Electronic Supplementary Material (ESI) for Materials Advances.

Electronic Supporting Information

Structure-gelation property relations of phenolic glycosides of pentose sugars: pH dependent controlled release of curcumin

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Table – S1. Gelation studies of compounds **2a, 2c, 2'a-d, 3a-d**, **3'b** and **3'c** in various solvents.[a]

	(MGC,[b] T_g[c])											
Solvent	**2a**	**2c**	**2'a**	**2'b**	**2'c**	**2'd**	**3a**	**3b**	**3c**	**3d**	**3'b**	**3'c**
Benzene	PG	PS	PP	PP	PP	PP	PS	PP	PP	PP	PP	PP
Toluene	PG	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS
o-xylene	PS	PS	PS	PS	PS	PS	PP	PP	PP	PP	PS	PS
m-xylene	PS	PS	PS	PS	PS	PS	PP	PP	PP	PP	PS	PS
p-xylene	PS	PS	PS	PS	PS	PS	PP	PP	PP	PP	PS	PS
Chlorobenzene	PG	PS	PS	PS	PS	PS	PG	PS	PS	PS	PS	PS
Amyl alcohol	S	S	S	S	S	S	S	S	S	S	S	S
n-butyl alcohol	S	S	S	S	S	S	S	S	S	S	S	S
Methanol	S	S	S	S	S	S	S	S	S	S	S	S
Ethanol	S	S	S	S	S	S	S	S	S	S	S	S
Water	S	S	S	S	S	S	S	S	S	S	S	S
DMF	S	S	S	S	S	S	S	S	S	S	S	S
DMSO	S	S	S	S	S	S	S	S	S	S	S	S
Coconut Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Mustard Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Olive Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP

[a]G = Gel; PG = Partial Gel; S = Solution; PS = Partial soluble; [b]MGC = Minumum Gelation Concentration % (w/v). [c]T_g = Gelation temperature.

Table – S2. Gelation studies of compounds **4a-d, 4'a-d** and **5a-d** in various solvents.[a]

	(MGC,[b] T_g[c])											
Solvent	**4a**	**4b**	**4c**	**4d**	**4'a**	**4'b**	**4'c**	**4'd**	**5a**	**5b**	**5c**	**5d**
Benzene	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS	PS
Toluene	S	S	S	S	S	S	S	S	S	S	S	S
o-xylene	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
m-xylene	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
p-xylene	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Chlorobenzene	PG	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Amyl alcohol	S	S	S	S	S	S	S	S	S	S	S	S
n-butyl alcohol	S	S	S	S	S	S	S	S	S	S	S	S
Methanol	S	S	S	S	S	S	S	S	S	S	S	S
Ethanol	S	S	S	S	S	S	S	S	S	S	S	S
Water	S	S	S	S	S	S	S	S	S	S	S	S
DMF	S	S	S	S	S	S	S	S	S	S	S	S
DMSO	S	S	S	S	S	S	S	S	S	S	S	S
Coconut Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Mustard Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
Olive Oil	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP

[a]G = Gel; PG = Partial Gel; S = Solution; PS = Partial soluble; [b]MGC = Minumum Gelation Concentration % (w/v). [c]T_g = Gelation temperature.

Figures and graphs

Figure S1. Gels from benzene (a) **2b** (0.2% w/v), (b) **2d** (0.3% w/v), (c) **3'a** (0.7% w/v), (d) **3'd** (0.3% w/v).

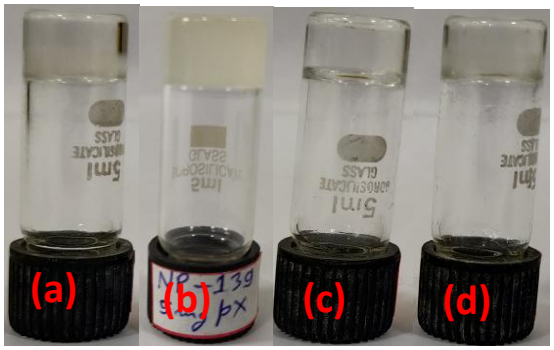

Figure S2. Gels from *p*-xylene (a) **2b** (0.2% w/v), (b) **2d** (0.5% w/v), (c) **3'a** (0.8% w/v), (d) **3'd** (0.3% w/v).

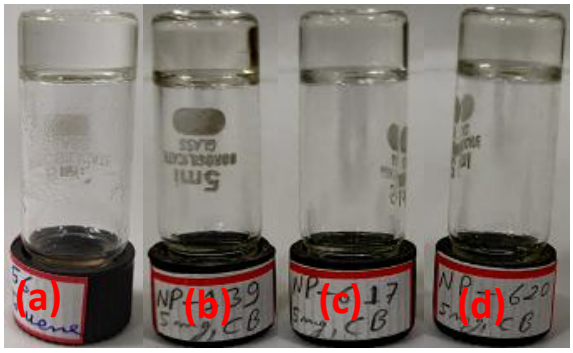

Figure S3. Gels from Chlorobenzene (a) **2b** (0.2% w/v), (b) **2d** (0.5% w/v), (c) **3'a** (0.5% w/v), (d) **3'd** (0.5% w/v).

Figure S4. Gels (a) **2b** in mustard oil (1% w/v), (b) **2b** in coconut oil (0.3% w/v), (c) **2d** in coconut oil (0.5% w/v), (d) **3'a** in coconut oil (0.6% w/v), (e) **3'd** in coconut oil (0.5% w/v).

Rheology

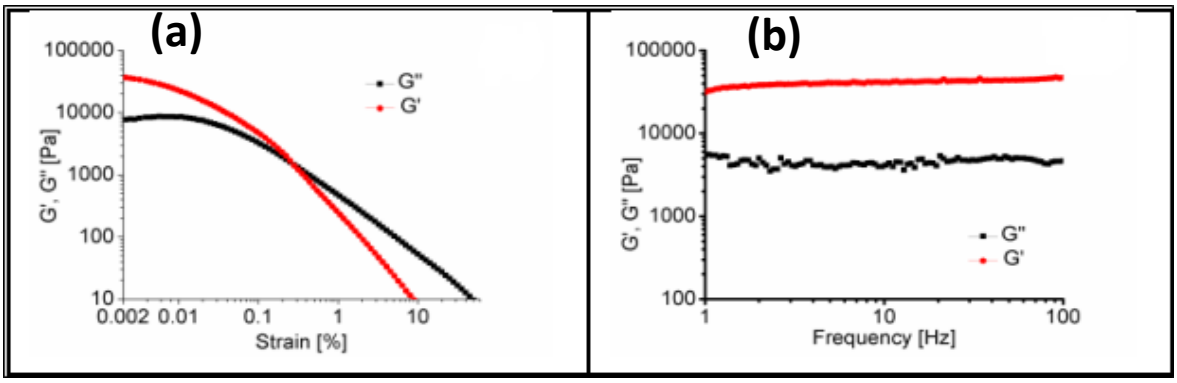

Figure S5. (a) DSS curve of **2b** gel with *p*-xylene at 1.0% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve of **2b** gel with *p*-xylene at 1.0% (w/v) at strain 0.001% and temperature 25°C.

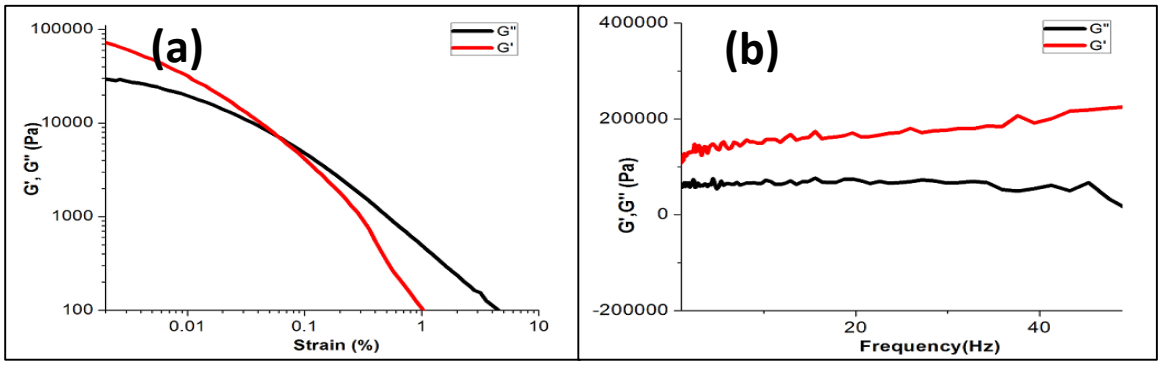

Figure S6. (a) DSS curve of **2d** gel with *p*-xylene at 1.0% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve of **2d** gel with *p*-xylene at 1.0% (w/v) at strain 0.001% and temperature 25°C.

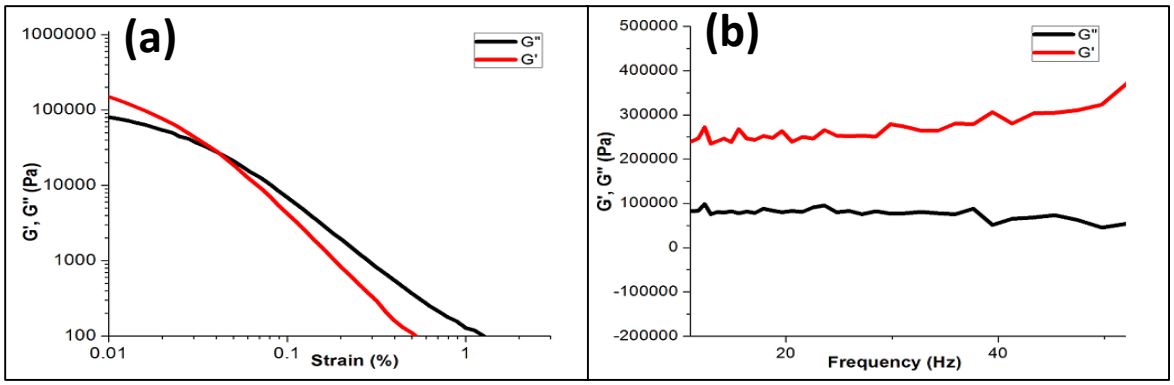

Figure S7. (a) DSS curve of **3'a** gel with *p*-xylene at 1.0% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve of **3'a** gel with *p*-xylene at 1.0% (w/v) at strain 0.001% and temperature 25°C.

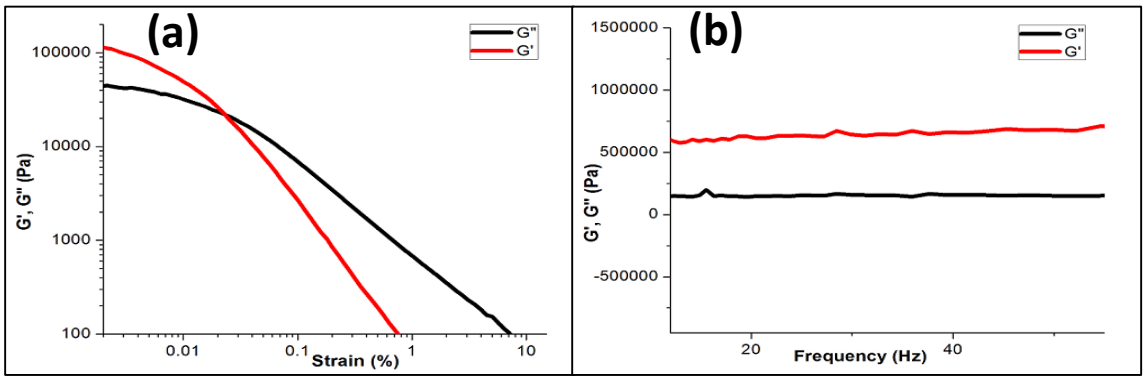

Figure S8. (a) DSS curve of **3'd** gel with *p*-xylene at 1.0% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve of **3'd** gel with *p*-xylene at 1.0% (w/v) at strain 0.001% and temperature 25 °C.

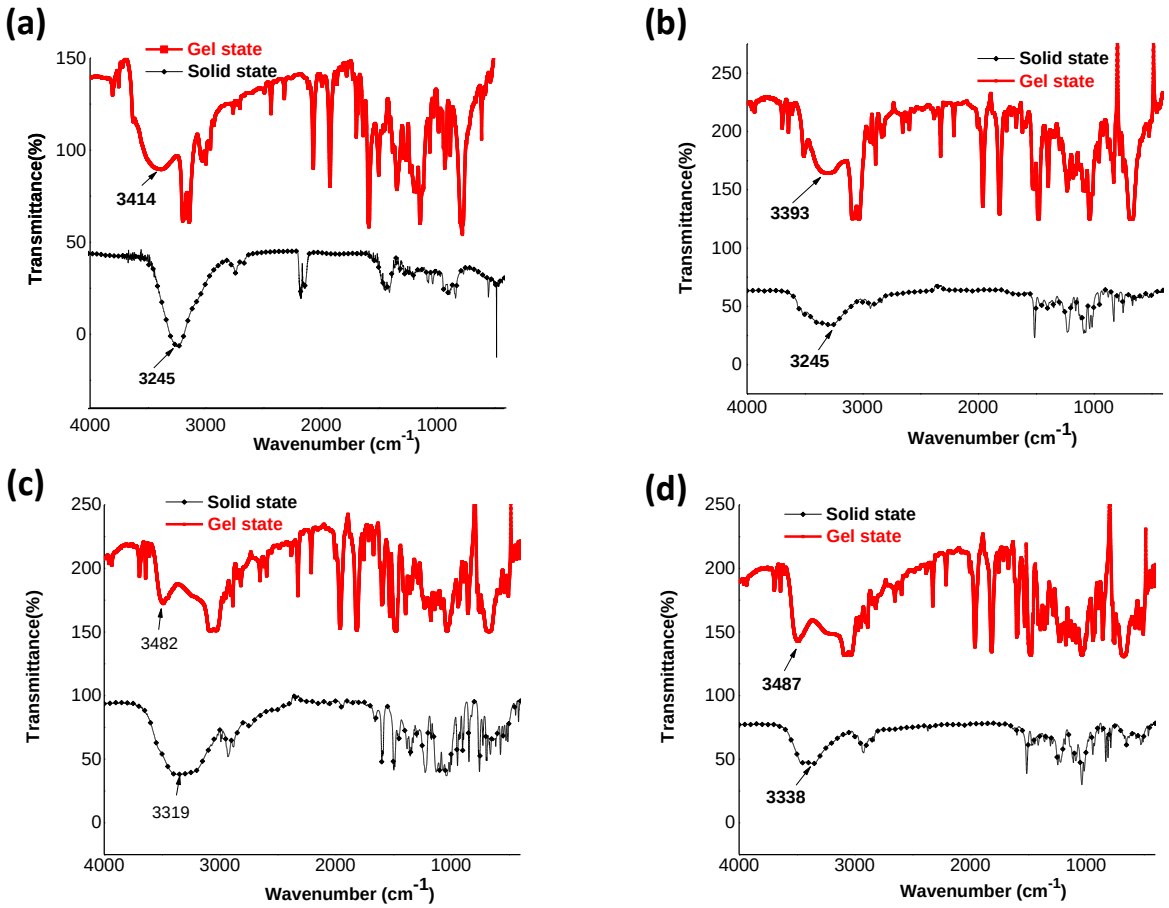

Figure S9. FTIR spectra of crystalline (black) and benzene gels (red) of (a) **2b** (b) **2d** (c) **3'a** (d) **3'd**. The shifts of the OH stretching frequencies for the gelators in their respective crystalline and gel states are shown.

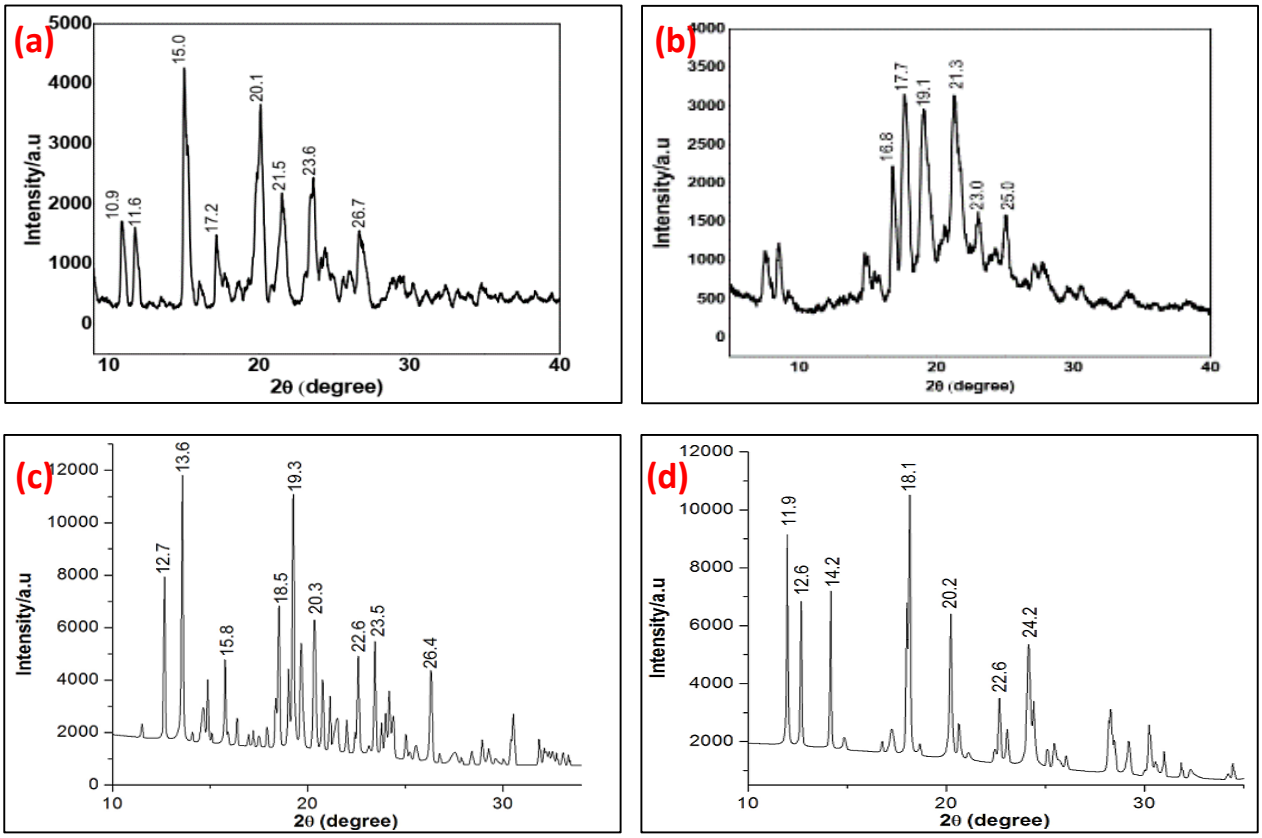

Figure S10. WXRD diffractograms of *p*-xylene xerogel of (a) **2b** (b) **2d** (c) **3'a** and (d) **3'd**.

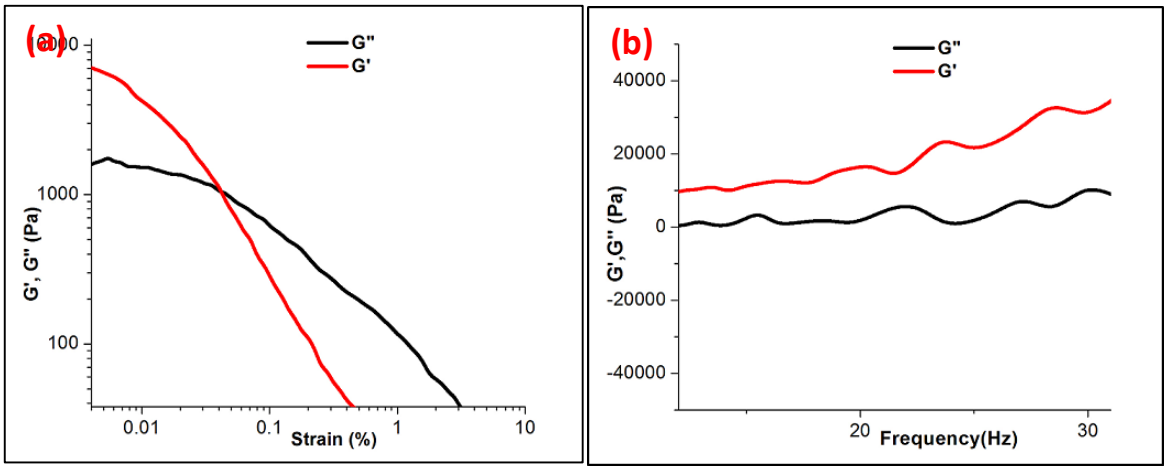

Figure S11. (a) DSS curve of **2b** gel with mustard oil at 1.5% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve **2b** gel with mustard oil at 1.5% (w/v) at strain 0.001% and temperature 25°C.

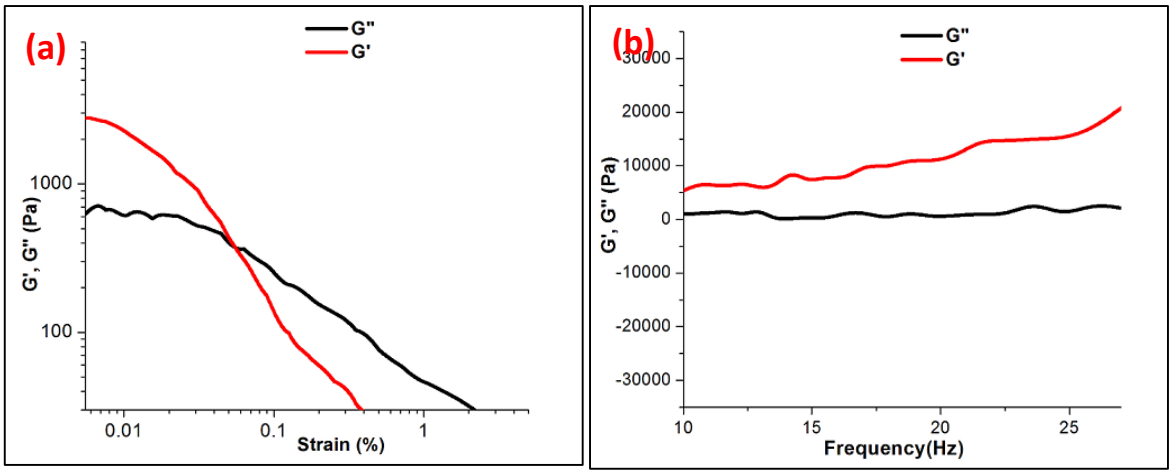

Figure S12. (a) DSS curve of **2b**+Cur gel with mustard oil at 1.5% (w/v) at frequency 1 Hz and temperature 25 °C (b) DFS curve **2b**+Cur gel with mustard oil at 1.5% (w/v) at strain 0.001% and temperature 25°C.

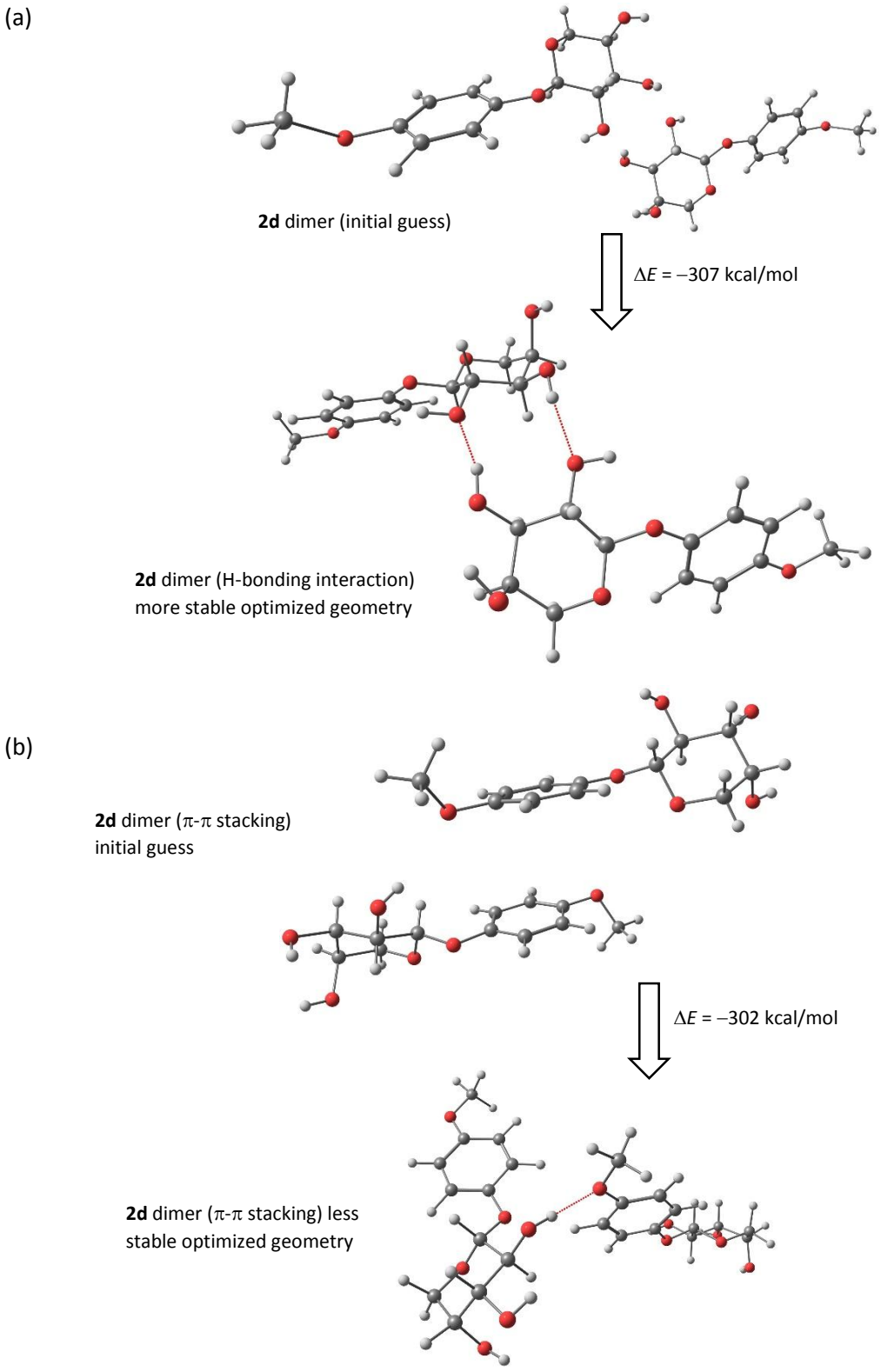

Figure S13. Optimized geometries of two differently oriented dimers of **2d** (a) H-bonding interactions (b) π–π stacking interactions.

