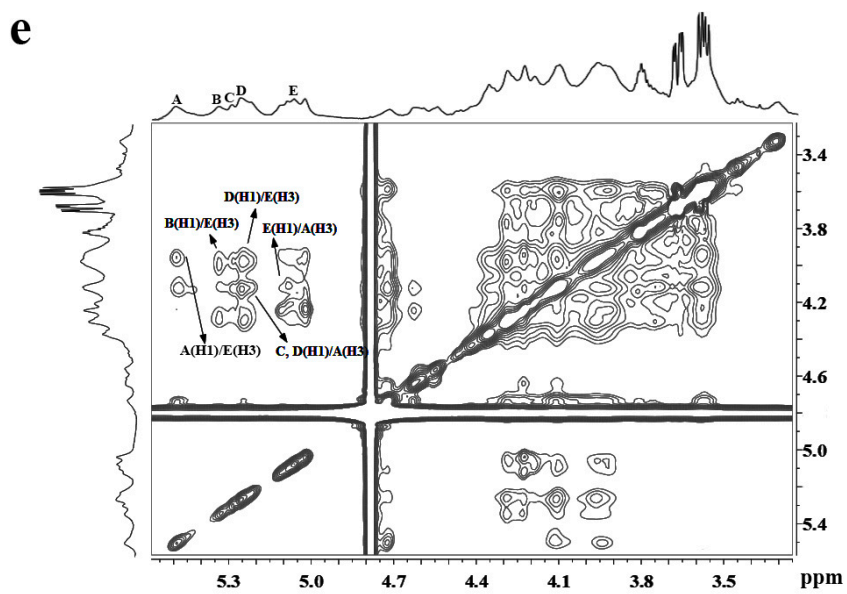
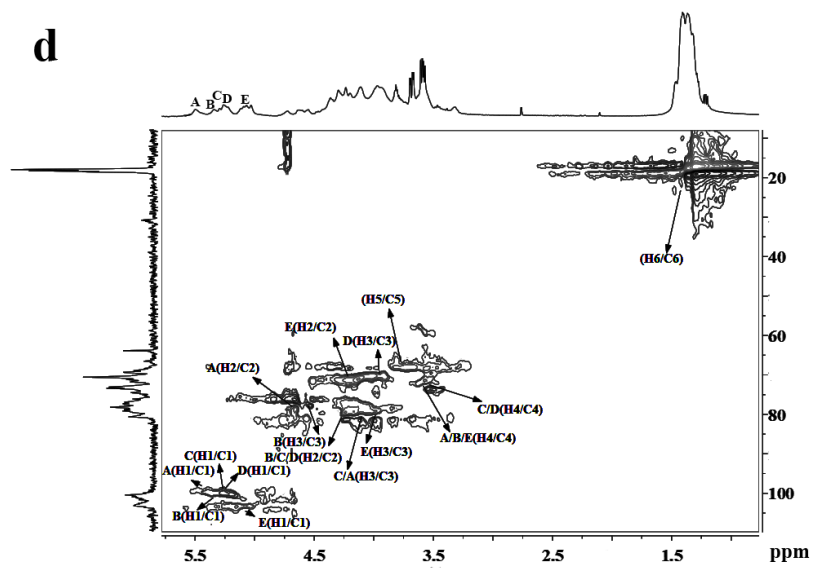


Figure S2