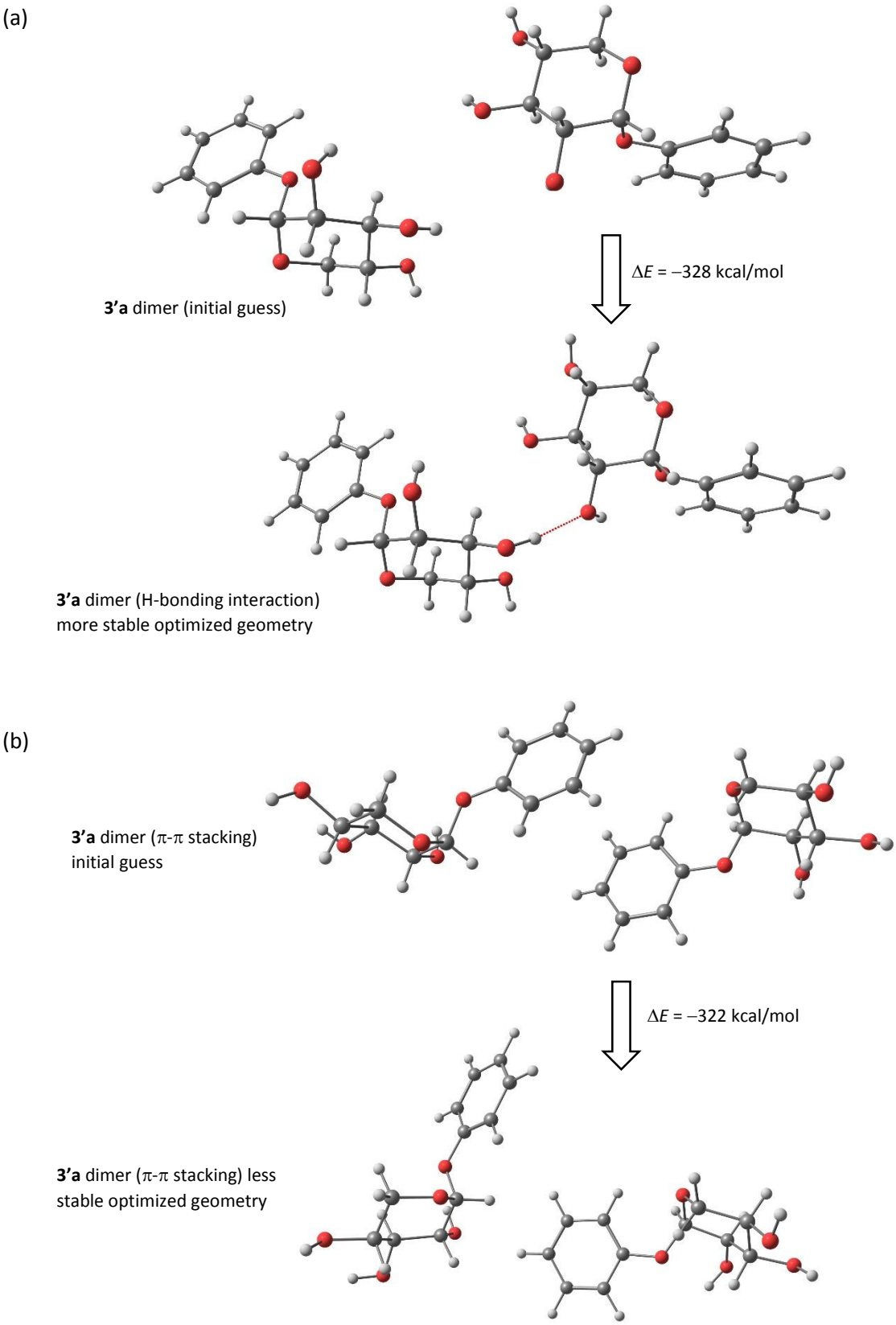

Figure S14. Optimized geometries of two differently oriented dimers of **3'a** (a) H-bonding interactions (b) π–π stacking interactions.

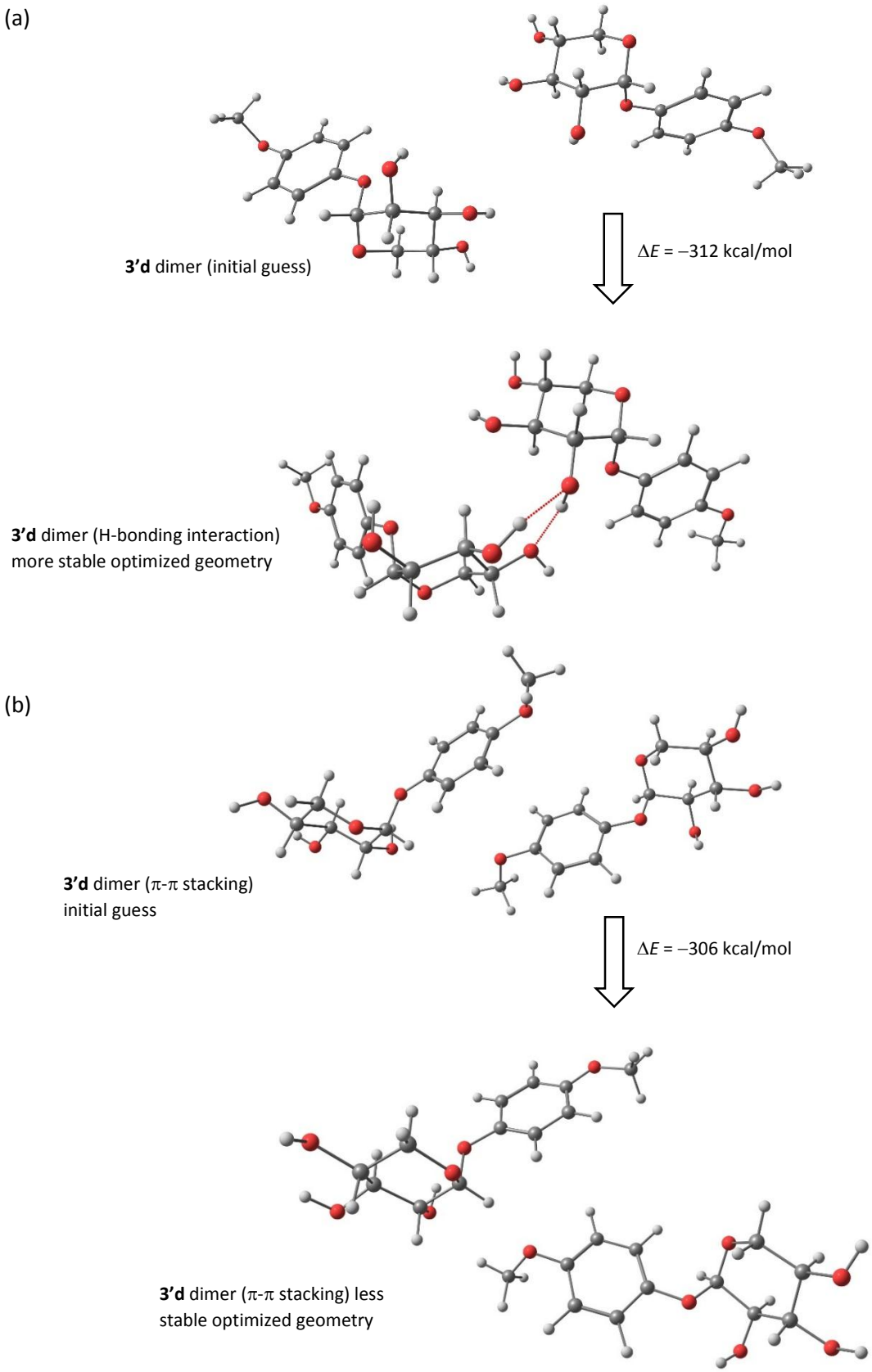

Figure S15. Optimized geometries of two differently oriented dimers of **3'd** (a) H-bonding interactions (b) π–π stacking interactions.

Table S3. DFT-optimized Cartesian coordinates of monomer of **2b**.

C	7.767848000	3.206968000	7.313752000
H	7.669280000	3.505750000	8.360195000
C	8.970204000	3.408180000	6.637111000
H	9.822545000	3.862825000	7.146715000
C	9.085484000	3.012653000	5.299015000
H	10.016346000	3.138896000	4.742742000
C	8.000632000	2.432618000	4.646057000
C	8.078098000	2.940100000	2.311856000
H	7.629294000	3.886880000	2.681687000
C	9.486160000	4.075219000	0.790455000
H	10.551112000	4.142270000	0.530097000
H	9.135524000	5.079748000	1.102595000
C	8.683516000	3.629316000	-0.431802000
H	8.656750000	4.477666000	-1.145677000
C	7.243239000	3.302127000	-0.019256000
H	6.738776000	4.243338000	0.276930000
C	7.223758000	2.362583000	1.181549000
H	7.676433000	1.395238000	0.897370000
O	8.091170000	1.982637000	3.344213000
O	9.405313000	3.163428000	1.885856000
O	9.318712000	2.508182000	-1.025493000
H	8.667219000	2.113236000	-1.629985000
O	6.584145000	2.734075000	-1.147981000
H	5.747570000	2.355468000	-0.831670000
O	5.869336000	2.201967000	1.582330000
H	5.865489000	1.766408000	2.456157000
C	6.778427000	2.231028000	5.326509000
C	6.672388000	2.619869000	6.666966000
H	5.741757000	2.474748000	7.215317000
O	5.767601000	1.663226000	4.593838000
C	4.519041000	1.426486000	5.234350000
H	4.060574000	2.367029000	5.584726000
H	3.869949000	0.967738000	4.477329000
H	4.630539000	0.734430000	6.086146000

Table S4. DFT-optimized Cartesian coordinates of dimer of **2b** (H-bonding).

C	8.502052000	5.285461000	6.806434000
H	8.348553000	6.093524000	7.525800000
C	9.794098000	4.899715000	6.450682000
H	10.660557000	5.399909000	6.888757000
C	9.978595000	3.855908000	5.535682000
H	10.975175000	3.515255000	5.248105000
C	8.875467000	3.216267000	4.976500000
C	9.353958000	2.402775000	2.774853000
H	9.132908000	3.464037000	2.528915000
C	11.147510000	2.338690000	1.253885000
H	12.216652000	2.088075000	1.229014000
H	11.027401000	3.403647000	0.968447000
C	10.388983000	1.467460000	0.256401000
H	10.647244000	1.819645000	-0.763686000
C	8.868480000	1.618596000	0.434299000
H	8.573282000	2.633540000	0.101561000
C	8.486284000	1.481800000	1.909297000
H	8.670029000	0.445096000	2.240478000
O	9.012304000	2.143541000	4.117848000
O	10.726592000	2.141580000	2.602856000
O	10.786658000	0.116024000	0.422805000
H	10.103757000	-0.421420000	-0.015273000
O	8.266067000	0.629901000	-0.383744000
H	7.289885000	0.750319000	-0.407034000
O	7.111431000	1.833712000	2.074094000
H	6.957594000	2.008341000	3.027220000

C	4.101120000	1.522334000	-6.857671000
H	4.209138000	1.891428000	-7.880465000
C	2.835115000	1.245285000	-6.342711000
H	1.944333000	1.393160000	-6.957138000
C	2.709008000	0.762487000	-5.034349000
H	1.735266000	0.517510000	-4.605672000
C	3.843459000	0.572753000	-4.249537000
C	5.127295000	0.859290000	-4.766097000
C	3.359143000	0.888030000	-1.924492000
H	3.466098000	1.950733000	-2.232389000
C	1.529498000	1.388201000	-0.532572000
H	0.490890000	1.070955000	-0.367991000
H	1.531570000	2.463099000	-0.805678000
C	2.336649000	1.199226000	0.748913000
H	2.009040000	1.975534000	1.470865000
C	3.839637000	1.401174000	0.491237000
H	4.021045000	2.473364000	0.277695000
C	4.282521000	0.599991000	-0.734801000
H	4.210341000	-0.478854000	-0.513113000
O	3.770420000	0.043610000	-2.976103000
O	2.014050000	0.604256000	-1.621866000
O	2.082710000	-0.094425000	1.272465000
H	2.799964000	-0.273526000	1.905458000
O	4.508088000	1.007740000	1.677855000
H	5.469640000	1.205496000	1.616257000
O	5.621805000	0.961706000	-1.076580000
H	5.788948000	0.662202000	-1.996078000
C	7.564766000	3.609400000	5.329416000
C	7.385494000	4.645671000	6.252096000
H	6.384123000	4.963142000	6.542688000
O	6.549165000	2.925279000	4.711477000
C	5.199601000	3.257841000	5.027916000
H	4.979252000	4.311045000	4.784320000
H	4.574858000	2.601206000	4.408509000
H	4.986514000	3.075226000	6.094416000
C	5.249171000	1.330933000	-6.077446000
H	6.229432000	1.554718000	-6.498170000
O	6.175867000	0.652345000	-3.906435000
C	7.503604000	0.903604000	-4.360510000
H	7.631830000	1.957613000	-4.660045000
H	8.159023000	0.684112000	-3.507652000
H	7.763478000	0.246633000	-5.207228000

Table S5. DFT-optimized Cartesian coordinates of dimer of **2b** (π–π stacking).

C	13.481216000	4.423570000	0.939306000
H	13.919829000	4.477927000	1.938825000
C	14.278828000	4.623083000	-0.187176000
H	15.345907000	4.830605000	-0.080405000
C	13.705477000	4.545661000	-1.462131000
H	14.301749000	4.680672000	-2.366850000
C	12.345362000	4.280661000	-1.600666000
C	11.493325000	5.320073000	-3.577815000
H	11.564954000	6.208207000	-2.914696000
C	12.227403000	6.529061000	-5.475352000
H	12.999417000	6.468858000	-6.254473000
H	12.367921000	7.473516000	-4.911605000
C	10.841932000	6.544746000	-6.121708000
H	10.707505000	7.533486000	-6.606265000
C	9.767301000	6.387863000	-5.040821000
H	9.765877000	7.300004000	-4.412933000
C	10.073982000	5.197658000	-4.138788000
H	10.043296000	4.266422000	-4.733362000
O	11.752816000	4.149028000	-2.841809000
O	12.443214000	5.408026000	-4.619980000
O	10.760062000	5.510161000	-7.089571000

H	9.814278000	5.393444000	-7.283595000
O	8.502651000	6.248468000	-5.688456000
H	7.882829000	5.900442000	-5.026264000
O	9.096906000	5.179783000	-3.105655000
H	9.394473000	4.556183000	-2.412120000
C	8.357899000	10.724013000	-2.670677000
H	8.074639000	11.361189000	-3.512070000
C	8.138259000	9.347948000	-2.728234000
H	7.685127000	8.896476000	-3.613660000
C	8.508216000	8.540235000	-1.644917000
H	8.372597000	7.457139000	-1.671090000
C	9.082913000	9.115426000	-0.514874000
C	8.570060000	8.027812000	1.545420000
H	7.783739000	8.811168000	1.586283000
C	7.050410000	6.355949000	2.239457000
H	6.657154000	5.386971000	1.902841000
H	6.206866000	7.071804000	2.303753000
C	7.685752000	6.211071000	3.620409000
H	6.875515000	6.036208000	4.356159000
C	8.408038000	7.509593000	3.996288000
H	7.647271000	8.298668000	4.157988000
C	9.330511000	7.974869000	2.872514000
H	10.148956000	7.243028000	2.743290000
O	9.509794000	8.336161000	0.547666000
O	7.982889000	6.774940000	1.244843000
O	8.580665000	5.105788000	3.608071000
H	9.127659000	5.191575000	4.407894000
O	9.124711000	7.271242000	5.204789000
H	9.710634000	8.032017000	5.350091000
O	9.837492000	9.251345000	3.237766000
H	10.204194000	9.667241000	2.435193000
C	12.113042000	4.151940000	0.810204000
H	11.504512000	4.009290000	1.702925000
C	11.532624000	4.079499000	-0.462163000
O	10.208402000	3.830605000	-0.702409000
C	9.354202000	3.578244000	0.416188000
H	9.303266000	4.445107000	1.092053000
H	8.359291000	3.386078000	-0.005776000
H	9.690667000	2.687755000	0.972641000
C	8.946427000	11.308608000	-1.541700000
H	9.113636000	12.385389000	-1.521152000
C	9.315427000	10.507801000	-0.454096000
O	9.899399000	10.971314000	0.696661000
C	10.140205000	12.368653000	0.818280000
H	9.201521000	12.945361000	0.758601000
H	10.592340000	12.515429000	1.807650000
H	10.837800000	12.725233000	0.041517000

Table S6. DFT-optimized Cartesian coordinates of monomer of **2d**.

C	8.827619000	3.948738000	6.300632000
H	9.659262000	4.554229000	6.666423000
C	8.794812000	3.517302000	4.975838000
H	9.619519000	3.762620000	4.307636000
C	7.719895000	2.737805000	4.526208000
C	8.313837000	2.865602000	2.195625000
H	8.307102000	3.970575000	2.321815000
C	10.437575000	2.933823000	1.150635000
H	11.430612000	2.474700000	1.247549000
H	10.541140000	4.029990000	1.281595000
C	9.871949000	2.652265000	-0.240588000
H	10.434242000	3.271519000	-0.968533000
C	8.396368000	3.065599000	-0.296203000
H	8.335384000	4.170163000	-0.228937000
C	7.624413000	2.480417000	0.882771000
H	7.640163000	1.378107000	0.818309000

O	7.591307000	2.261507000	3.229618000
O	9.644697000	2.383583000	2.202129000
O	10.032436000	1.274767000	-0.538531000
H	9.467942000	1.092520000	-1.309171000
O	7.867703000	2.625498000	-1.542528000
H	6.902413000	2.723431000	-1.496598000
O	6.294587000	2.982335000	0.799631000
H	5.786460000	2.587887000	1.525788000
C	6.741255000	2.807117000	6.746506000
H	5.932898000	2.513659000	7.415936000
C	6.703528000	2.383560000	5.414786000
H	5.875948000	1.768497000	5.055117000
C	7.806237000	3.600980000	7.196539000
O	7.940874000	4.074162000	8.475625000
C	6.948465000	3.735035000	9.429990000
H	6.879712000	2.642360000	9.576665000
H	7.257113000	4.205301000	10.372990000
H	5.954823000	4.122467000	9.142054000

Table S7. DFT-optimized Cartesian coordinates of dimer of **2d** (H-bonding).

C	8.913857000	5.675966000	6.935801000
C	9.607147000	5.792863000	5.722277000
H	10.199984000	6.692628000	5.544075000
C	9.558271000	4.777314000	4.768799000
H	10.139776000	4.872854000	3.852333000
C	8.794932000	3.628624000	5.018317000
C	9.043995000	2.718920000	2.794270000
H	8.678593000	3.698110000	2.410876000
C	10.876924000	2.807103000	1.326140000
H	11.971336000	2.714428000	1.342266000
H	10.612486000	3.819912000	0.959054000
C	10.283354000	1.763949000	0.384826000
H	10.497951000	2.082216000	-0.655597000
C	8.752275000	1.674645000	0.537139000
H	8.303374000	2.604138000	0.132645000
C	8.377822000	1.576385000	2.016093000
H	8.758477000	0.628106000	2.423703000
O	8.667106000	2.564445000	4.134620000
O	10.445762000	2.646596000	2.677075000
O	10.886434000	0.507878000	0.649666000
H	10.336066000	-0.156545000	0.198204000
O	8.344554000	0.550641000	-0.218202000
H	7.369171000	0.525575000	-0.342466000
O	6.954166000	1.654823000	2.157325000
H	6.794215000	1.788891000	3.107178000
C	4.057001000	2.056148000	-7.100309000
C	3.528402000	2.841936000	-6.065758000
H	3.145573000	3.835706000	-6.308122000
C	3.474819000	2.362281000	-4.758303000
H	3.021303000	2.973755000	-3.978632000
C	3.968856000	1.083054000	-4.468024000
C	3.812933000	1.332124000	-2.075497000
H	4.414747000	2.260622000	-2.195079000
C	2.231590000	2.486182000	-0.767000000
H	1.148792000	2.666404000	-0.724447000
H	2.746872000	3.459873000	-0.897297000
C	2.699177000	1.843366000	0.535552000
H	2.678192000	2.621105000	1.325913000
C	4.146181000	1.334294000	0.414641000
H	4.829331000	2.203700000	0.377567000
C	4.322607000	0.529304000	-0.871950000
H	3.718688000	-0.391531000	-0.807392000
O	3.969047000	0.515428000	-3.201601000
O	2.450127000	1.657948000	-1.908418000
O	1.816688000	0.782810000	0.868005000
H	2.258649000	0.267249000	1.565097000

O	4.407552000	0.553326000	1.566143000
H	5.369912000	0.569865000	1.755822000
O	5.705199000	0.208145000	-1.028827000
H	5.786637000	-0.284515000	-1.863026000
C	8.165420000	4.516916000	7.187507000
H	7.619221000	4.388445000	8.121766000
C	4.533688000	0.770072000	-6.807806000
H	4.945678000	0.128865000	-7.586806000
C	4.488706000	0.293117000	-5.494461000
H	4.860662000	-0.706128000	-5.258433000
C	8.109405000	3.502470000	6.227407000
H	7.527145000	2.597882000	6.415122000
O	4.057479000	2.623792000	-8.347257000
O	9.034206000	6.730261000	7.801902000
C	4.574187000	1.870853000	-9.432215000
H	4.474862000	2.507030000	-10.321587000
H	5.639879000	1.620818000	-9.283750000
H	4.004365000	0.937925000	-9.590030000
C	8.361095000	6.660906000	9.048327000
H	8.595788000	7.594863000	9.575716000
H	7.266967000	6.585209000	8.916866000
H	8.710814000	5.805974000	9.653923000

Table S8. DFT-optimized Cartesian coordinates of dimer of **2d** (π–π stacking).

C	15.193107000	7.401867000	-0.990198000
C	15.226389000	6.487692000	-2.053307000
H	16.184748000	6.044478000	-2.331393000
C	14.060024000	6.136429000	-2.730285000
H	14.096972000	5.392926000	-3.525935000
C	12.838162000	6.714223000	-2.356421000
C	11.615208000	5.975819000	-4.289163000
H	12.387235000	6.517661000	-4.877306000
C	11.868448000	4.025736000	-5.622154000
H	12.065411000	2.952066000	-5.499098000
H	12.682997000	4.465924000	-6.232480000
C	10.541838000	4.228690000	-6.349789000
H	10.688024000	3.943402000	-7.411483000
C	10.148592000	5.707905000	-6.296177000
H	10.864883000	6.285699000	-6.914308000
C	10.221225000	6.250886000	-4.869150000
H	9.495379000	5.705310000	-4.240335000
O	11.626243000	6.422350000	-2.963867000
O	11.879158000	4.581292000	-4.308566000
O	9.548557000	3.408881000	-5.754029000
H	8.692648000	3.742979000	-6.072981000
O	8.835744000	5.836086000	-6.830508000
H	8.527099000	6.725797000	-6.588980000
O	9.908985000	7.632610000	-4.942852000
H	9.678973000	7.963802000	-4.051361000
C	8.286672000	8.550150000	-1.532040000
C	7.273092000	9.247765000	-0.870465000
H	6.949653000	10.232172000	-1.207827000
C	6.634542000	8.676543000	0.240503000
H	5.816427000	9.213314000	0.719108000
C	7.020545000	7.414825000	0.694279000
C	5.723207000	7.499580000	2.721121000
H	6.241100000	8.458504000	2.943241000
C	3.602972000	8.468789000	3.137013000
H	2.627577000	8.583434000	2.645358000
H	4.025084000	9.476839000	3.324461000
C	3.426694000	7.748918000	4.472852000
H	2.945318000	8.455131000	5.179342000
C	4.797782000	7.361086000	5.040360000
H	5.335224000	8.285964000	5.330481000
C	5.636531000	6.641559000	3.987712000

H	5.138081000	5.696916000	3.707666000
O	6.457320000	6.767868000	1.780870000
O	4.425987000	7.752458000	2.216417000
O	2.607066000	6.607575000	4.281522000
H	2.703985000	6.061871000	5.080632000
O	4.579204000	6.546494000	6.186380000
H	5.434613000	6.155898000	6.429947000
O	6.913099000	6.399117000	4.569089000
H	7.436828000	5.889632000	3.930964000
C	13.966966000	7.965898000	-0.609688000
H	13.903676000	8.677571000	0.213394000
C	8.665834000	7.275813000	-1.079337000
H	9.464766000	6.740606000	-1.596956000
C	12.798784000	7.623122000	-1.297723000
H	11.842028000	8.066145000	-1.015112000
C	8.035688000	6.715176000	0.025054000
H	8.325296000	5.725984000	0.385038000
O	16.396382000	7.672180000	-0.390664000
C	16.418346000	8.575988000	0.701062000
H	17.465115000	8.637825000	1.027075000
H	16.072329000	9.582749000	0.405622000
H	15.798649000	8.216042000	1.541798000
O	8.962590000	9.027485000	-2.637404000
C	8.662592000	10.337686000	-3.106644000
H	7.613095000	10.416868000	-3.438092000
H	9.327112000	10.515307000	-3.962058000
H	8.858250000	11.093496000	-2.327233000

Table S9. DFT-optimized Cartesian coordinates of monomer of **3'a.**

C	5.377593000	6.278199000	11.417389000
H	6.264732000	5.860569000	10.916589000
C	5.591819000	6.297072000	12.944599000
H	6.554954000	6.796541000	13.135459000
C	4.493107000	7.111762000	13.641453000
H	3.528694000	6.574372000	13.536496000
C	4.339069000	8.474523000	12.962713000
H	5.268820000	9.046985000	13.138193000
C	4.125738000	8.305506000	11.458354000
H	3.161080000	7.803684000	11.270923000
H	4.117659000	9.278052000	10.944442000
C	4.051528000	4.889732000	9.930268000
C	4.699408000	5.329583000	8.768989000
H	5.391846000	6.170236000	8.800125000
C	4.420129000	4.695675000	7.552134000
H	4.927183000	5.040128000	6.647034000
C	3.501059000	3.647417000	7.481664000
H	3.288674000	3.163014000	6.525921000
C	2.850020000	3.227176000	8.647598000
H	2.126602000	2.408759000	8.607700000
O	5.209061000	7.568459000	10.879242000
O	5.730531000	4.984906000	13.449466000
O	4.832711000	7.256964000	15.010095000
H	4.145205000	7.815325000	15.407316000
O	3.227594000	9.123828000	13.588355000
H	3.283624000	10.076295000	13.422642000
O	4.254757000	5.436379000	11.183959000
H	4.940089000	4.489894000	13.177760000
C	3.121764000	3.842445000	9.868793000
H	2.626615000	3.521312000	10.787616000

Table S10. DFT-optimized Cartesian coordinates of dimer of **3'a** (H-bonding).

C	5.237010000	6.381715000	11.993530000
H	6.132754000	6.059369000	11.441243000
C	5.524034000	6.387848000	13.507063000
H	6.445619000	6.972348000	13.657349000
C	4.400872000	7.074309000	14.299440000
H	3.492913000	6.441818000	14.258868000
C	4.056252000	8.423968000	13.654652000
H	4.919728000	9.095510000	13.813638000
C	3.801584000	8.269489000	12.154582000
H	2.884637000	7.677202000	11.994273000
H	3.669690000	9.248276000	11.670871000
C	3.981165000	4.914824000	10.525231000
C	4.541384000	5.437330000	9.352103000
H	5.160075000	6.333447000	9.381557000
C	4.269374000	4.813037000	8.129192000
H	4.709152000	5.223309000	7.216568000
C	3.441486000	3.691648000	8.061983000
H	3.233426000	3.215215000	7.101523000
C	2.875867000	3.187479000	9.238904000
H	2.223781000	2.311009000	9.201947000
O	4.921520000	7.660321000	11.500454000
O	5.820767000	5.081667000	13.962854000
O	4.831007000	7.237135000	15.632702000
H	4.038440000	7.347366000	16.190759000
O	2.893915000	8.943264000	14.308270000
H	2.905744000	9.907337000	14.234404000
O	4.186575000	5.442165000	11.782336000
H	5.032156000	4.540570000	13.800009000
C	2.380102000	5.996862000	19.628368000
H	3.207456000	6.503862000	20.148277000
C	2.687372000	5.889408000	18.122600000
H	3.691856000	5.453856000	18.011455000
C	1.685314000	4.966266000	17.419924000
H	0.683456000	5.440285000	17.435509000
C	1.582463000	3.640902000	18.176915000
H	2.557397000	3.126396000	18.095191000
C	1.265452000	3.890551000	19.651754000
H	0.261198000	4.336521000	19.749114000
H	1.288346000	2.954497000	20.228274000
C	0.877015000	7.382143000	20.936380000
C	1.486964000	7.071316000	22.157537000
H	2.241191000	6.288001000	22.222909000
C	1.090685000	7.760012000	23.310438000
H	1.568599000	7.516668000	24.262774000
C	0.093952000	8.735198000	23.258109000
H	-0.209457000	9.263304000	24.164757000
C	-0.517683000	9.025595000	22.032870000
H	-1.301333000	9.785338000	21.977490000
O	2.262047000	4.734709000	20.239740000
O	2.771641000	7.179840000	17.539607000
O	2.109822000	4.759570000	16.080727000
H	1.485342000	4.124606000	15.693909000
O	0.558447000	2.878377000	17.531482000
H	0.674052000	1.942735000	17.751499000
O	1.194914000	6.772870000	19.735474000
H	1.924969000	7.641324000	17.678851000
C	-0.130042000	8.354936000	20.874054000
H	-0.593520000	8.575084000	19.910324000
C	3.142542000	3.792231000	10.465773000
H	2.714077000	3.406376000	11.392741000

Table S11. DFT-optimized Cartesian coordinates of dimer of **3'a** (π–π stacking).

C	-0.599317000	15.252722000	15.362904000
H	-0.234424000	14.247413000	15.622803000
C	0.409317000	15.952303000	14.429264000
H	0.626510000	15.257487000	13.602946000
C	-0.188697000	17.231483000	13.829577000
H	-0.321512000	17.977236000	14.639723000
C	-1.570106000	16.940091000	13.239741000
H	-1.434205000	16.261981000	12.376870000
C	-2.465137000	16.262778000	14.278061000
H	-2.668443000	16.959537000	15.109205000
H	-3.425589000	15.956716000	13.837854000
C	-1.161524000	15.511662000	17.710756000
C	-1.840161000	14.288586000	17.787987000
H	-2.051864000	13.708846000	16.890048000
C	-2.275783000	13.829549000	19.037058000
H	-2.804712000	12.874690000	19.094871000
C	-2.054807000	14.576892000	20.195077000
H	-2.401839000	14.209207000	21.163254000
C	-1.388473000	15.804710000	20.101585000
H	-1.211289000	16.402656000	20.999221000
O	-1.853829000	15.058556000	14.754703000
O	1.642600000	16.164310000	15.090014000
O	0.697547000	17.727771000	12.840670000
H	0.266975000	18.504318000	12.448138000
O	-2.107348000	18.194692000	12.809576000
H	-2.812553000	18.032656000	12.165900000
O	-0.678923000	16.056099000	16.535089000
H	1.451226000	16.676365000	15.893191000
C	2.211827000	7.930067000	16.637134000
H	2.790962000	8.400853000	17.446496000
C	2.687732000	6.479096000	16.420291000
H	2.674847000	5.978363000	17.401349000
C	1.728358000	5.720581000	15.492336000
H	1.802155000	6.151794000	14.473358000
C	0.284656000	5.898488000	15.967258000
H	0.185240000	5.391186000	16.944864000
C	-0.049837000	7.381135000	16.132185000
H	-0.028396000	7.881509000	15.148977000
H	-1.049556000	7.518304000	16.570447000
C	2.516234000	9.997035000	15.400505000
C	2.077356000	10.812236000	16.450770000
H	1.622748000	10.380152000	17.341620000
C	2.199353000	12.202367000	16.329469000
H	1.857881000	12.835698000	17.152643000
C	2.736238000	12.783418000	15.178244000
H	2.817832000	13.869940000	15.097224000
C	3.157864000	11.953989000	14.130972000
H	3.580014000	12.392383000	13.222993000
O	0.864271000	8.000517000	17.043616000
O	4.032748000	6.450515000	15.988740000
O	2.096294000	4.351278000	15.477610000
H	1.445493000	3.896761000	14.919004000
O	-0.551507000	5.268114000	14.991261000
H	-1.416293000	5.085780000	15.387194000
O	2.450408000	8.614296000	15.414507000
H	4.087621000	7.003870000	15.192098000
C	3.051071000	10.567705000	14.237326000
H	3.381586000	9.909921000	13.430575000
C	-0.941389000	16.273182000	18.867006000
H	-0.414585000	17.225763000	18.779380000

Table S12. DFT-optimized Cartesian coordinates of monomer of **3'd.**

C	5.208005000	6.731133000	11.284767000
H	6.161896000	6.376469000	10.863725000
C	5.324365000	6.875606000	12.816089000
H	6.219915000	7.482783000	13.022883000
C	4.109080000	7.618157000	13.389552000
H	3.211765000	6.977148000	13.272130000
C	3.861544000	8.908199000	12.605328000
H	4.716068000	9.585787000	12.788604000
C	3.760390000	8.616182000	11.108187000
H	2.866090000	8.002008000	10.906395000
H	3.684345000	9.545227000	10.524087000
C	4.146289000	5.104339000	9.832535000
C	4.763628000	5.569369000	8.661891000
H	5.306584000	6.514283000	8.657028000
C	4.655078000	4.830102000	7.485068000
H	5.129606000	5.179125000	6.565764000
C	3.926195000	3.632478000	7.450987000
C	3.299336000	3.178734000	8.620765000
H	2.723511000	2.253495000	8.630832000
O	4.947700000	7.961352000	10.646977000
O	5.557995000	5.621078000	13.422754000
O	4.346726000	7.890375000	14.760698000
H	3.584052000	8.401296000	15.076318000
O	2.653814000	9.478851000	13.120264000
H	2.624652000	10.418517000	12.887859000
O	4.192084000	5.766782000	11.050369000
H	4.844320000	5.029311000	13.132527000
C	3.415057000	3.915369000	9.803149000
H	2.935116000	3.564845000	10.719352000
O	3.881553000	2.988700000	6.242266000
C	3.159491000	1.771528000	6.150993000
H	2.089586000	1.912627000	6.386823000
H	3.256497000	1.435272000	5.110263000
H	3.576505000	0.998514000	6.820867000

Table S13. DFT-optimized Cartesian coordinates of dimer of **3'd** (H-bonding).

C	4.823503000	6.991984000	12.323016000
H	5.392384000	7.163809000	11.395970000
C	5.781687000	6.893517000	13.524417000
H	6.426545000	7.786525000	13.498584000
C	5.022863000	6.902688000	14.864969000
H	4.458644000	5.955160000	14.961606000
C	4.013373000	8.061290000	14.876206000
H	4.588636000	9.002329000	14.929028000
C	3.140408000	8.054495000	13.620089000
H	2.487968000	7.164537000	13.629830000
H	2.502792000	8.950141000	13.575732000
C	3.551526000	5.372070000	11.045902000
C	3.239142000	6.261458000	10.006530000
H	3.433044000	7.328737000	10.111011000
C	2.646787000	5.779574000	8.840237000
H	2.398541000	6.460067000	8.023219000
C	2.344771000	4.418066000	8.694284000
C	2.644829000	3.534459000	9.741185000
H	2.422869000	2.470233000	9.663525000
O	3.941636000	8.087269000	12.436351000
O	6.651747000	5.789412000	13.380135000
O	5.964983000	7.028335000	15.909282000
H	5.584323000	6.610425000	16.707142000
O	3.177684000	7.938863000	16.045991000
H	2.837137000	8.815021000	16.278292000
O	4.139845000	5.748955000	12.241487000
H	6.100275000	4.990522000	13.362166000

C	2.651565000	5.469130000	19.681930000
H	3.240031000	5.897257000	20.508113000
C	3.581733000	5.107403000	18.506300000
H	4.369533000	4.452832000	18.911994000
C	2.808454000	4.322007000	17.441003000
H	2.032308000	4.980010000	17.003419000
C	2.102980000	3.132191000	18.093535000
H	2.880917000	2.439315000	18.464732000
C	1.236758000	3.597466000	19.266255000
H	0.402497000	4.213851000	18.890133000
H	0.817385000	2.740579000	19.814120000
C	1.036014000	7.223037000	20.094774000
C	0.963125000	6.985943000	21.475568000
H	1.438347000	6.110653000	21.917723000
C	0.247314000	7.862443000	22.289716000
H	0.182542000	7.690349000	23.365971000
C	-0.415286000	8.972660000	21.746955000
C	-0.354530000	9.196614000	20.363658000
H	-0.861887000	10.045925000	19.906403000
O	2.023026000	4.322077000	20.218279000
O	4.244631000	6.250237000	18.009068000
O	3.713038000	3.892970000	16.431930000
H	3.199545000	3.331563000	15.828364000
O	1.324419000	2.503393000	17.070113000
H	1.104664000	1.602468000	17.349388000
O	1.722691000	6.420989000	19.198979000
H	3.619407000	6.818275000	17.509089000
C	0.370343000	8.322689000	19.548520000
H	0.424056000	8.489133000	18.470558000
C	3.247589000	4.016044000	10.906902000
H	3.493246000	3.332705000	11.722552000
O	-1.091903000	9.765543000	22.636804000
O	1.759956000	4.054010000	7.508830000
C	1.429285000	2.689836000	7.310332000
H	0.698702000	2.333628000	8.058585000
H	0.979559000	2.625688000	6.310632000
H	2.324083000	2.042958000	7.345940000
C	-1.786386000	10.897543000	22.140073000
H	-2.576775000	10.609575000	21.424014000
H	-2.249149000	11.379840000	23.011189000
H	-1.102278000	11.614165000	21.651450000

Table S14. DFT-optimized Cartesian coordinates of dimer of **3'd** ($\pi-\pi$ stacking).

C	1.643375000	15.128614000	15.681000000
H	2.078153000	14.157519000	15.955425000
C	2.749171000	16.083885000	15.186548000
H	3.316078000	15.556289000	14.402777000
C	2.150115000	17.351405000	14.562926000
H	1.662805000	17.947210000	15.361132000
C	1.072329000	16.974120000	13.544502000
H	1.571111000	16.462030000	12.700067000
C	0.041292000	16.030326000	14.167771000
H	-0.520346000	16.557473000	14.958202000
H	-0.676397000	15.668968000	13.415706000
C	0.305818000	15.019199000	17.707085000
C	-0.079521000	13.699503000	17.486299000
H	0.182124000	13.168118000	16.569900000
C	-0.840326000	13.043994000	18.443026000
H	-1.121076000	12.026425000	18.253281000
C	-1.237643000	13.698117000	19.615329000
C	-0.868478000	15.030442000	19.833661000
H	-1.184845000	15.534216000	20.749062000
O	0.683607000	14.860310000	14.684658000
O	3.678015000	16.353748000	16.215401000
O	3.194499000	18.096384000	13.955887000

H	2.777885000	18.868112000	13.539700000
O	0.478982000	18.200341000	13.102694000
H	0.017406000	18.041524000	12.266148000
O	1.069263000	15.759676000	16.822365000
H	3.168645000	16.672216000	16.979469000
C	2.636934000	6.359540000	17.726346000
H	3.229380000	6.756375000	18.565907000
C	3.019423000	4.889903000	17.450751000
H	2.956051000	4.348821000	18.408528000
C	2.027955000	4.238079000	16.477395000
H	2.148301000	4.708586000	15.479750000
C	0.592061000	4.491552000	16.940786000
H	0.445523000	3.952153000	17.895616000
C	0.352161000	5.985218000	17.162353000
H	0.419186000	6.522893000	16.200395000
H	-0.642412000	6.171030000	17.594886000
C	3.126662000	8.448390000	16.590086000
C	2.675361000	9.250929000	17.644653000
H	2.117106000	8.817019000	18.473768000
C	2.908160000	10.640851000	17.639656000
H	2.546768000	11.300133000	18.506827000
C	3.579539000	11.189720000	16.548611000
C	4.028868000	10.374740000	15.443127000
H	4.533088000	10.809335000	14.577599000
O	1.290719000	6.506374000	18.110155000
O	4.366552000	4.790686000	17.037783000
O	2.304952000	2.849566000	16.407207000
H	1.632940000	2.463850000	15.822196000
O	-0.267427000	3.957525000	15.928374000
H	-1.145221000	3.807258000	16.309159000
O	2.947803000	7.075964000	16.536508000
H	4.469235000	5.374865000	16.268304000
C	3.796122000	9.009151000	15.483391000
H	4.120183000	8.357418000	14.669451000
C	-0.097830000	15.698744000	18.886382000
H	0.195725000	16.737327000	19.051267000
O	3.731500000	12.561754000	16.542200000
O	-1.997729000	13.132362000	20.608680000
C	5.077753000	13.070575000	16.464605000
H	5.590441000	12.720097000	15.552838000
H	4.999323000	14.164099000	16.442009000
H	5.663702000	12.764035000	17.348418000
C	-2.419852000	11.788752000	20.453528000
H	-1.561459000	11.097881000	20.372711000
H	-3.001068000	11.538763000	21.350986000
H	-3.060645000	11.664024000	19.561850000

UV-spectra

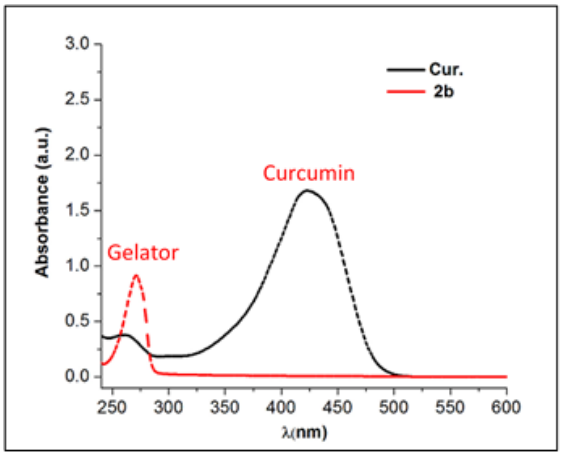

Figure S16. UV-spectra for release of gelator **2b** (red) and curcumin (black).

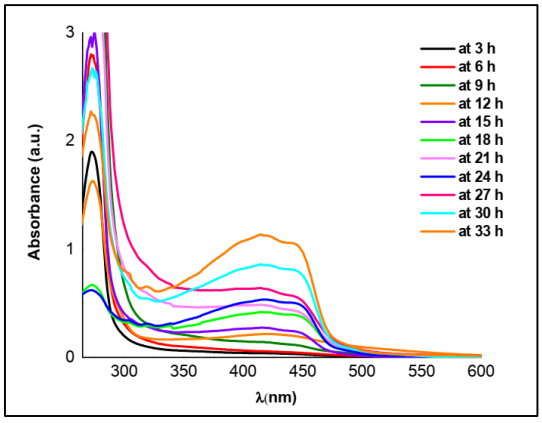

Figure S17. UV-spectra for release of curcumin from MO gel of **2b+Cur** at pH 7 in buffer solution.

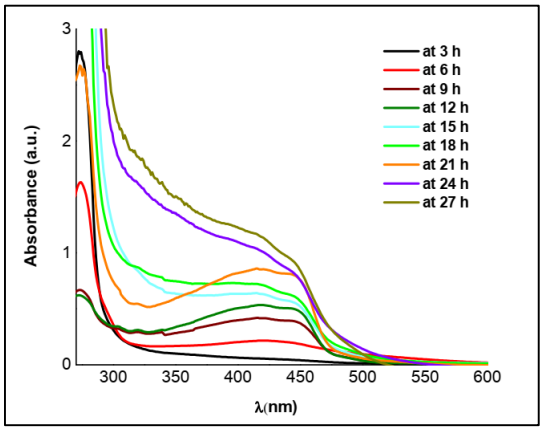

Figure S18. UV-spectra for release of curcumin from MO gelator of **2b+Cur** at pH 7.4 in buffer solution.

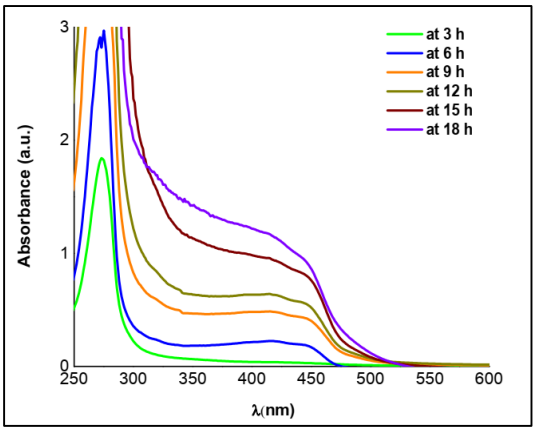

Figure S19. UV-spectra for release of curcumin from MO gelator of **2b+Cur** at pH 7.6 in buffer solution.

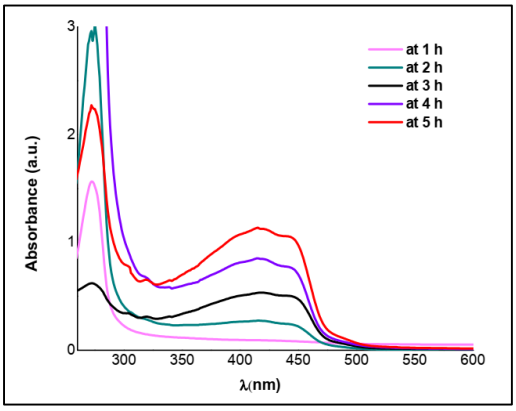

Figure S20. UV-spectra for release of curcumin from MO gelator of **2b+Cur** at pH 8 in buffer solution.

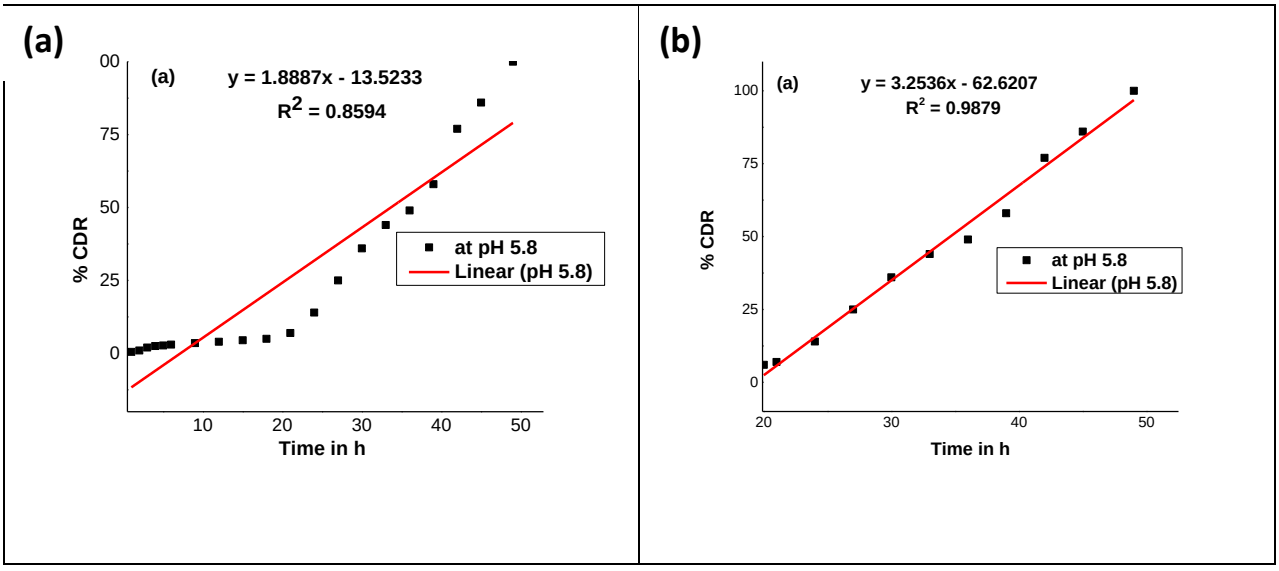

Figure S21. (a) Analysis of the data of release of curcumin from the entrapped organogel of **2b** using zero order kinetic equation. (b) Analysis of the data of release of curcumin from the entrapped organogel of **2b** using zero order kinetic equation from 20 h onwards.

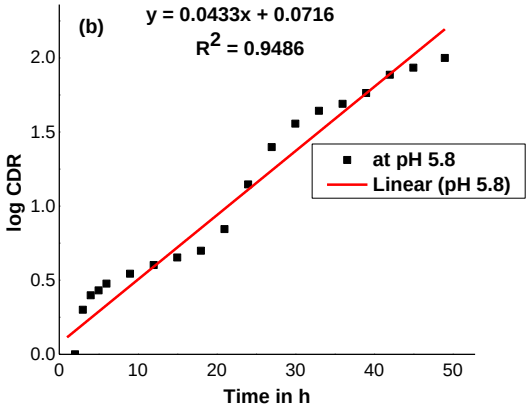

Figure S22. Analysis of the data of release of curcumin from the entrapped organogel of **2b** using first order kinetic equation.

Experimental

General Procedures

All chemicals, solvents and reagents were procured from commercial source and were used without further purification. Column chromatography was performed by using silica gel (100-200 mesh) under medium pressure. TLC was performed on precoated aluminium plates of silica gel 60-F_{254}. TLC spot were visualized by standing with a vaniline solution and subsequent heating on hot plate. ^{1}H and ^{13}C NMR spectra are recorded on Bruker AC-400 NMR spectrometer at 400 MHz (^{1}H) and 100 MHz (^{13}C) in solution of d_6-DMSO or $CDCl_3$ using the residual peak of the solvent as internal standard.

A: General procedure for synthesis of β-phenolic glycosides (2a-d, 3a-d, 4a-d)

The β-phenolic glycosides **2a**-**d**, **3a**-**d** and **4a**-**d** were synthesized by following the procedure reported previously.[1]

B: General procedure for synthesis of α-phenolic glycosides (2'a-d, 3'a-d, 4'a-d) and the β-phenolic glycosides 5a-d:[2]

1,2,3,4-tetra-*O*-acetyl-D-pyranosyl pentose sugar (1.50 g, 4.68 mmol) was dissolved in dichloromethane (DCM, 5 mL) followed by addition of phenol derivatives (0.88 mL, 9.35 mmol) and triflic acid (TfOH) in catalytic amount (30 µL). The solution was stirred at room temperature, the progress of the reaction was monitored by TLC. After 2-12 h, when the reaction was complete, the mixture was quenched with DCM and water, neutralized with sodium bicarbonate and extracted with DCM. The organic extract was then dried over Na_2SO_4, filtered and concentrated in *vacuo* to yield the crude product. Subsequently, the 2,3,4-tri-*O*-acetyl-1-phenoxy-α-D-pentose pyranoside was dissolved in methanol (5 mL) and sodium methoxide (0.07 g, 1.29 mmol) was added to the reaction mixture. After 1 h, the mixture was neutralized with amberlite IR 120 H^+ resin. Then the reaction mixture was filtered and concentrated in *vacuo* to yield the crude product. The crude product was

purified by column chromatography using MeOH/$CHCl_3$ mixture to afford the desired product.

Gelation tests

Gelation test were carried out by heating-cooling method in which exact weights of compounds were added to 1 mL of appropriate solvent in a sample vial. The vial was then sealed and heated to dissolve the compound till a clear solution was obtained. The vial was then set aside and allowed cool to room temperature, after which gelation was tested by inverting the sample vial. If the inverted sample vial was able to hold the weight of the system, it was considered as gel.

Determination of Minimum Gelation Concentration (MGC)

To 1 mL of appropriate solvent taken in 5 mL sample vial, 1 mg of gelator was added in it and heated till the clear solution obtained. The mixture was subjected to heating cooling cycle as described above. If gelation was not observed, the process was repeated with 1 mg increments of the gelator until a gel was formed after a cycle. The minimum weight of the gelator at which the gel was formed was used to report the MGC.

Field Emission Scanning Electron Micrographs (FESEM)

Samples were prepared for FESEM by drop casting a hot 1% (w/v) solution of gelator **2b**, **2d**, **3'a** or **3'd** in *p*-xylene solvent on a glass slide (2mm x 2mm) and drying them overnight in air followed by drying inside a vacuum desiccator. The slides loaded with the xerogels was then placed on a stub which was then coated with gold by Quorum-Q150RES sputter coater under vacuum of 5 x 10-5 mbar and a current of 20 mA for 2 minutes. Then the FESEM analyses were performed by using a Zeiss supra-55 FESEM.

Atomic force microscopy (AFM)

The AFM experiments carried on a Bruker Dimension Icon instrument with the *p*-xylene xerogels of the gelators **2b**, **2d**, **3'a** and **3'd**. The respective *p*-xylene gel sample was placed on a glass slide (2mm x 2mm) and then dried under vacuum overnight. The AFM image of the samples were obtained using Tapping Mode at 1 Hz scan rate with a silicon cantilever tip (RFESP-MPP-21100-10) at a resonance frequency of 75 kHZ and spring constant of 3 Nm^{-1}.

Rheology

The rheology of the gel samples were performed on a Bohlin Gemini-2 Malvern rheometer using parallel plates (25 mm, stainless steel) with gaps of 500 micron between the parallel plates. The experiments were carried out for gels of **2b**, **2d**, **3'a** and **3'd** at 1% (w/v) concentration. The gel samples were placed on parallel plate by spatula in such a way that it covered the surface of the parallel plates. The different tests Dynamic Strain Sweep (DSS) and Dynamic Frequency Sweep (DFS) were performed to characterize the mechanical properties of the gels. DSS experiment were carried out at constant frequency of 1 Hz at temperature 25 °C. The strain value was determined at a point where tan δ = G''/G' (G'' =

loss modulus; G' = storage modulus). Variation of storage modulus (G') was tested within frequency range of 1 Hz to 100 Hz at strain of 0.01% by DFS experiments.

FTIR experiments

FTIR experiments carried out by Perkin Elmer Spectrum Two FTIR spectrometer. Samples for IR experiments in the crystalline states were prepared by crystallization from CH_2Cl_2-Hexane mixtures. For FTIR experiments in the gel state, the benzene gel of each gelator was analysed on a KBr pellet.

Wide Angle X-ray diffraction (WXRD)

The xerogels of the sample were prepared by drying a *p*-xylene gel of each gelator overnight in a vacuum desiccator. The WXRD diffractogram of the samples were recorded on a Proro-AXRD diffractometer. X-rays of wavelength 1.5 Å were used.

UV –Visible Spectroscopy

UV-spectra were measured in a Shimadzu UV-1800 spectrophotometer wavelength range of 200-600 nm using water as a solvent. For every UV-spectra at a regular time take 2 mL of phosphate buffer in cuvettes from every pH and recorded their spectra, after then transfer it in their respective vial.

Preparation of phosphate buffer solution

The phosphate buffer solution of different pH for curcumin release study were prepared as follows. A stock solution of 0.1 M monobasic potassium phosphate (K_2HPO_4) was prepared by dissolving 87.09g in 500 mL deionized water in a volumetric flask and a 0.1 M stock solution of potassium phosphate dibasic (KH_2PO_4) was prepared by dissolving 68.045g in 500 mL deionized water. The stock solutions were mixed in proportions as indicated in Table S15 to provide the buffers of appropriate buffers. Further, the pH of the buffers were confirmed using a pH meter at 25 °C.

Table S15. Preparation of phosphate buffers of different pH.

pH	0.1 (M) K_2HPO_4 (mL)	0.1 (M) KH_2PO_4 (mL)
8.0	9.4	0.6
7.6	8.66	1.34
7.4	8.02	1.98
7.0	6.15	3.85
5.8	0.85 mL	9.15

Physical entrapment of curcumin in gels and curcumin release experiments

A stock solution (20 mL) containing 1 mg curcumin per 1 mL of mustard oil was prepared. Then 2 mL of the curcumin-mustard oil solution was transferred into a sample vial and 10 mg of the gelator was added to it. The solution was warmed to dissolve the gelator. Then the solution was allowed to cool to enable the gel formation. After, 1 h 4 mL of the appropriate phosphate buffer was added to the vial. The release of curcumin from the gel matrix to the buffer was measured at intervals of 1 h by physically removing aliquots of the buffer and subjecting it to UV-Vis spectroscopy. After measuring the UV-Vis absorption, the aliquot was reintroduced into the vial containing the curcumin-mustard oil gel.

Compound characterization data

The characterization data for compounds 1-(phenoxy)-β-D-arabinopyranosides (**2a**), 1-(2-methoxyphenoxy)-β-D-arabinopyranosides (**2b**) and 1-(3-methoxyphenoxy)-β-D-arabinopyranosides (**2c**) were previously reported.[1]

1-(4-methoxyphenoxy)-β-D-arabinopyranosides (2d): It was synthesized following the general method-A and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(4-methoxyphenoxy)-β-D-arabinopyranosides (**2d**, 2.25 g; 47%) from compound **1a** (over three steps). m.p. 150 – 152°C $[\alpha]_D^{30}$ = 4.321 (*c* = 0.632 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO in $CDCl_3$) δ (ppm) 7.00 – 6.95 (m, 2H), 6.86 – 6.82 (m, 2H), 5.21 (d, *J* = 4.9 Hz, 1H), 4.78 (d, *J* = 5.6 Hz, 1H), 4.70 (d, *J* = 6.9 Hz, 1H), 4.63 (d, *J* = 4.0 Hz, 1H), 3.80 (dd, *J* = 12.1 and 3.0 Hz, 1H), 3.75 (bs, 1H), 3.73 (s, 3H), 3.66 – 3.61 (m, 1H), 3.57 - 3.53 (m, 1H), 3.51 – 3.47 (m, 1H); ^{13}C NMR (100 MHz, d6-DMSO in $CDCl_3$) δ (ppm) 154.3, 151.1, 117.8(2C), 114.2(2C), 102, 72.5, 70.4, 67.5, 65**.5, 55.2;** HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0856.

1-(phenoxy)-β-D-xylopyranosides (3a): It was synthesized following the general method-A and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-β-D-xylopyranosides (**3a**, 1.91 g; 45%) from compound **1b** (over three steps). m.p. 167 – 169°C $[\alpha]_D^{25}$ = – 35.051 (*c* = 0.533 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.31 – 7.27 (m, 2H), 7.01 – 6.98 (m, 3H), 5.36 (d, *J* = 4.8 Hz, 1H), 5.15 (d, *J* = 4.0 Hz, 1H), 5.10 (d, *J* = 4.8 Hz, 1H), 4.86 (d, *J* = 7.2 Hz, 1H), 3.75 (dd, *J* = 11.0 and 4.8 Hz, 1H), 3.38 – 3.36 (m, 1H), 3.29 – 3.24 (m, 3H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 157.6, 129.9(2C), 122.3, 116.7(2C), 101.3, 76.9, 73.5, 69.**8, 66.1;** HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M + Na)^+$ 249.0739; found 249.0658.

1-(2-methoxyphenoxy)-β-D-xylopyranosides (3b): It was synthesized following the general method-A and purified by column chromatography (9% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-β-D-xylopyranosides (**3b**, 2.11 g; 50%) from compound **1b** (over three steps). m.p. 165 – 167°C $[\alpha]_D^{25}$ = – 51.418 (*c* = 0.732 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.04 – 7.02 (m, 1H), 6.99 – 6.93 (m, 2H), 6.88 – 6.84 (m, 1H), 5.33 (d, *J* = 4.8 Hz, 1H), 5.16 – 5.13 (m, 2H), 4.88 (d, *J* = 6.9 Hz, 1H), 3.74 – 3.70 (m, 4H), 3.36 (bs, 1H), 3.29 – 3.18 (m, 3H); ^{13}C NMR (100 MHz,

d6-DMSO) δ (ppm) 149.5, 146.3, 122.6, 120.9, 116.3, 112.9, 101.1, 76.7, 73.2, 69.6, 65.8, 55.8.; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0851.

1-(3-methoxyphenoxy)-β-D-xylopyranosides (3c): It was synthesized following the general method-A and purified by column chromatography (9% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-β-D-xylopyranosides (**3c**, 1.52 g; 36%) from compound **1b** (over three steps). m.p. 161 – 163°C $[\alpha]_D^{25}$ = – 63.371 (*c* = 0.433 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.25 – 7.21 (m, 1H), 6.65 – 6.59 (m, 3H), 5.36 (bs, 1H), 5.15 – 5.11 (m, 2H), 4.89 (t, *J* = 6.8 Hz, 1H), 3.80 – 3.76 (m, 5H), 3.32 (d, *J* = 10.8 Hz, 1H), 3.28 – 3.26 (m, 2H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 160.3, 158.3, 129.8, 108.4, 107.4, 102.6, 100.8, 76.4, 73, 69.3, 65.6, 55; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0853.

1-(4-methoxyphenoxy)-β-D-xylopyranosides (3d): It was synthesized following the general method-A and purified by column chromatography (9% MeOH/$CHCl_3$) to afford white solid 1-(4-methoxyphenoxy)-β-D-xylopyranosides (**3d**, 2.05 g; 49%) from compound **1b** (over three steps). m.p. 171 – 173°C $[\alpha]_D^{25}$ = – 78.926 (*c* = 0.524 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.01 – 6.97 (m, 2H), 6.91 – 6.87 (m, 2H), 5.35 (bs, 1H), 5.13 – 5.09 (m, 2H), 4.75 (t, *J* = 3.7 Hz, 1H), 3.79 – 3.74 (m, 5H), 3.28 – 3.21 (m, 3H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 154.3, 151.1, 117.8(2C), 114.4(2C), 102.1, 76.4, 73.1, 69.4, 65.6, 55.3; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0848.

1-(phenoxy)-β-D-lyxopyranosides (4a): It was synthesized following the general method-A and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-β-D-lyxopyranosides (**4a**, 1.30 g; 31%) from compound **1c** (over three steps). m.p. 129 – 131°C $[\alpha]_D^{25}$ = 58.909 (*c* = 0.466 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.31 – 7.28 (m, 2H), 7.03 – 6.97 (m, 3H), 5.32 (d, *J* = 2.4 Hz, 1H), 5.09 (d, *J* = 4.8 Hz, 1H), 4.95 (bs, 1H), 4.92 (d, *J* = 3.2 Hz, 1H), 3.85 – 3.62 (m, 4H), 3.37 (d, *J* = 6.8 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 156.8, 129.9(2C), 122.3, 116.9(2C), 99, 71.5, 69.7, 67.3, 64.5; HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M + Na)^+$ 249.0739; found 249.0667.

1-(2-methoxyphenoxy)-β-D-lyxopyranosides (4b): It was synthesized following the general method-A and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-β-D-lyxopyranosides (**4b**, 1.25 g; 26%) from compound **1c** (over three steps). m.p. 133 – 135°C $[\alpha]_D^{25}$ = 53.732 (*c* = 0.400 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.05 – 7.03 (m, 1H), 7.00 – 6.94 (m, 2H), 6.87 – 6.83 (m, 1H), 5.25 (d, *J* = 2.0 Hz, 1H), 5.02 (d, *J* = 4.8 Hz, 1H), 4.91 (d, *J* = 4.0 Hz, 1H), 4.84 (d, *J* = 4.0 Hz, 1H), 3.82 (bs, 1H), 3.75 (s, 3H), 3.65 (m, 2H), 3.54 (dd, *J* = 12.2 and 4.0 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 150.5, 145.7, 123.3, 121.1, 118.2, 113.2, 100, 71.4, 70.2, 66.8, 64.3, 56.1; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0853.

1-(3-methoxyphenoxy)-β-D-lyxopyranosides (4c): It was synthesized following the general method-A and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-β-D-lyxopyranosides (**4c**, 1.11 g; 23%) from compound **1c** (over three steps).

m.p. 137 – 139°C $[\alpha]_D^{25}$ = 55.782 (*c* = 0.333 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.19 – 7.15 (m, 1H), 6.60 – 6.55 (m, 3H), 5.29 (d, *J* = 3.2 Hz, 1H), 5.07 (d, *J* = 4.8 Hz, 1H), 4.94 (d, *J* = 2.8 Hz, 1H), 4.89 (d, *J* = 4.4 Hz, 1H), 3.77 (bs, 1H), 3.70 (s, 3H), 3.65 – 3.60 (m, 3H), 3.33 (dd, *J* = 9.6 and 8.0 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 160.8, 158, 130.5, 108.9, 108, 103.1, 99, 71.5, 69.7, 67.3, 64.5, 55.6; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0851.

1-(4-methoxyphenoxy)-β-D-lyxopyranosides (4d): It was synthesized following the general method-A and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(4-methoxyphenoxy)-β-D-lyxopyranosides (**4d**, 1.05 g; 43%) from compound **1c** (over three steps). m.p. 132 – 134°C $[\alpha]_D^{25}$ = 78.911 (*c* = 0.533 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 6.95 – 6.92 (m, 2H), 6.85 – 6.82 (m, 2H), 5.16 (d, *J* = 3.2 Hz, 1H), 5.03 (d, *J* = 4.8 Hz, 1H), 4.92 (d, *J* = 4.4 Hz, 1H), 4.86 (d, *J* = 4.8 Hz, 1H), 3.76 (dd, *J* = 3.7 and 3.2 Hz, 1H), 3.67 (s, 3H), 3.64 – 3.51 (m, 3H), 3.37 – 3.32 (m, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 154.6, 150.7, 118.3(2C), 115(2C), 100, 71.5, 69.8, 67.3, 64.4, 55.8; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0853.

1-(phenoxy)-β-D-ribopyranosides (5a): It was synthesized following the general method-B and purified by column chromatography (5% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-β-D-ribopyranosides (**5a**, 0.82 g; 77%) from compound **1d** (over two steps). m.p. 123 – 125°C $[\alpha]_D^{25}$ = – 104.964 (*c* = 0.40 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.32 – 7.28 (m, 2H), 7.04 – 6.98 (m, 3H), 5.29 (d, *J* = 5.2 Hz, 1H), 5.24 (d, *J* = 2.8 Hz, 1H), 5.00 (d, *J* = 5.6 Hz, 1H), 3.89 – 3.88 (m, 1H), 3.73 – 3.56 (m, 4H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 156.8, 129.6(2C), 122, 116.6, 116.4, 98.6, 70.4, 68.2, 68, 64; HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M +Na)^+$ 249.0739; found 249.0738.

1-(2-methoxyphenoxy)-β-D-ribopyranosides (5b): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-β-D-ribopyranosides (**5b**, 0.95 g; 79%) from compound **1d** (over two steps). m.p. 128 – 130°C $[\alpha]_D^{25}$ = – 108.716 (*c* = 0.266 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.08 – 7.06 (m, 1H), 7.00 – 6.96 (m, 2H), 6.89 – 6.85 (m, 1H), 5.32 (d, *J* = 4 Hz, 1H), 5.15 (d, *J* = 7.6 Hz, 1H), 5.08 (d, *J* = 6 Hz, 1H), 5.01 (d, *J* = 5.2 Hz, 1H), 3.86 – 3.84 (m, 1H), 3.77 – 3.66 (m, 6H), 3.60 (dd, *J* = 12.0 and 6.0 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 150, 145.5, 122.9, 120.7, 117.5, 112.7, 99.6, 70.6, 68.6, 66.8, 64.4, 55.7; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0850.

1-(3-methoxyphenoxy)-β-D-ribopyranosides (5c): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-β-D-ribopyranosides (**5c**, 0.89 g; 74%) from compound **1d** (over two steps). m.p. 127 – 129°C $[\alpha]_D^{25}$ = – 76.474 (*c* = 0.20 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.21 – 7.17 (m, 1H), 6.61 – 6.57 (m, 3H), 5.27 (d, *J* = 4.8 Hz, 1H), 5.17 (d, *J* = 6.8 Hz, 1H), 4.99 (bs, 2H), 3.86 (bs, 1H), 3.72 – 3.56 (m, 7H), 3.28 – 3.26 (m, 2H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 160.4, 158, 130, 108.5, 107.6, 102.7, 98.6, 70.4, 68(2C), 64.1, 55.2; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0856.

1-(4-methoxyphenoxy)-β-D-ribopyranosides (5d): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(4-

methoxyphenoxy)-β-D-ribopyranosides (**5d**, 1,05 g; 88%) from compound **1d** (over two steps). m.p. 131 – 133°C $[\alpha]_D^{25}$ = – 99.576 (*c* = 0.333 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 6.98 – 6.94 (m, 2H), 6.87 – 6.84 (m, 2H), 5.16 – 5.14 (m, 2H), 4.98 – 4.95 (m, 2H), 3.87 – 3.84 (m, 1H), 3.69 -3.53 (m, 7H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 154.4, 150.7, 117.9(2C), 114.5(2C), 99.7, 70.5, 68.1, 68, 64, 55.4; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0862.

1-(phenoxy)-α-D-arabinopyranosides (2'a): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-α-D-arabinopyranosides (**2'a**, 0.91 g; 86%) from compound **1a** (over two steps). m.p. 136 – 138°C $[\alpha]_D^{25}$ = – 101.616 (*c* = 0.266 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.31 – 7.27 (m, 2H), 7.05 – 6.96 (m, 3H), 5.45 (d, *J* = 2.4 Hz, 1H), 4.97 (d, *J* = 5.2 Hz, 1H), 4.79 (d, *J* = 5.2 Hz, 1H), 4.70 (d, *J* = 3.6 Hz, 1H), 3.80 – 3.78 (bs, 3H), 3.70 (d, *J* = 12.0 Hz, 1H), 3.51 (dd, *J* = 12.0 and 2.4 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 157.5, 129.9(2C), 122.1, 117.1(2C), 98.5, 69.3, 68.7, 68.6, 64.4; HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M + Na)^+$ 249.0739; found 249.0738.

1-(2-methoxyphenoxy)-α-D-arabinopyranosides (2'b): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-α-D-arabinopyranosides (**2'b**, 0.95 g; 79%) from compound **1a** (over two steps). m.p. 136 – 138°C $[\alpha]_D^{25}$ = – 107.471 (*c* = 0.333 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.01 – 7.08 (m, 1H), 7.00 – 6.94 (m, 2H), 6.89 – 6.85 (m, 1H), 5.44 (d, *J* = 2.4 Hz, 1H), 4.85 (d, *J* = 5.2 Hz, 1H), 4.81 (d, *J* = 4.8 Hz, 1H), 4.65 (d, *J* = 2.8 Hz, 1H), 3.81 – 3.78(m, 7H), 3.47 (dd, *J* = 12.0 and 2.4 Hz, 1H); ^{13}C NMR (100 MHz, $DMSOd_6$) *δ* (ppm) 150.6, 146.6, 123.0, 121.3, 117.8, 113.4, 99.4, 69.2, 68.8, 68.7, 64.6, 56.3; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0858.

1-(3-methoxyphenoxy)-α-D-arabinopyranosides (2'c): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-α-D-arabinopyranosides (**2'c**, 0.85 g; 71%) from compound **1a** (over two steps). m.p. 142 – 144°C $[\alpha]_D^{25}$ = – 119.239 (*c* = 0.133 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.20 – 7.16 (m, 1H), 6.64 – 6.56 (m, 3H), 5.44 (s, 1H), 4.95 (bs, 1H), 4.82 – 4.77(m, 1H), 4.69 (bs, 1H), 3.78 (s, 3H), 3.74 – 3.67 (m, 4H), 3.50 (dd, *J* = 11.6 and 1.6 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 160.7, 158.7, 130.3, 109.2, 107.8, 103.2, 98.5, 69.3, 68.7, 68.6, 64.5, 55.5; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0856.

1-(4-methoxyphenoxy)-α-D-arabinopyranosides (2'd): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(4-methoxyphenoxy)-α-D-arabinopyranosides (**2'd**, 0.98 g; 82%) from compound **1a** (over two steps). m.p. 139 – 141°C $[\alpha]_D^{25}$ = – 121.321 (*c* = 0.266 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.00 – 6.94 (m, 2H), 6.87 – 6.84 (m, 2H), 5.30 (d, *J* = 2.4 Hz, 1H), 4.91 (d, *J* = 6.0 Hz, 1H), 4.74 (d, *J* = 4.8 Hz, 1H), 4.66 (d, *J* = 3.2 Hz, 1H), 3.79 – 3.74 (m, 3H), 3.71 – 3.69 (m, 4H), 3.50 (dd, *J* = 12.0 and 2.0 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 154.7, 151.4, 118.5(2C), 114.9(2C), 99.5, 69.4, 68.8, 68.7, 64.3, 55.8**;** HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0841.

1-(phenoxy)-α-D-xylopyranosides (3'a): It was synthesized following the general method-B and purified by column chromatography (6% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-α-D-xylopyranosides (**3'a**, 0.58 g; 55%) from compound **1b** (over two steps). m.p. 153 – 155°C $[\alpha]_D^{25}$ = 127.887 (*c* = 0.466 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.32 – 7.27 (m, 2H), 7.06 – 6.98 (m, 3H), 5.42 (d, *J* = 3.6 Hz, 1H), 5.13 (bs, 1H), 5.06 (d, *J* = 4.4 Hz, 1H), 5.02 (d, *J* = 4.8 Hz, 1H), 3.60 (td, *J* = 8.8 and 4.8 Hz, 1H), 3.51 (d, *J* = 4.8 Hz, 1H), 3.43 – 3.34 (m, 5H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 157.3, 129.9(2C), 122.3, 117.1(2C), 97.9, 73.7, 72, 70.1, 63.1; HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M + Na)^+$ 249.0739; found 249.0770.

1-(2-methoxyphenoxy)-α-D-xylopyranosides (3'b): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-α-D-xylopyranosides (**3'b**, 0.49 g; 41%) from compound **1b** (over two steps). m.p. 159 – 161°C $[\alpha]_D^{25}$ = 110.401 (*c* = 0.533 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.10 – 7.08 (m, 1H), 7.07 – 6.95 (m, 2H), 6.89 – 6.85 (m, 1H), 5.41 (d, *J* = 3.6 Hz, 1H), 5.07 (d, *J* = 5.2 Hz, 1H), 5.04 – 5.00 (m, 2H), 3.75 (s, 3H), 3.62 – 3.59 (m, 1H), 3.49 – 3.43 (m, 2H), 3.41 – 3.35 (m, 2H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 150.5, 146.4, 123, 121.3, 117.7, 113.5, 98.8, 73.6, 72.2, 70.1, 63.2, 56.3; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0851.

1-(3-methoxyphenoxy)-α-D-xylopyranosides (3'c): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-α-D-xylopyranosides (**3'c**, 0.56 g; 47%) from compound **1b** (over two steps). m.p. 149 – 151°C $[\alpha]_D^{25}$ = 127.211 (*c* = 0.466 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.21 – 7.17 (m, 1H), 6.64 – 6.56 (m, 3H), 5.40 (d, *J* = 3.6 Hz, 1H), 5.08 (d, *J* = 6.4 Hz, 1H), 4.05 (d, *J* = 4.8 Hz, 1H), 5.00 (d, *J* = 4.8 Hz, 1H), 3.72 (s, 3H), 3.58 – 3.53 (m, 1H), 3.50 – 3.48 (m, 1H), 3.39 – 3.31 (m, 3H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 160.8, 158.5, 130.4, 109.2, 108, 103.2, 97.9, 73.7, 72, 70.1, 63.1, 55.6; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0854.

1-(4-methoxyphenoxy)-α-D-xylopyranosides (3'd): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(4-methoxyphenoxy)-α-D-xylopyranosides (**3'd**, 0.72 g; 60%) from compound **1b** (over two steps). m.p. 156 – 158°C $[\alpha]_D^{25}$ = 138.226 (*c* = 0.733 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 6.94 – 6.92 (m, 2H), 6.74 – 6.72 (m, 2H), 5.23 (d, *J* = 3.0 Hz, 1H), 4.84 (bs, 1H), 4.75 – 4.73 (m, 2H), 3.67 – 3.66 (m, 4H), 3.53 – 3.44 (m, 4H); ^{13}C NMR (100 MHz, d6-DMSO) *δ* (ppm) 154.6, 151, 118.3(2C), 114.4(2C), 98.8, 73.8, 71.9, 70, 62.7, 55.4; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0863.

1-(phenoxy)-α-D-lyxopyranosides (4'a): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(phenoxy)-α-D-lyxopyranosides (**4'a**, 0.82 g; 77%) from compound **1c** (over two steps). m.p. 144 – 146°C $[\alpha]_D^{25}$ = 56.981 (*c* = 0.533 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) *δ* (ppm) 7.32 – 7.27 (m, 2H), 7.03 – 6.97 (m, 3H), 5.32 (d, *J* = 3.6 Hz, 1H), 5.08 (d, *J* = 5.2 Hz, 1H), 4.95 (d, *J* = 4.4 Hz, 1H), 4.90 (d, *J* = 4.8 Hz, 1H), 3.80 (dd, *J* = 4.0 and 3.6 Hz, 1H) 3.70 – 3.61 (m, 3H), 3.36 (dd, *J* = 10.2 and 7.6 Hz, 1H); ^{13}C NMR

(100 MHz, d6-DMSO) δ (ppm) 156.8, 130(2C), 122.3, 116.9(2C), 99.0, 71.5, 69.7, 67.3, 64.5; HRMS calcd. for $C_{11}H_{14}O_5Na^+$ $(M + Na)^+$ 249.0739; found 249.0742.

1-(2-methoxyphenoxy)-α-D-lyxopyranosides (4'b): It was synthesized following the general method-B and purified by column chromatography (7% MeOH/$CHCl_3$) to afford white solid 1-(2-methoxyphenoxy)-α-D-lyxopyranosides (**4'b**, 0.91 g; 76%) from compound **1c** (over two steps). m.p. 145 – 147°C $[\alpha]_D^{25}$ = 13.795 (*c* = 0.333 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.07 – 6.96 (m, 3H), 6.89 – 6.84 (m, 1H), 5.28 (d, *J* = 2.8 Hz, 1H), 5.04(d, *J* = 4.8 Hz, 1H), 4.93 (d, *J* = 4.0 Hz, 1H), 4.87 (d, *J* = 4.4 Hz, 1H), 3.85 (t, *J* = 2.0 Hz, 1H), 3.68(m, 2H), 3.57(dd, *J* = 11.0 and 3.2 Hz, 1H), 3.42 (s, 3H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 150.5, 145.7, 123.3, 121.1, 118.2, 113.2, 100, 71.4, 70.1, 66.9, 64.3, 56.1; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0851.

1-(3-methoxyphenoxy)-α-D-lyxopyranosides (4'c): It was synthesized following the general method-B and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid 1-(3-methoxyphenoxy)-α-D-lyxopyranosides (**4'c**, 0.82 g; 68%) from compound **1c** (over two steps). m.p. 140 – 142°C $[\alpha]_D^{25}$ = 59.646 (*c* = 0.600 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 7.21 – 7.17 (m, 1H), 6.62 – 6.57 (m, 3H), 5.31 (d, *J* = 3.6 Hz, 1H), 3.79 – 3.72 (m, 1H), 3.68 – 3.62 (m, 8H), 3.35 (dd, *J* = 9.0 and 7.6 Hz, 1H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 160.8, 158, 130.5, 108.9, 108, 103.1, 99, 71.5, 69.7, 67.3, 64.5, 55.6; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0849.

1-(4-methoxyphenoxy)-α-D-lyxopyranosides (4'd): It was synthesized following the general method-B and purified by column chromatography (8% MeOH/$CHCl_3$) to afford white solid **(4'd**, 0.99 g, 83%) from compound **1c** (over two steps). m.p. 149 – 151°C $[\alpha]_D^{25}$ = 95.717 (*c* = 0.40 in MeOH); ^{1}H NMR (400 MHz, d6-DMSO) δ (ppm) 6.97– 6.94 (m, 2H), 6.88 – 6.84 (m, 2H), 5.18 (d, *J* = 3.2 Hz, 1H), 5.05 (d, *J* = 4.8 Hz, 1H), 4.93 – 4.88 (m, 2H), 3.78 (bs, 1H), 3.70 (s, 3H), 3.66 – 3.65 (m, 2H), 3.60 (dd, *J* = 9.4 and 3.6 Hz, 1H), 3.37 – 3.36 (m, 1H); ^{13}C NMR (100 MHz, d6-DMSO) δ (ppm) 154.8, 150.7, 118.3(2C), 115(2C), 100, 71.5, 69.8, 67.3, 64.4, 55.8; HRMS calcd. for $C_{12}H_{16}O_6Na^+$ $(M + Na)^+$ 279.0845; found 279.0851.

Reference

1. N. P. Pathak, Rajkamal and S. Yadav, *Chem. Commun*., 2020, **56**, 2999.
2. S. Escopy, Y. Singh and A. V. Demchenko, *Org. Biomol. Chem*., 2019, **17**, 8379-8383.

1H an 13C- NMR spectra

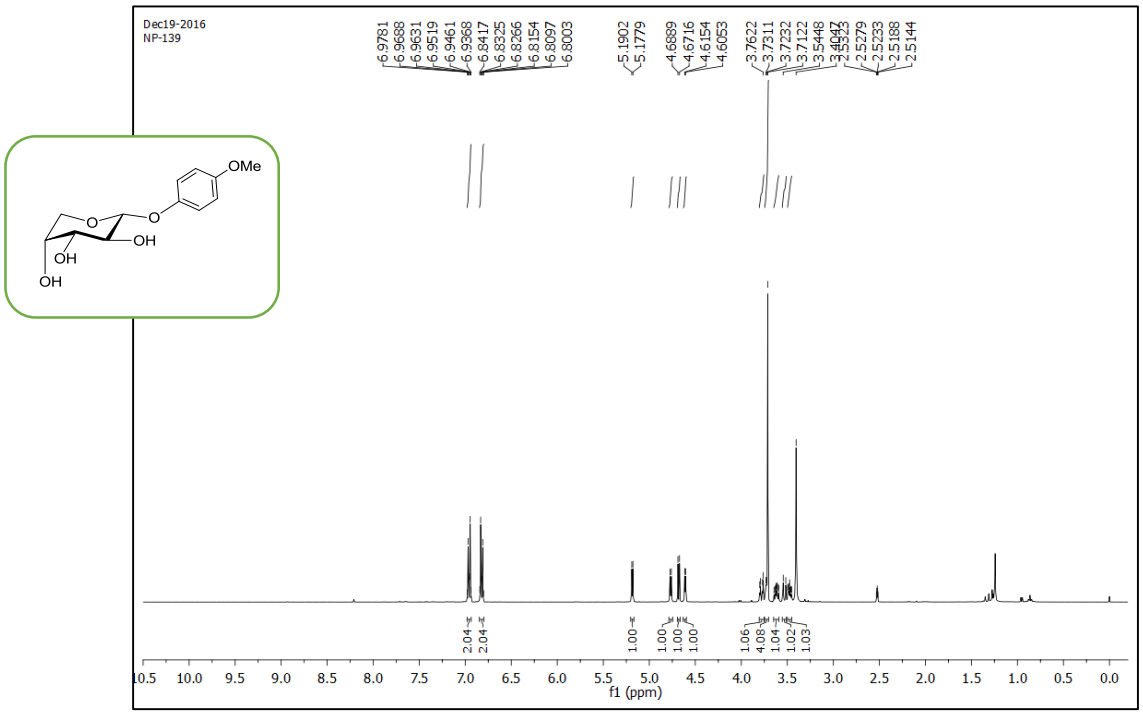

Figure S23. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **2d**.

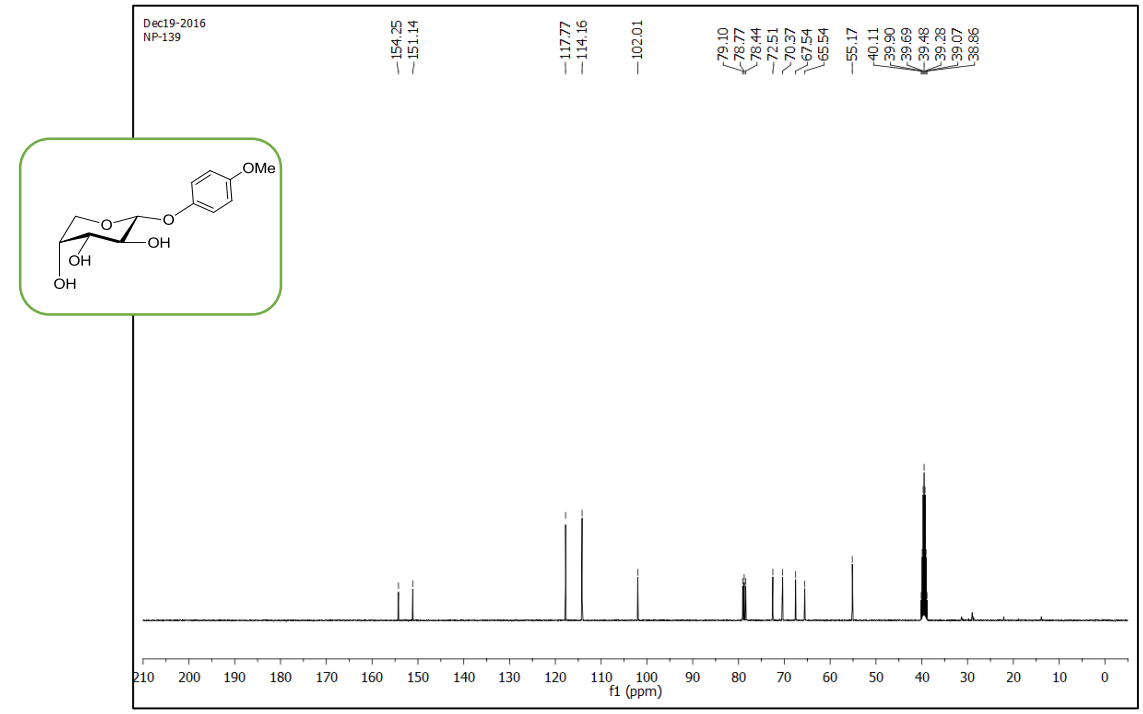

Figure S24. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **2d**.

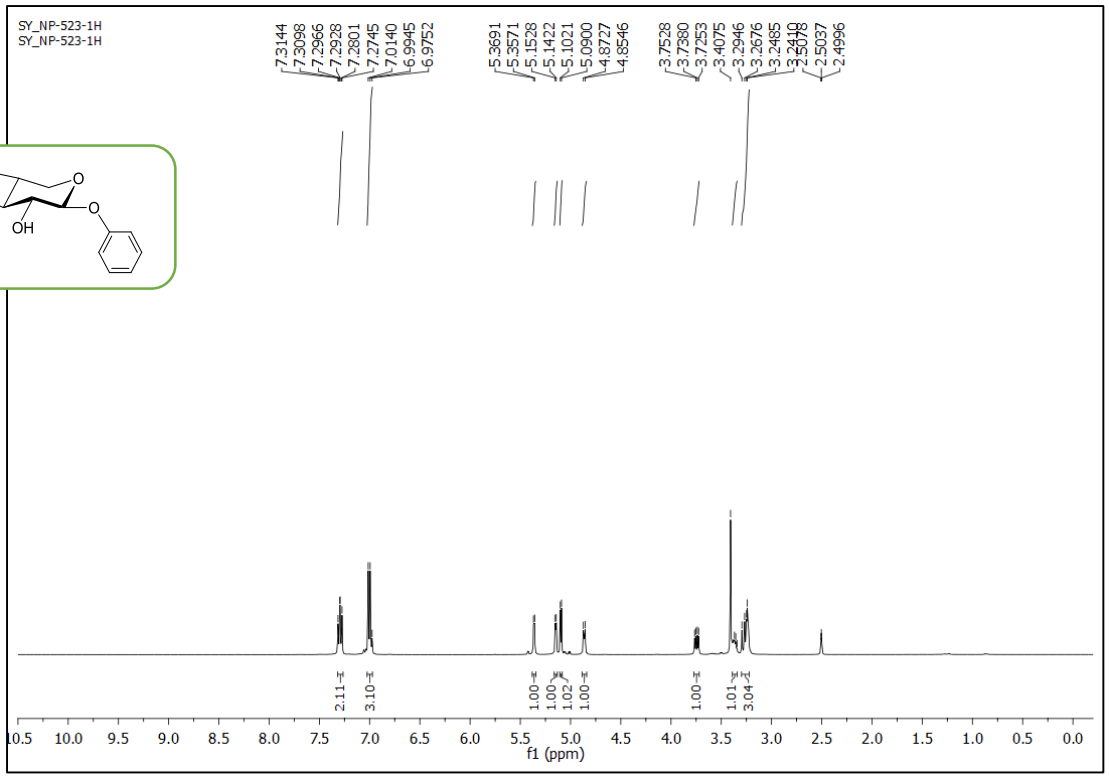

Figure S25. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3a**.

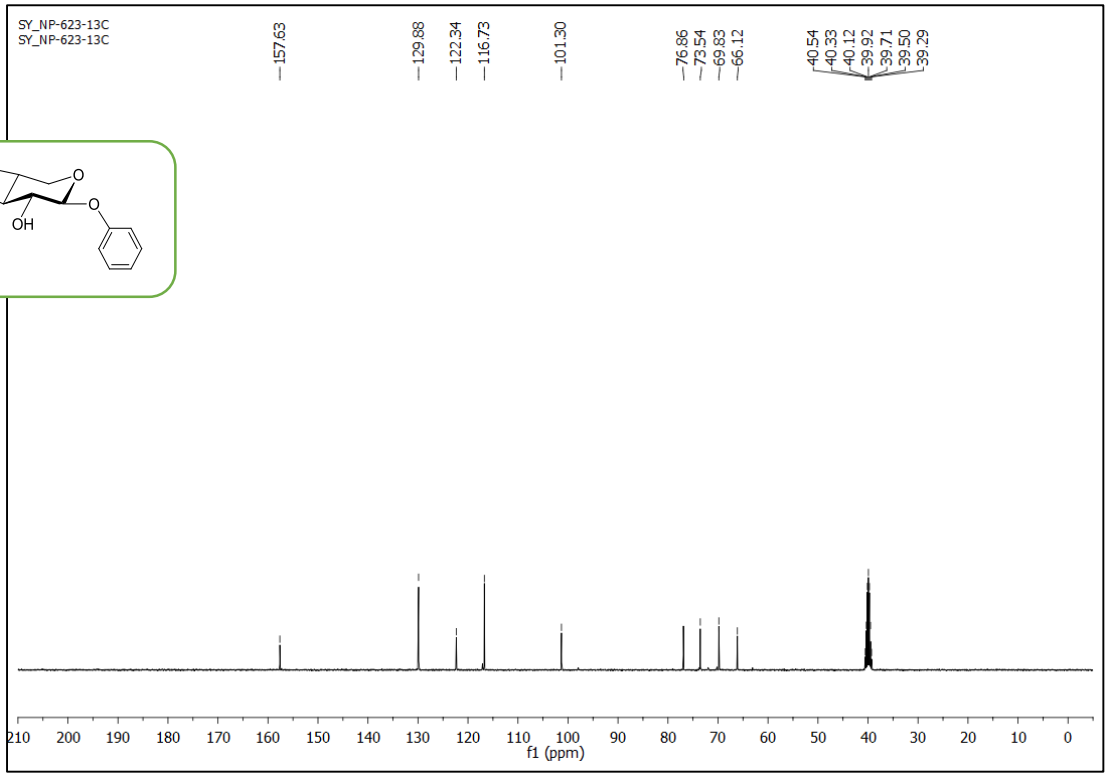

Figure S26. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3a**.

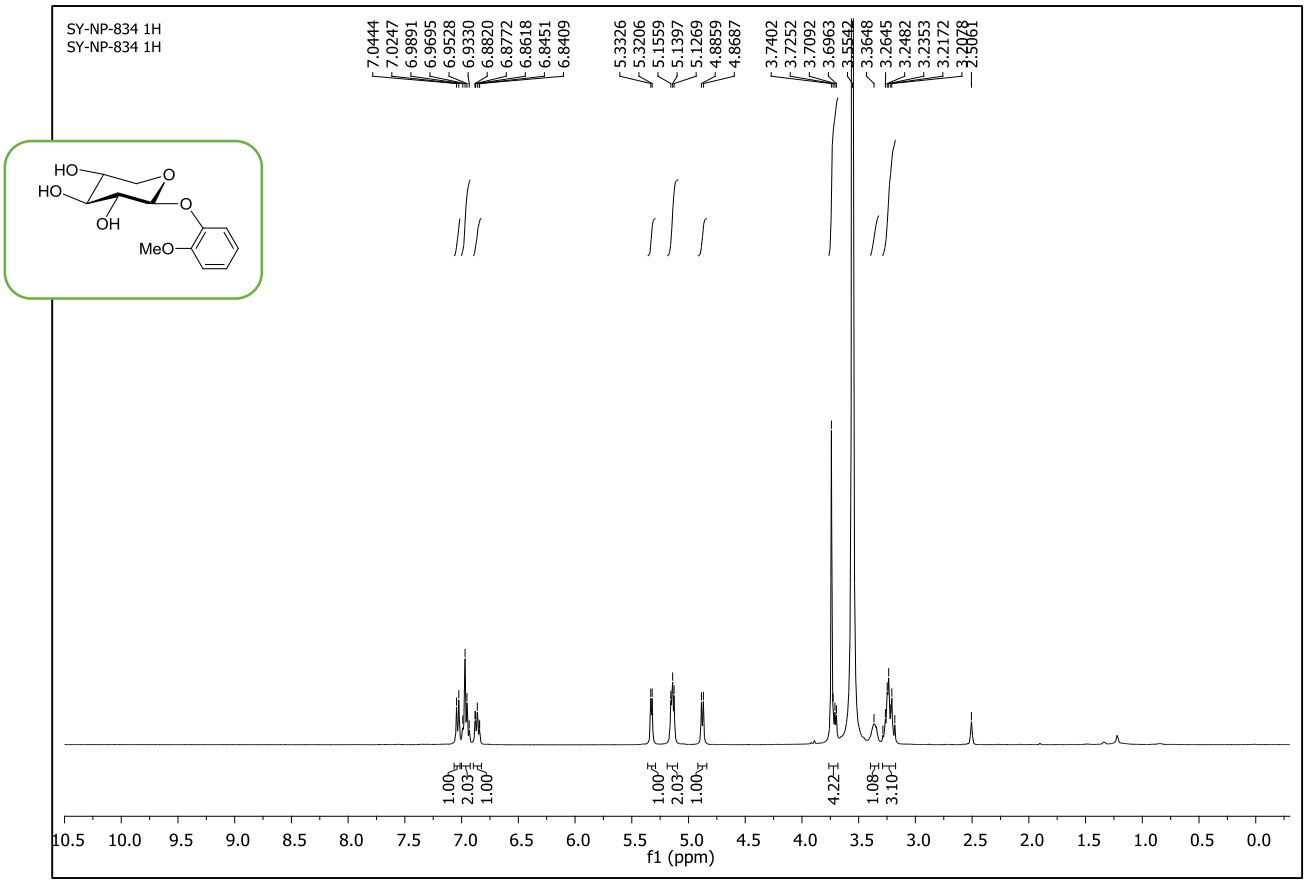

Figure S27. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3b**.

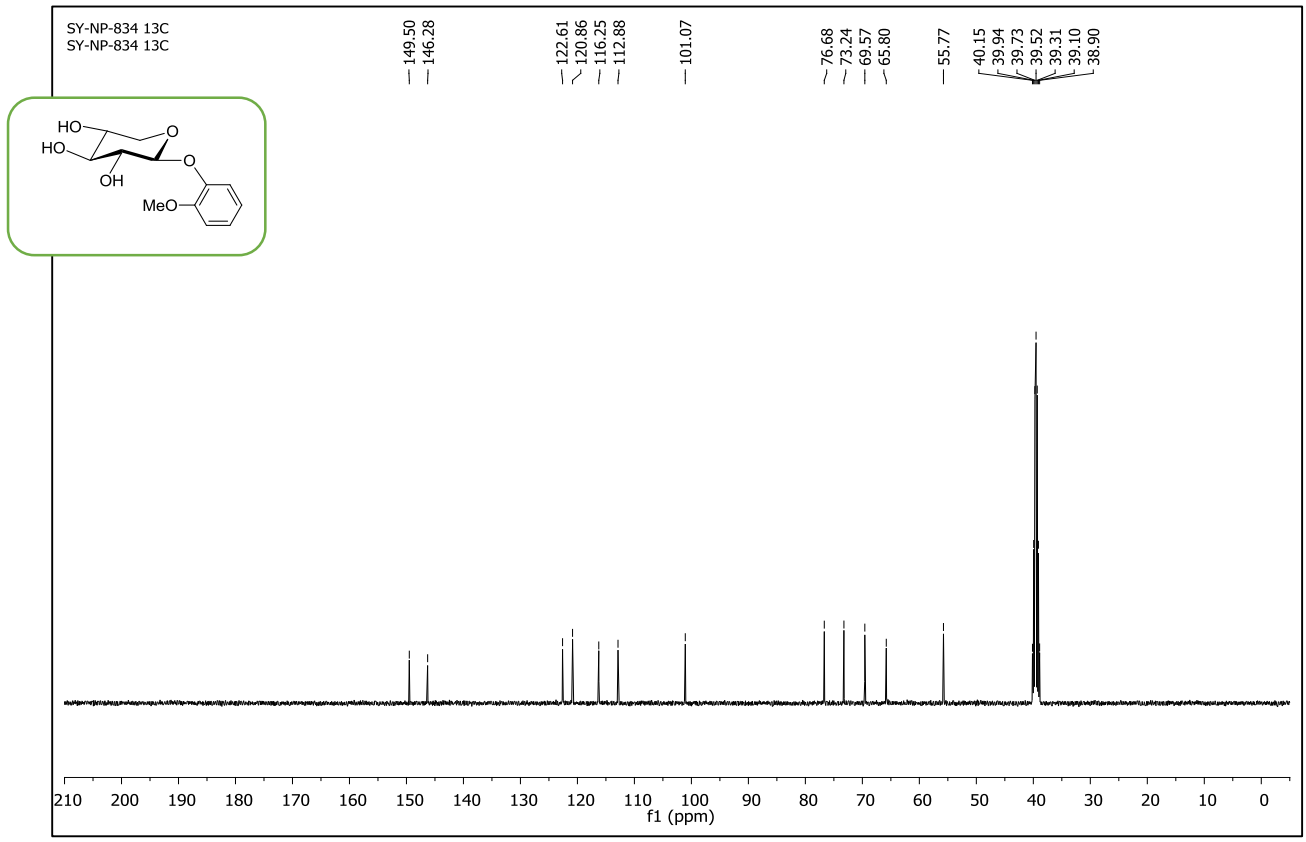

Figure S28. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3b**.

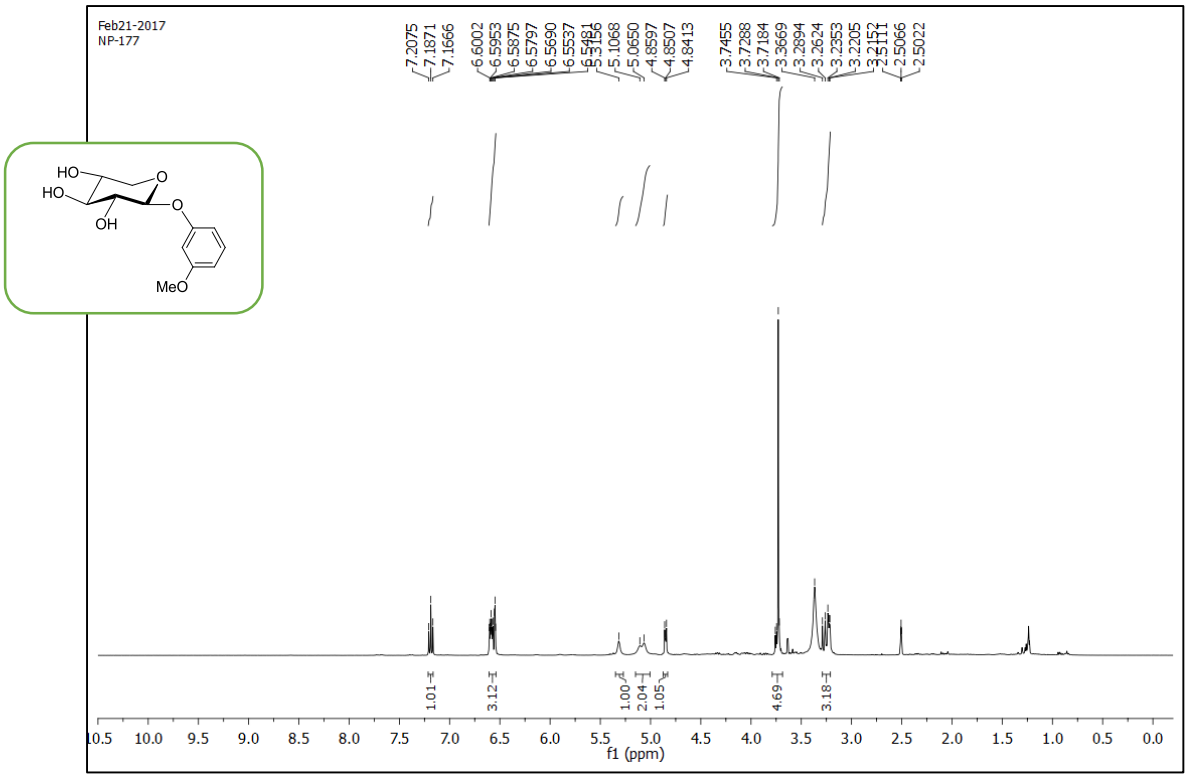

Figure S29. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3c**.

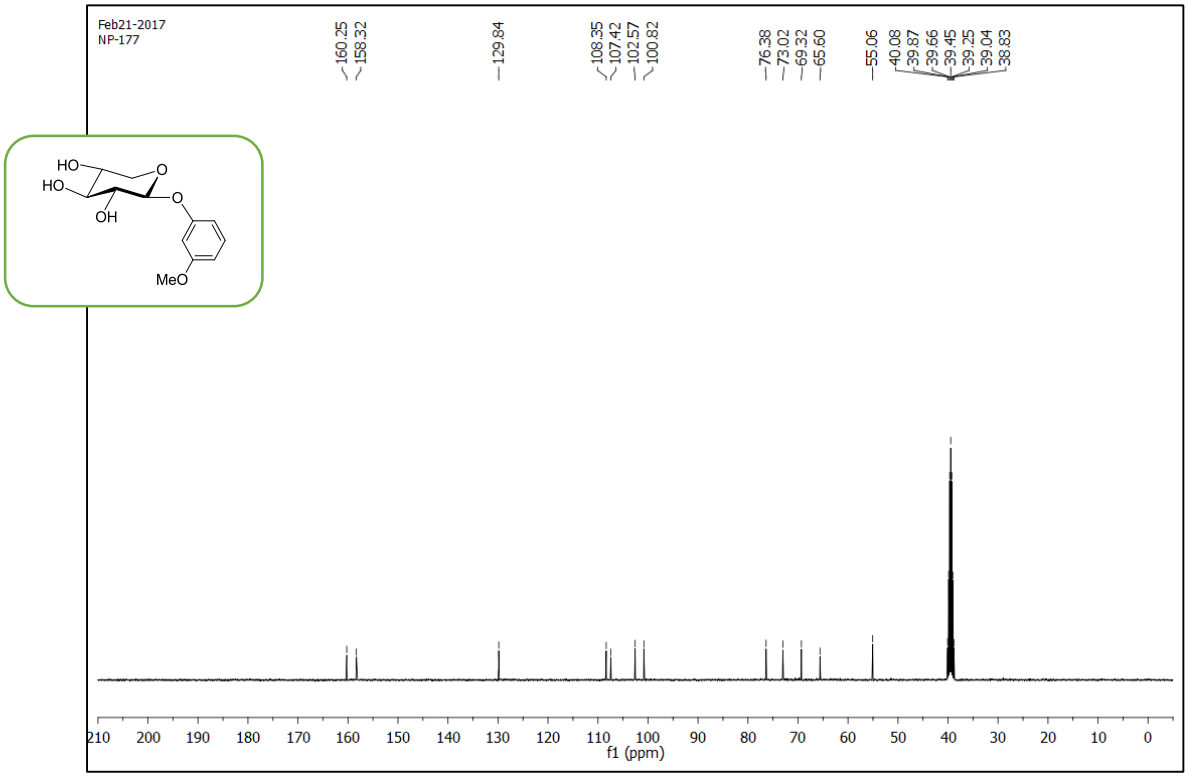

Figure S30. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3c**.

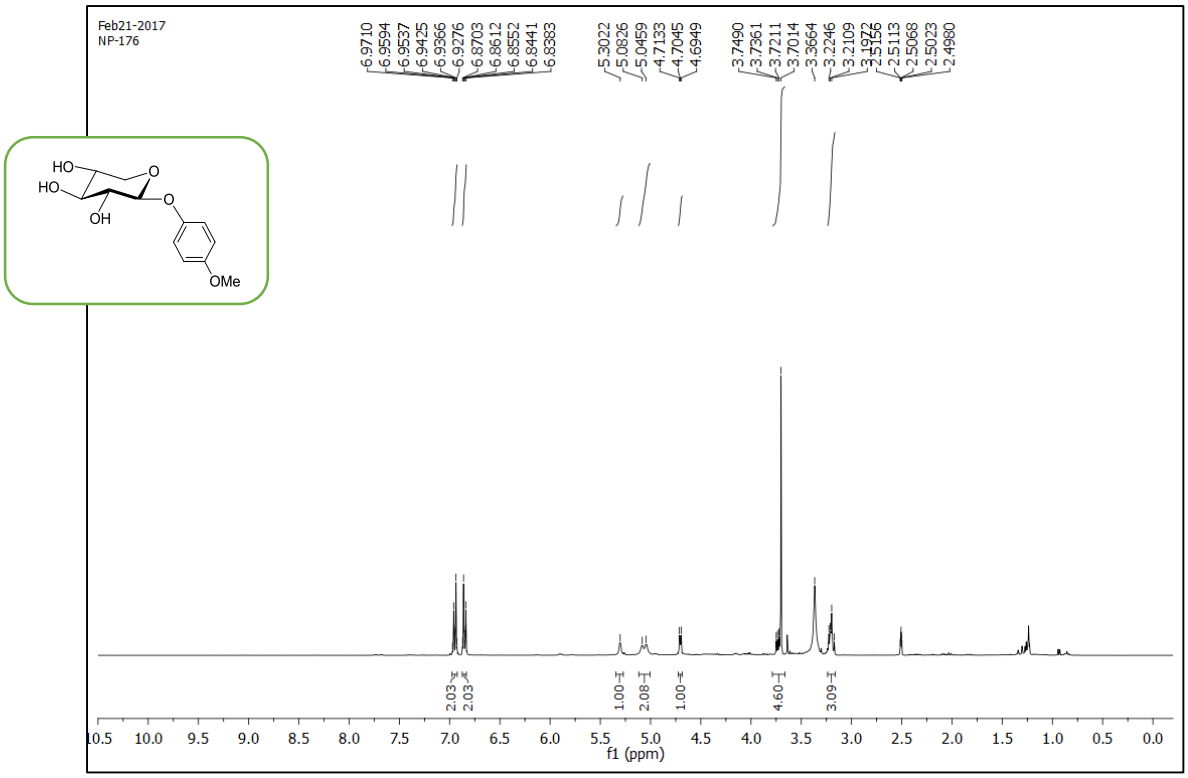

Figure S31. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3d**.

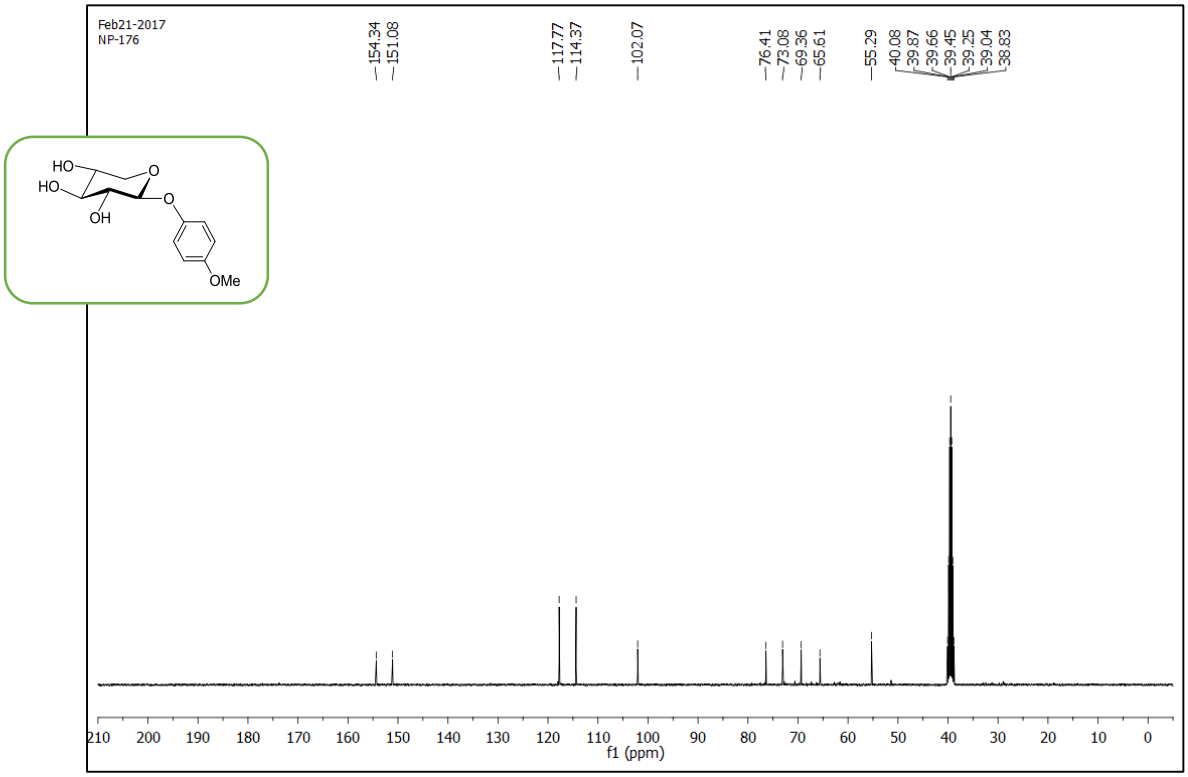

Figure S32. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3d**.

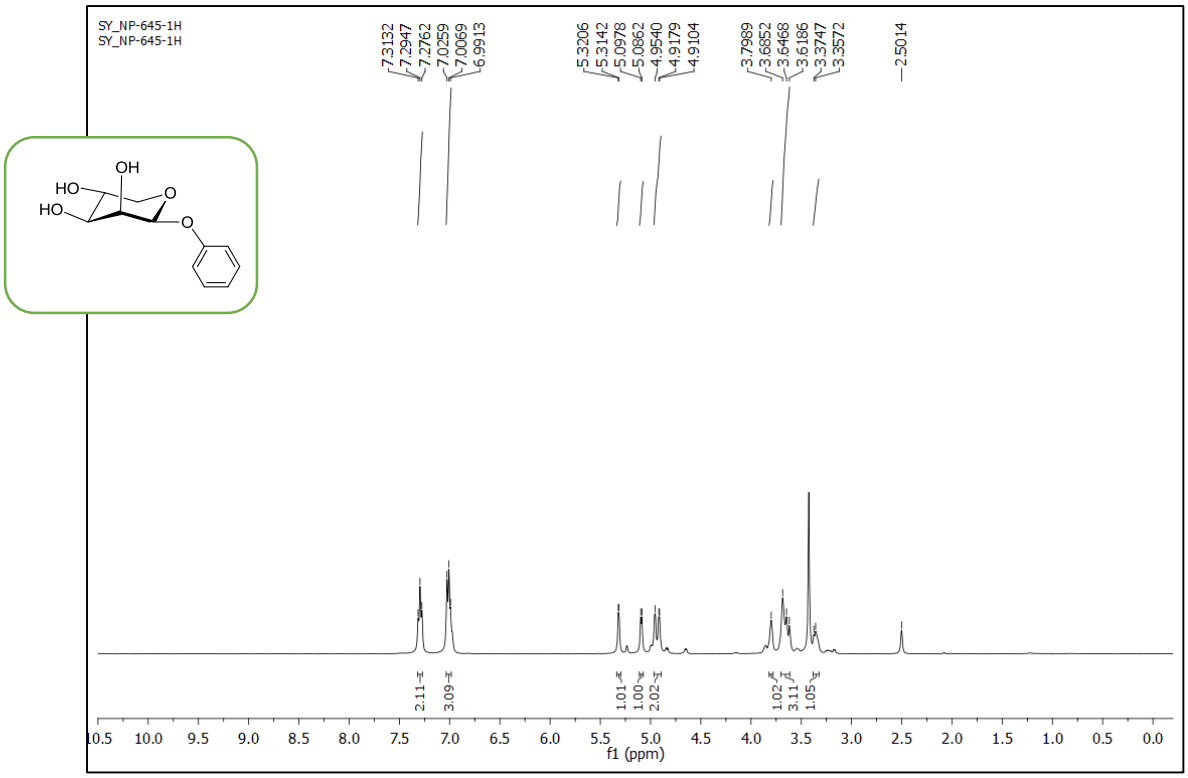

Figure S33. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4a**.

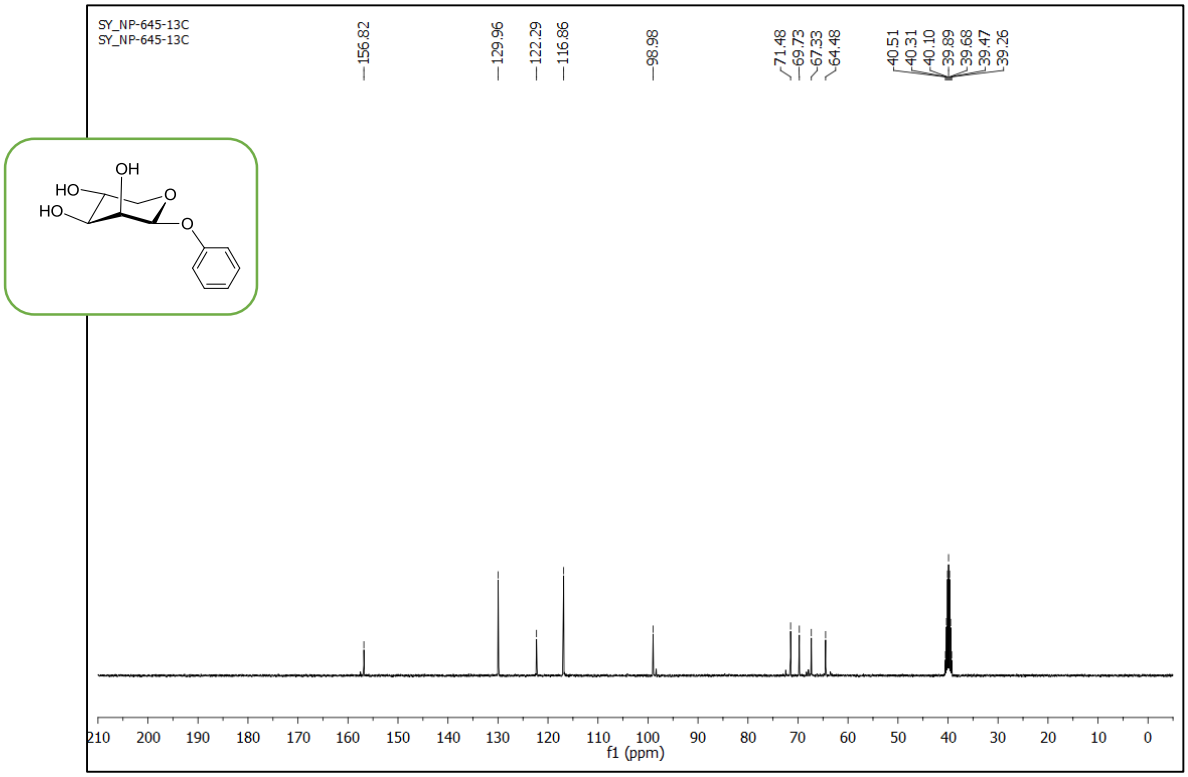

Figure S34. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4a**.

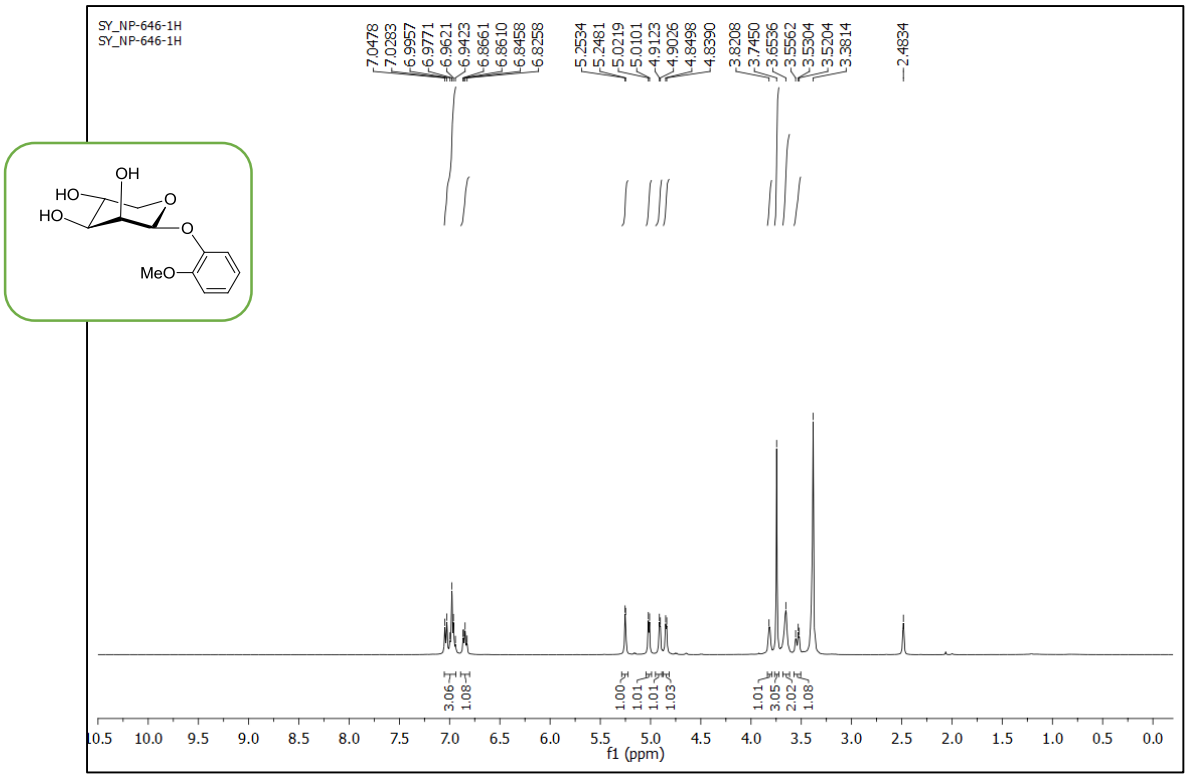

Figure S35. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4b**.

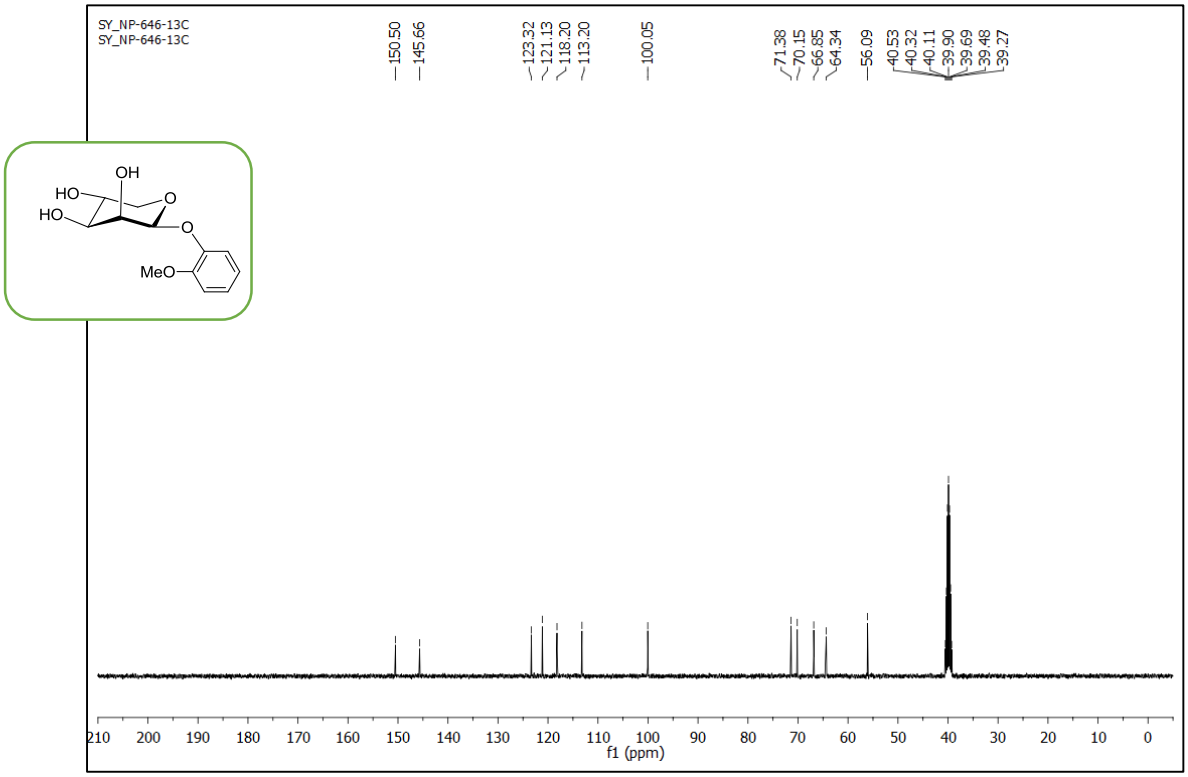

Figure S36. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4b**.

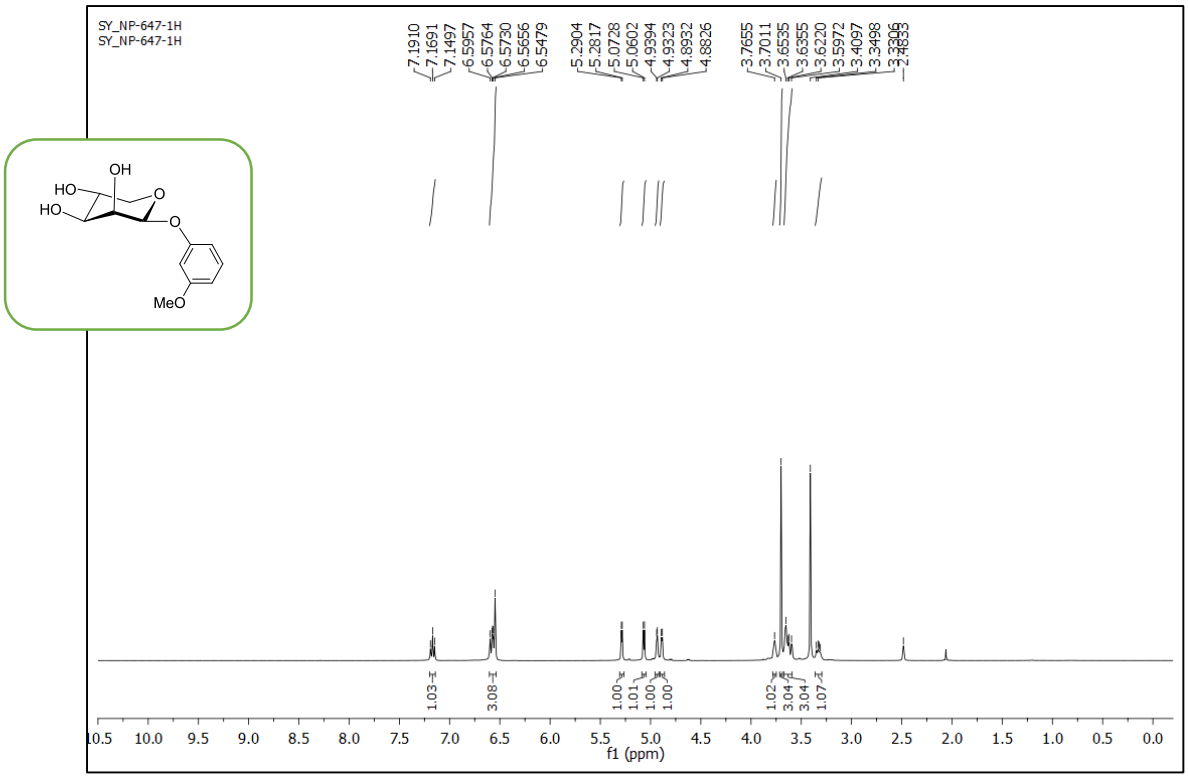

Figure S37. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4c**.

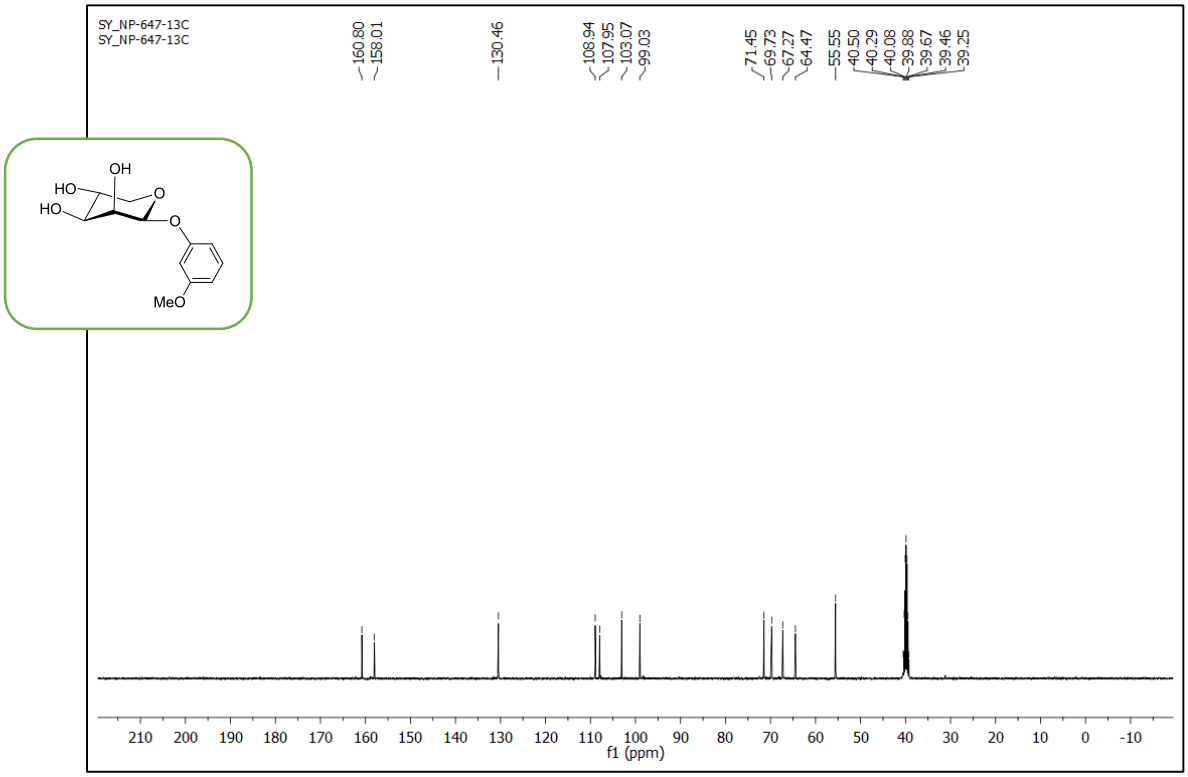

Figure S38. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4c**.

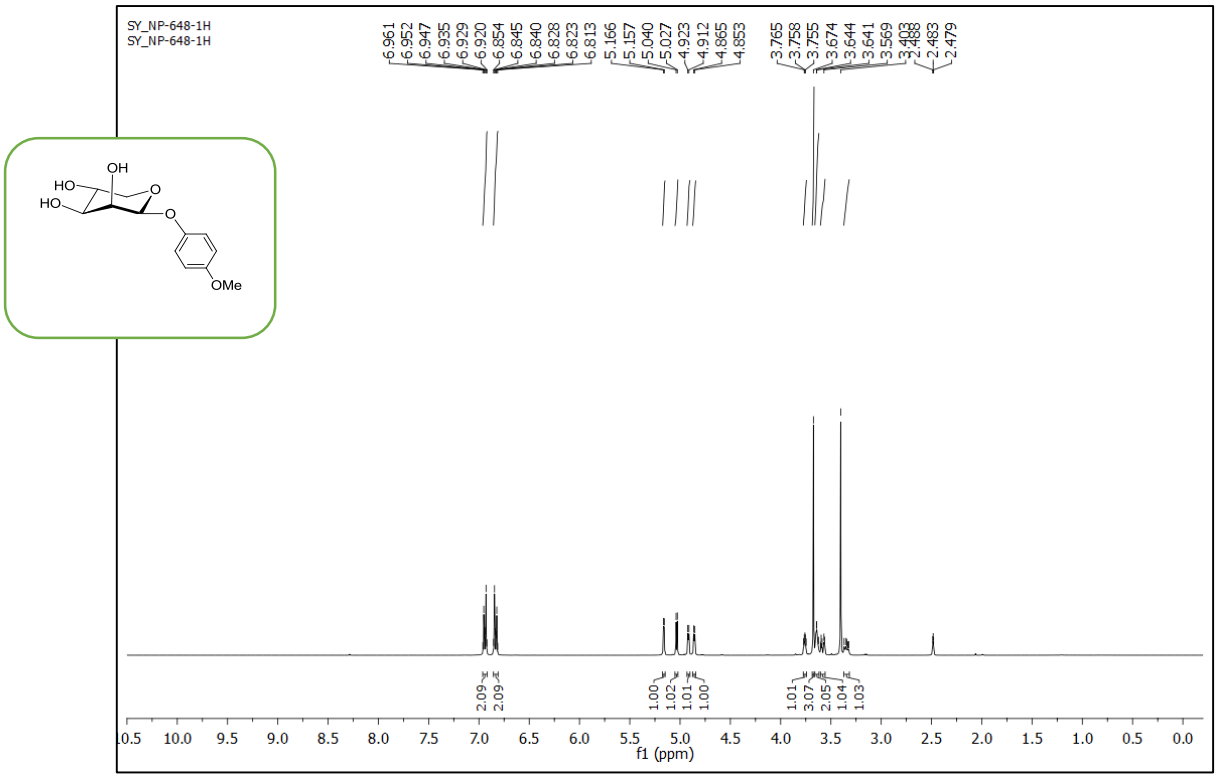

Figure S39. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4d**.

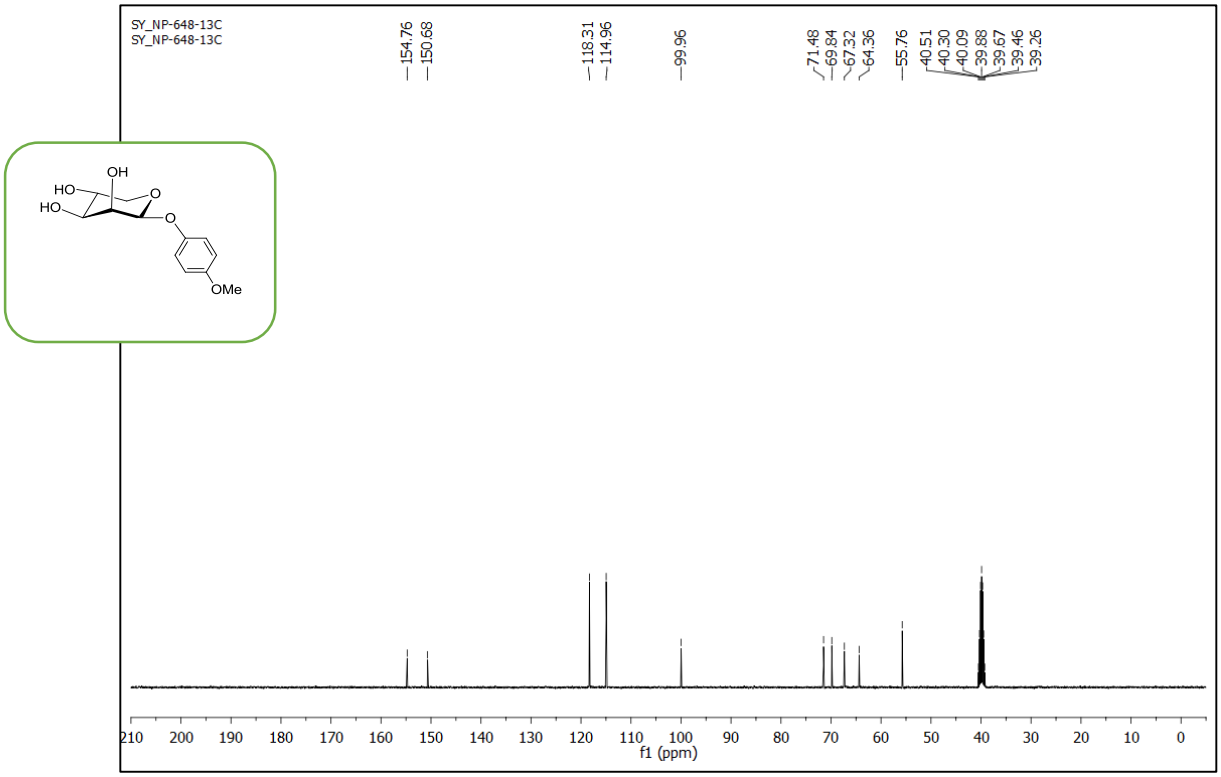

Figure S40. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4d**.

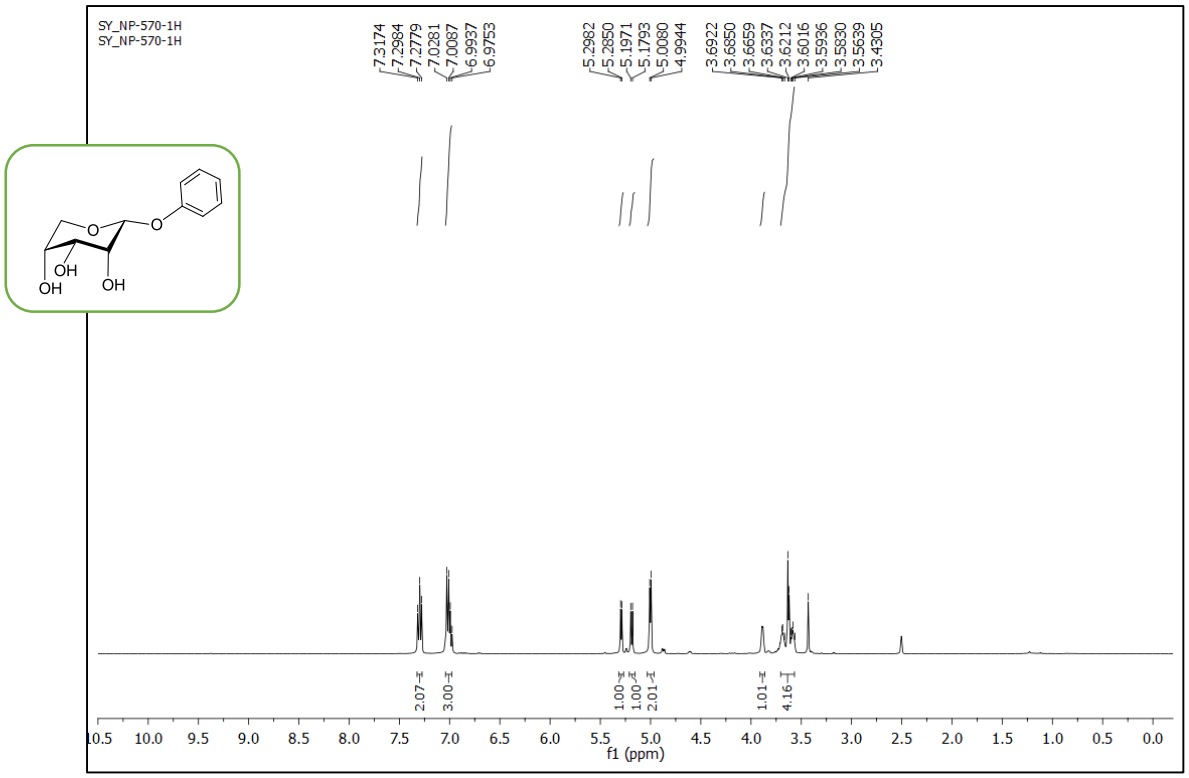

Figure S41. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **5a**.

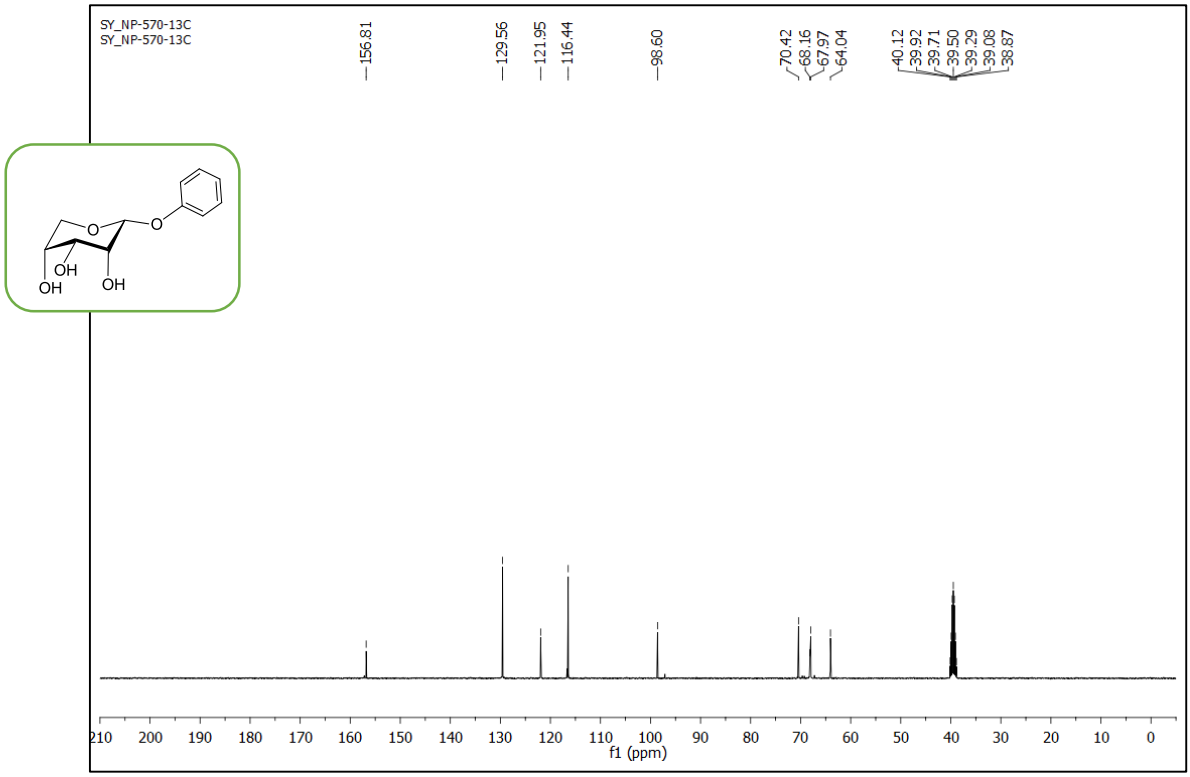

Figure S42. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **5a.**

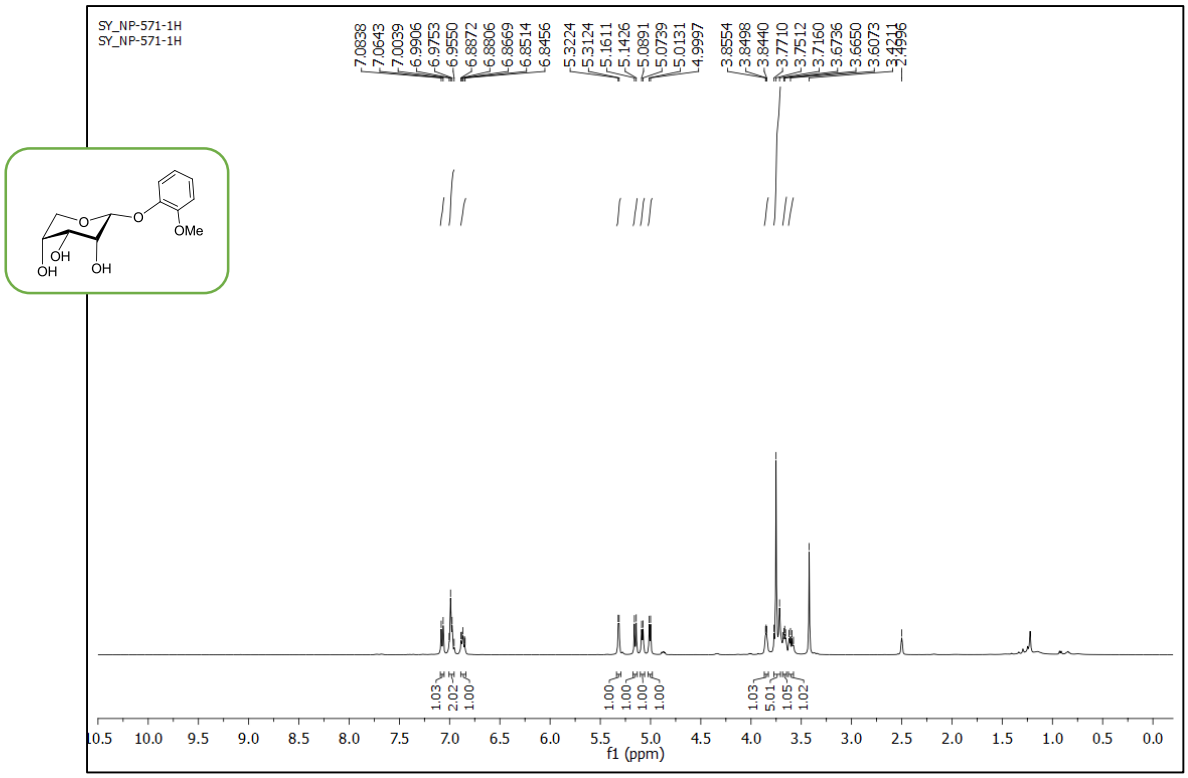

Figure S43. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **5b**.

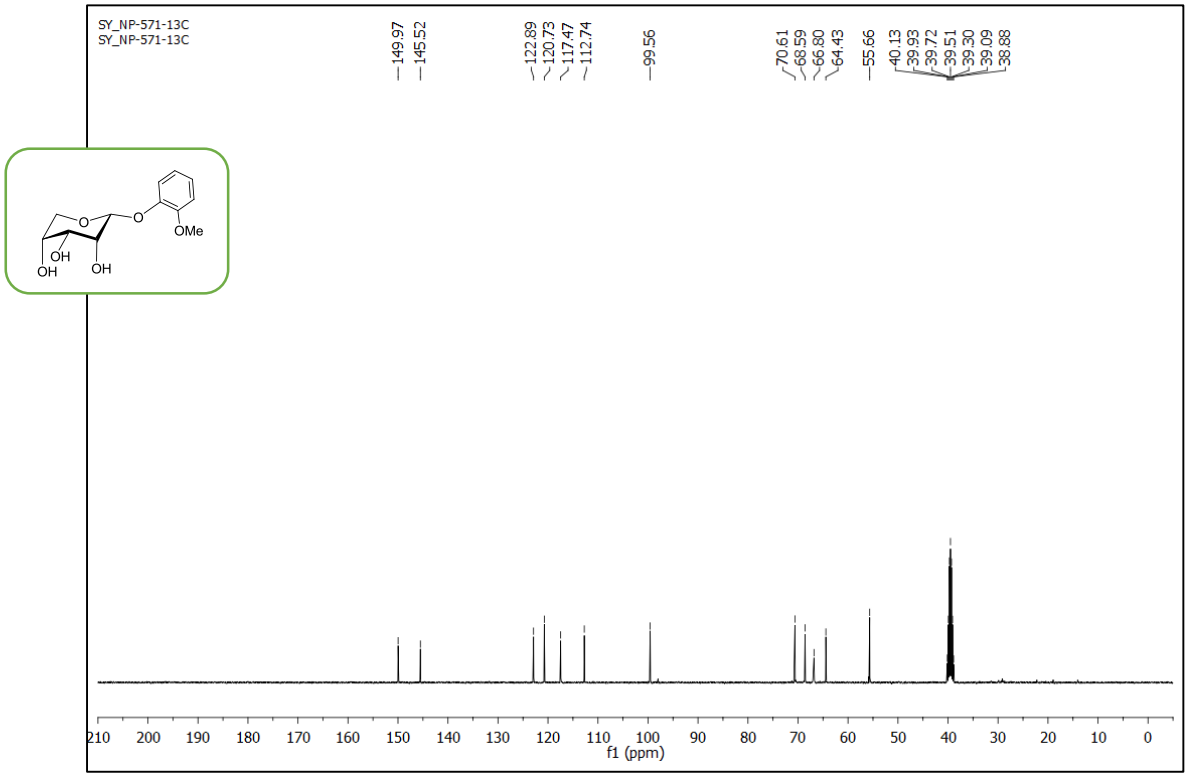

Figure S44. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **5b**.

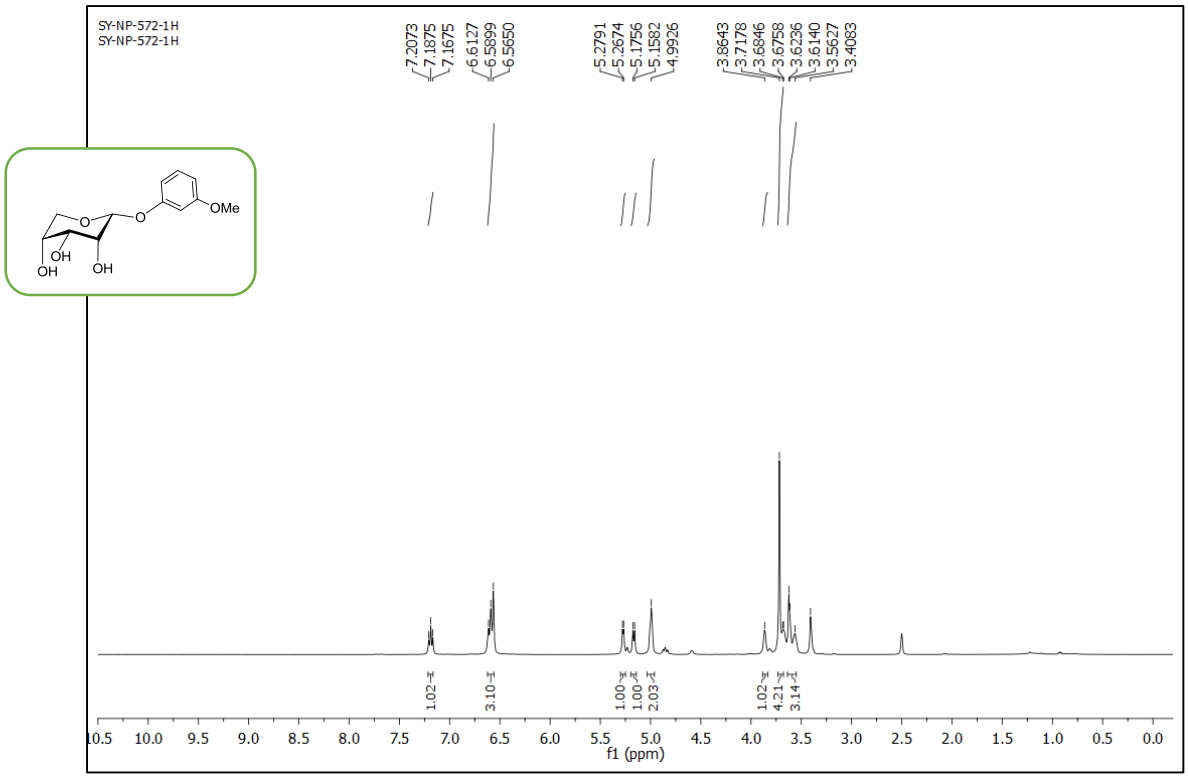

Figure S45. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **5c**.

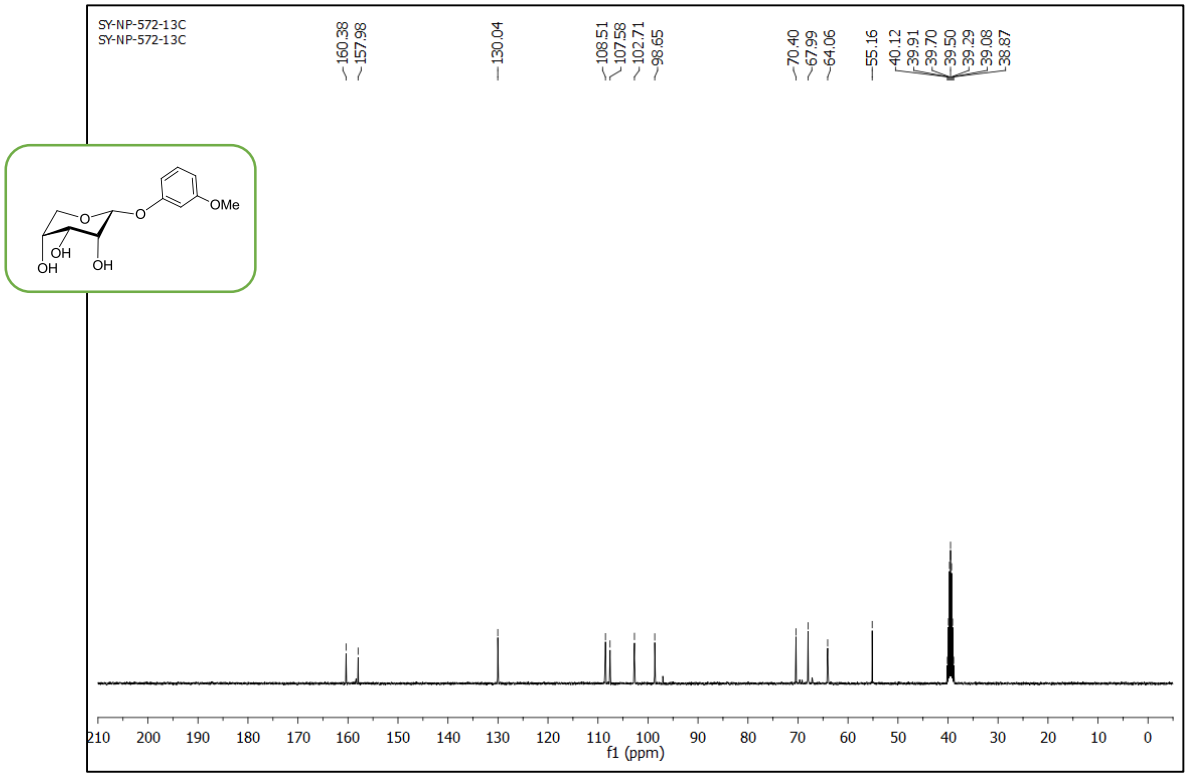

Figure S46. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **5c**.

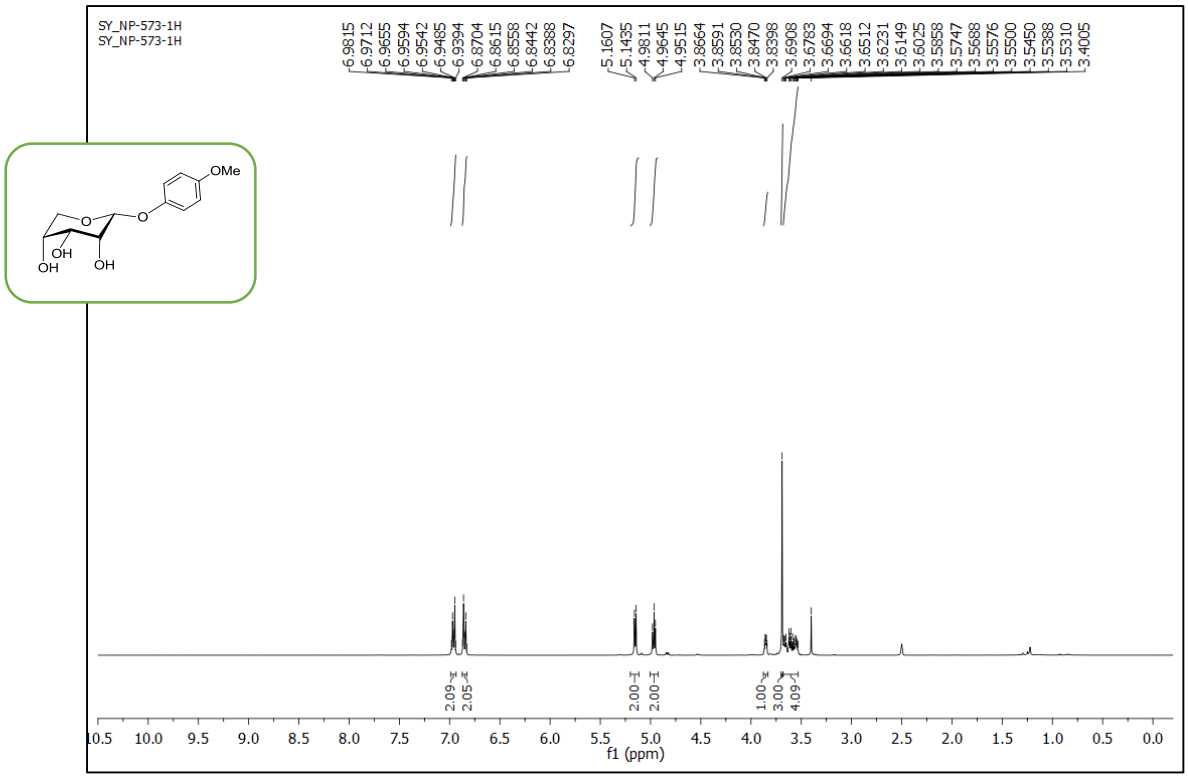

Figure S47. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **5d**.

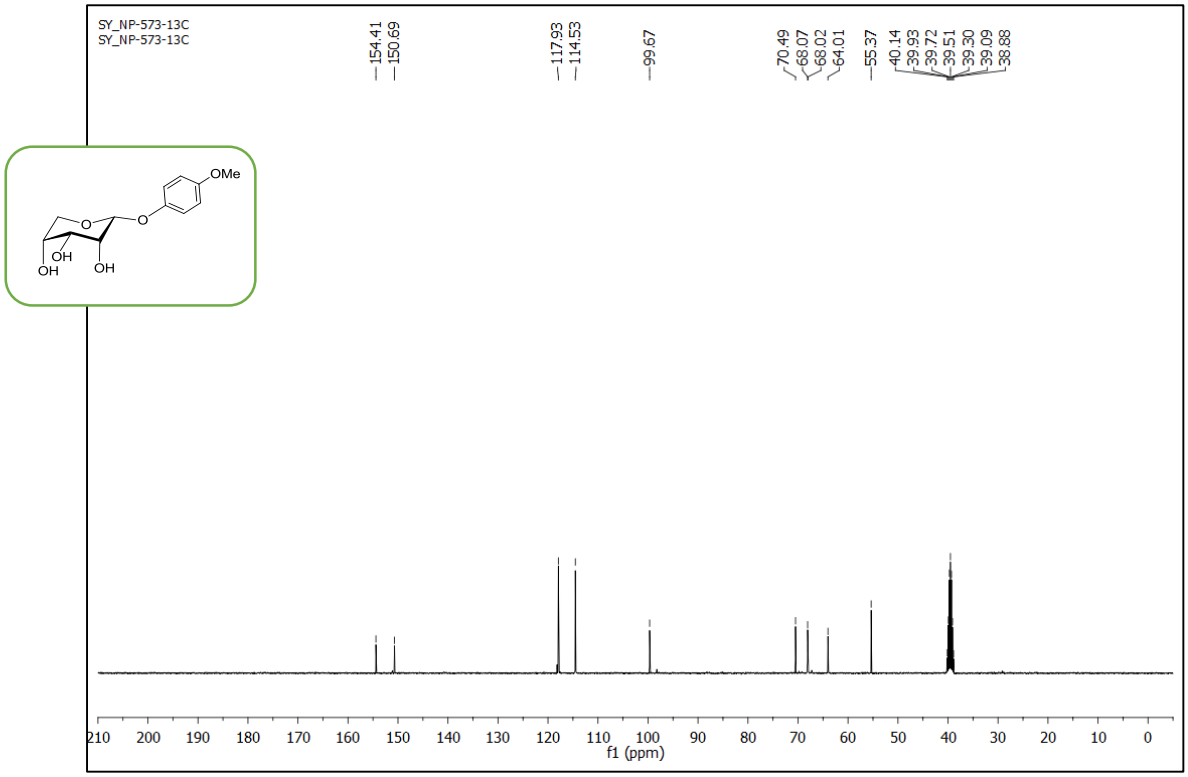

Figure S48. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **5d**.

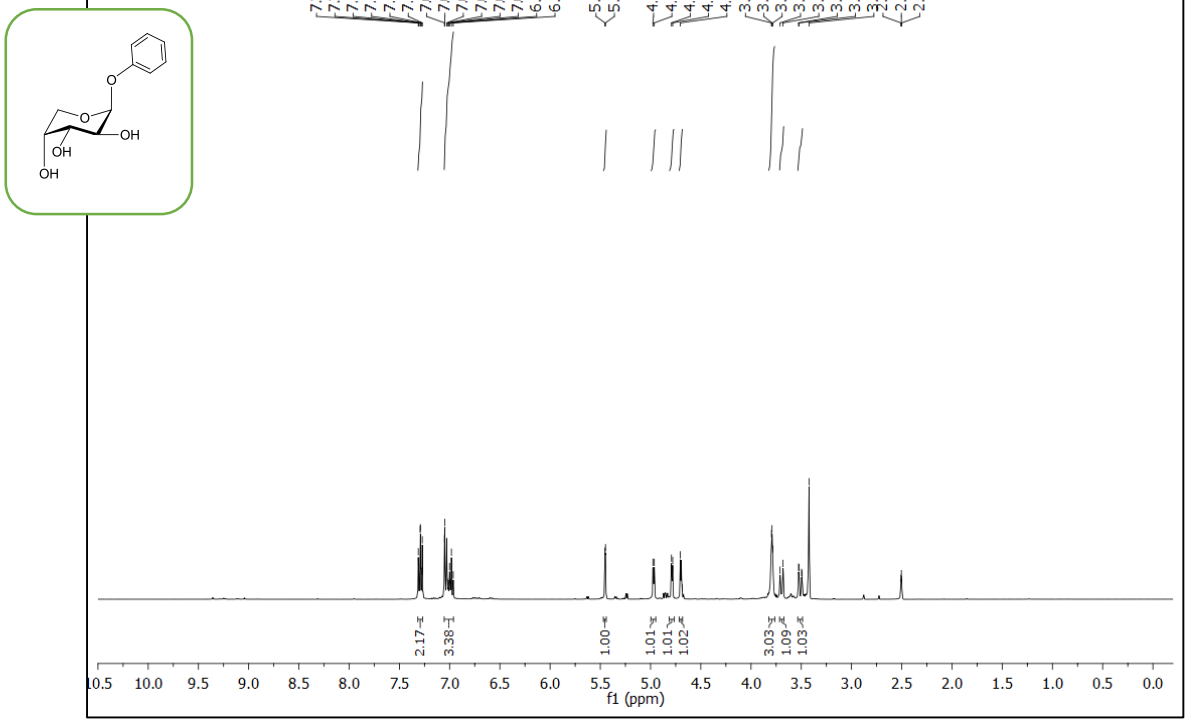

Figure S49. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **2'a**.

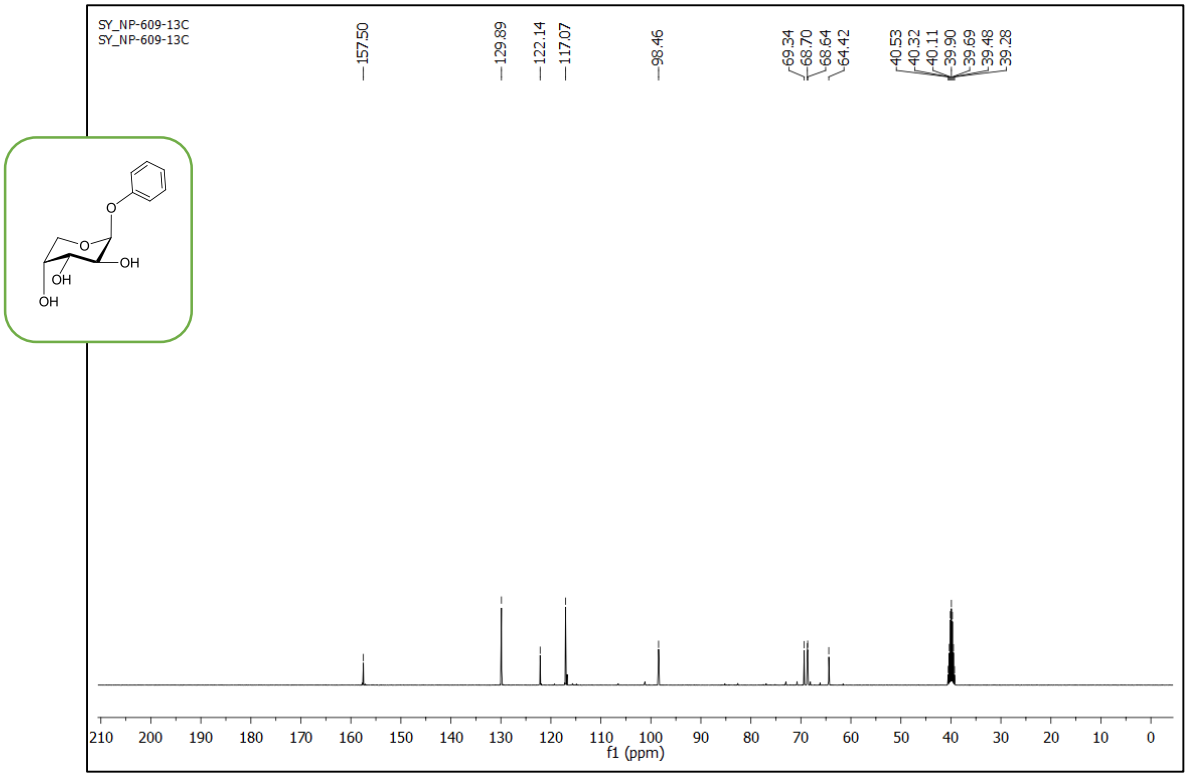

Figure S50. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **2'a**.

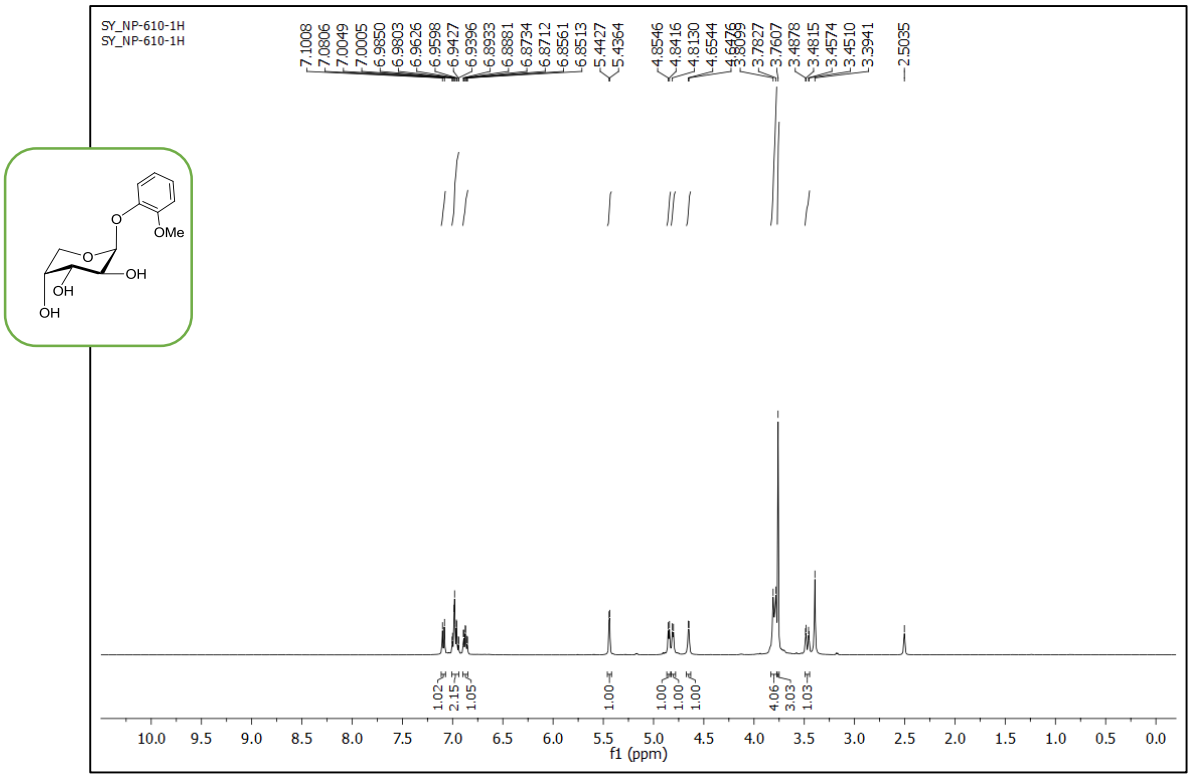

Figure S51. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **2'b**.

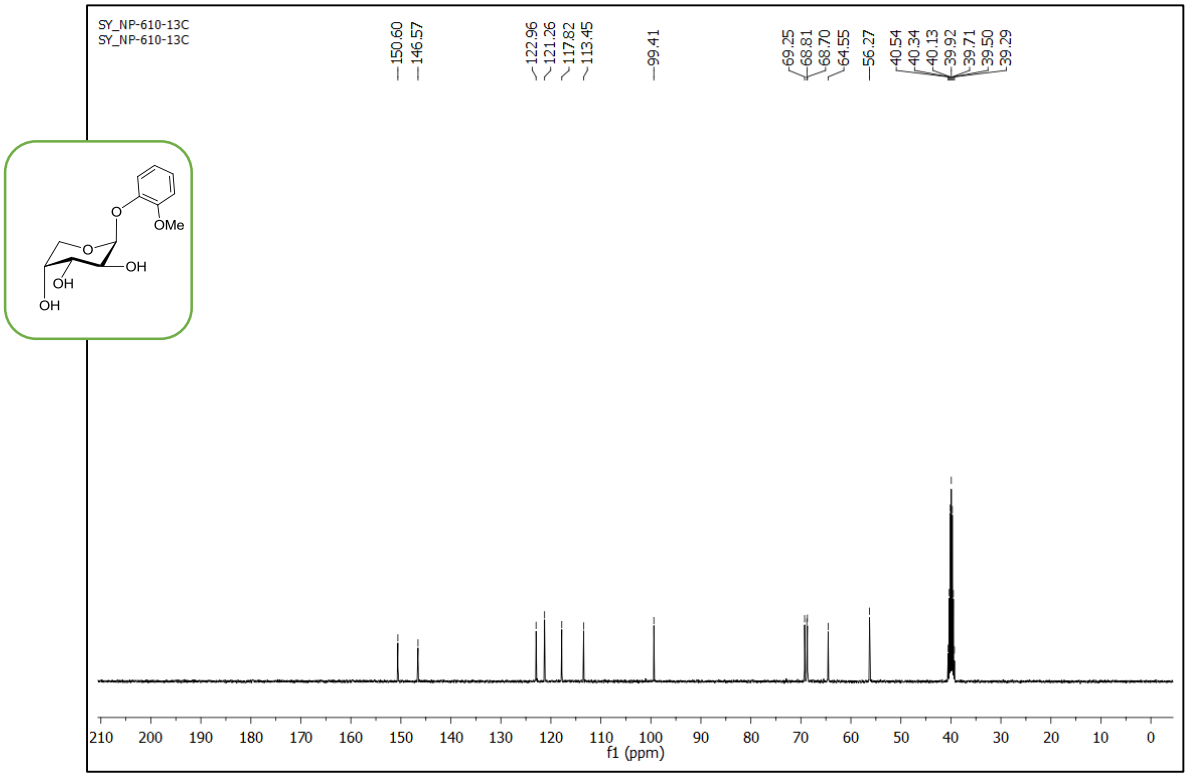

Figure S52. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **2'b**.

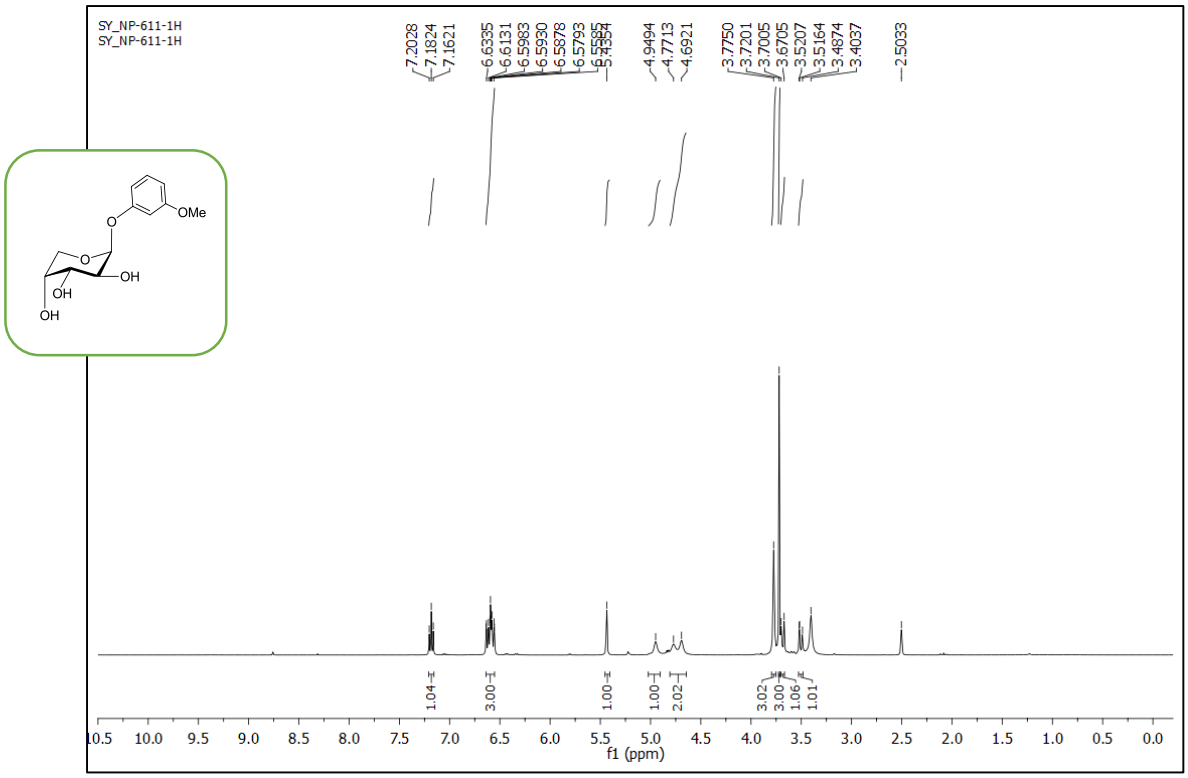

Figure S53. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **2'c**.

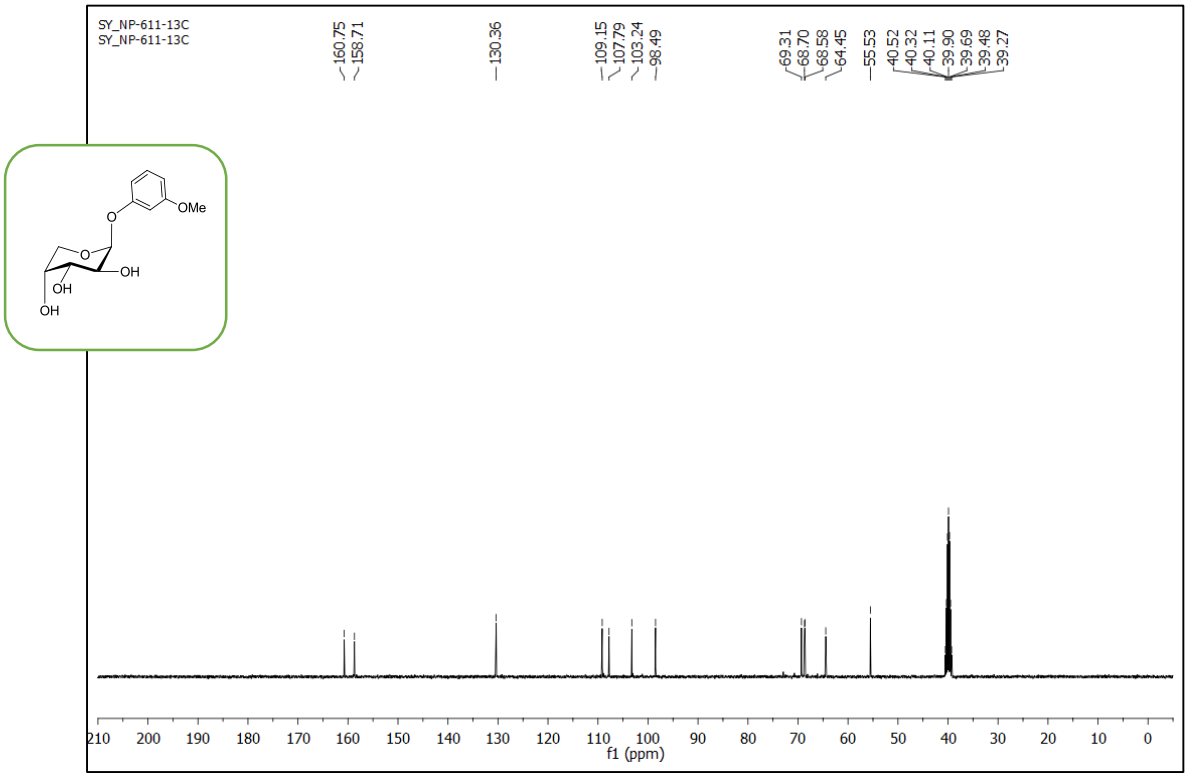

Figure S54. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **2'c**.

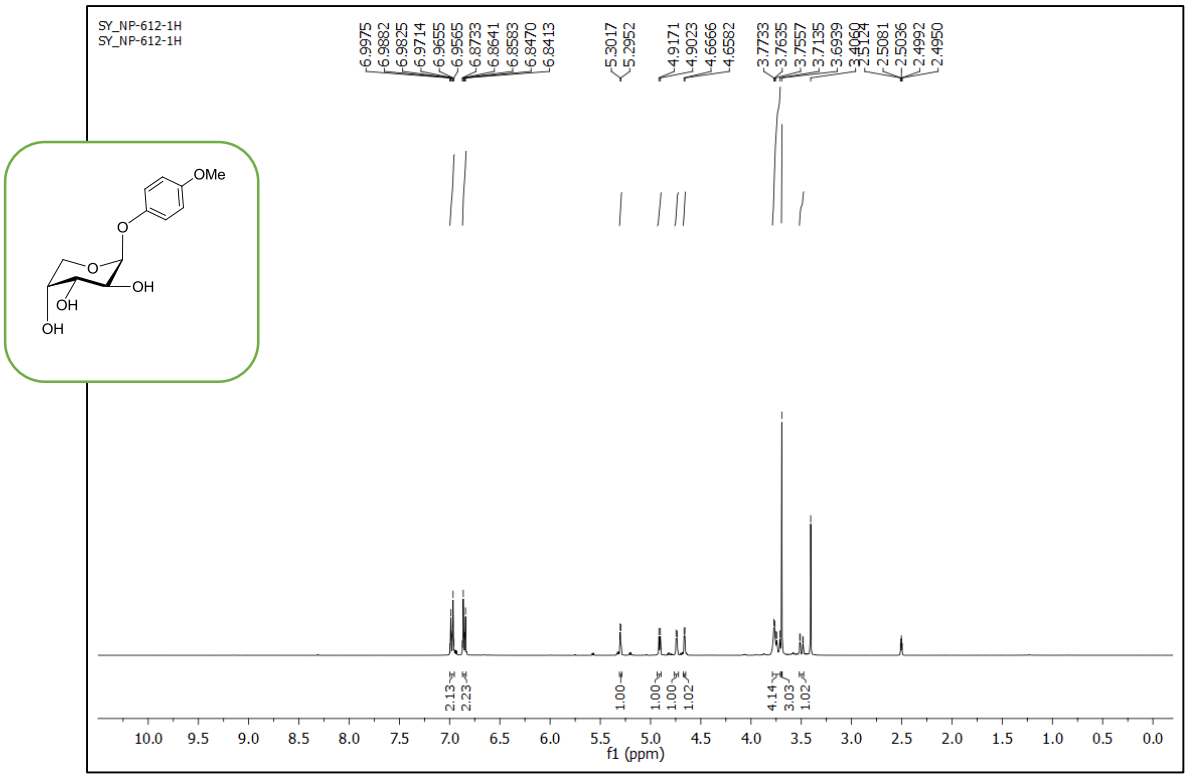

Figure S55. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **2'd.**

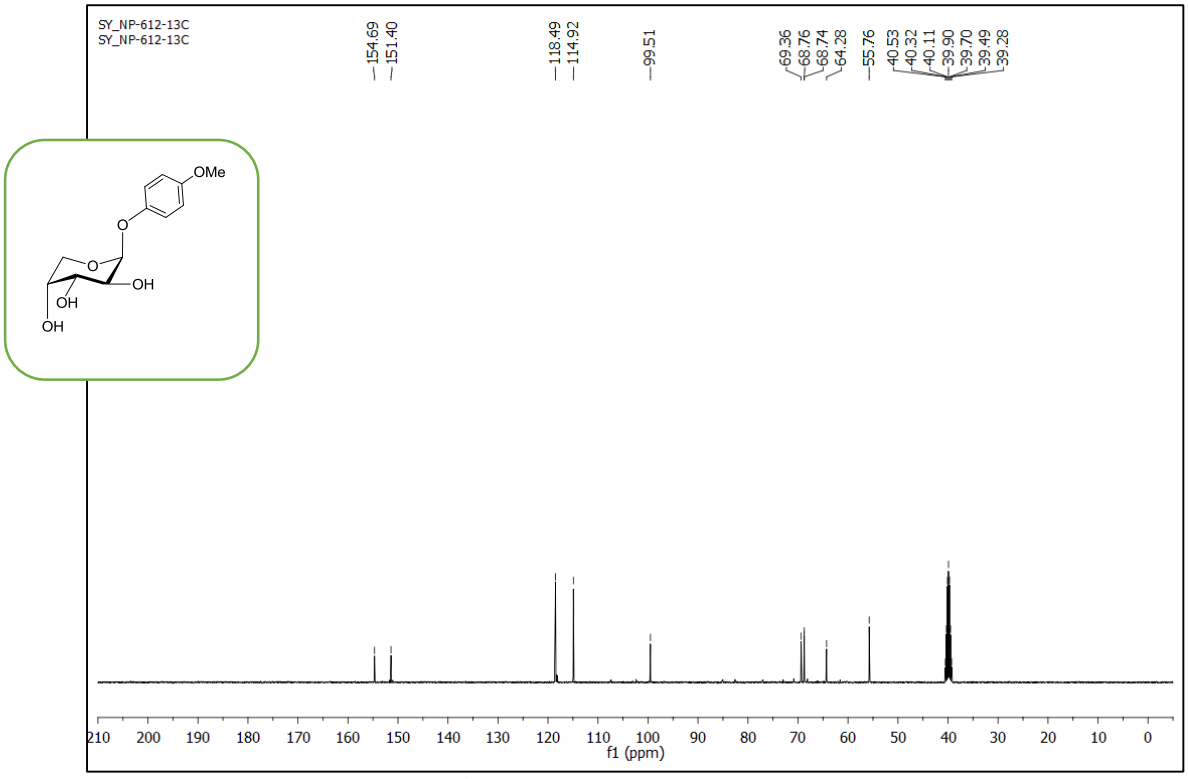

Figure S56. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **2'd**.

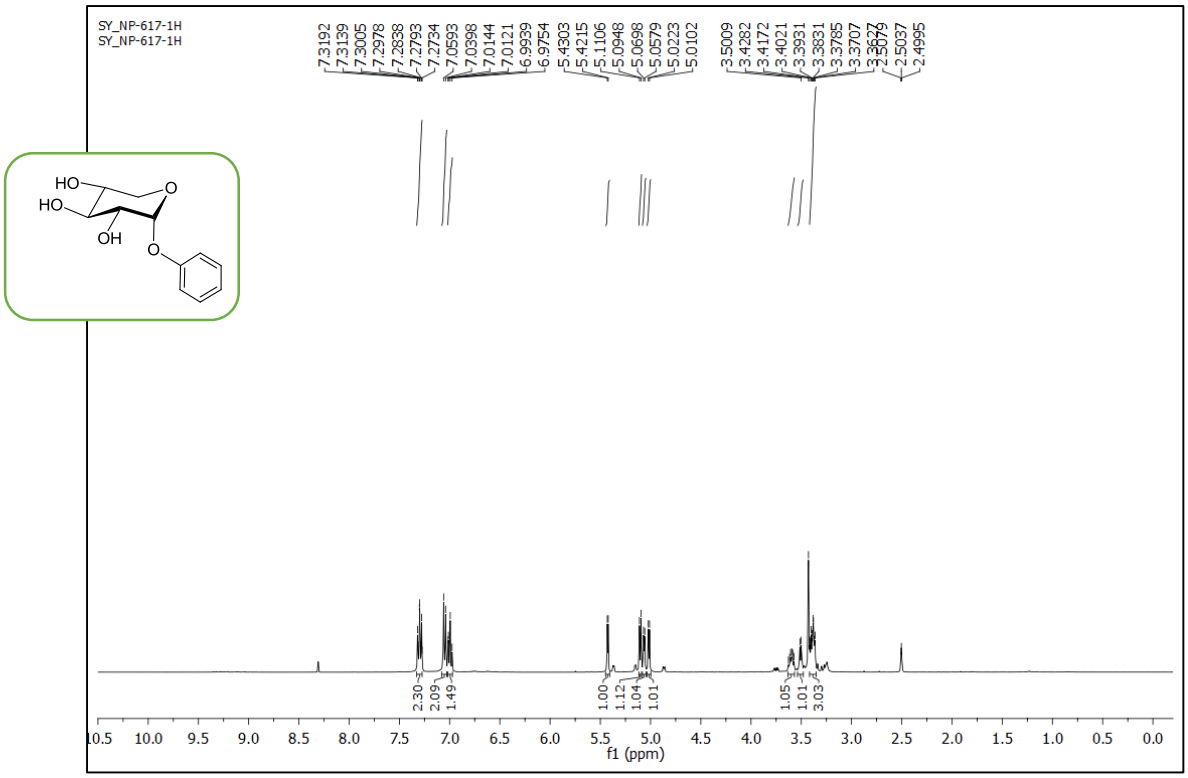

Figure S57. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3'a**.

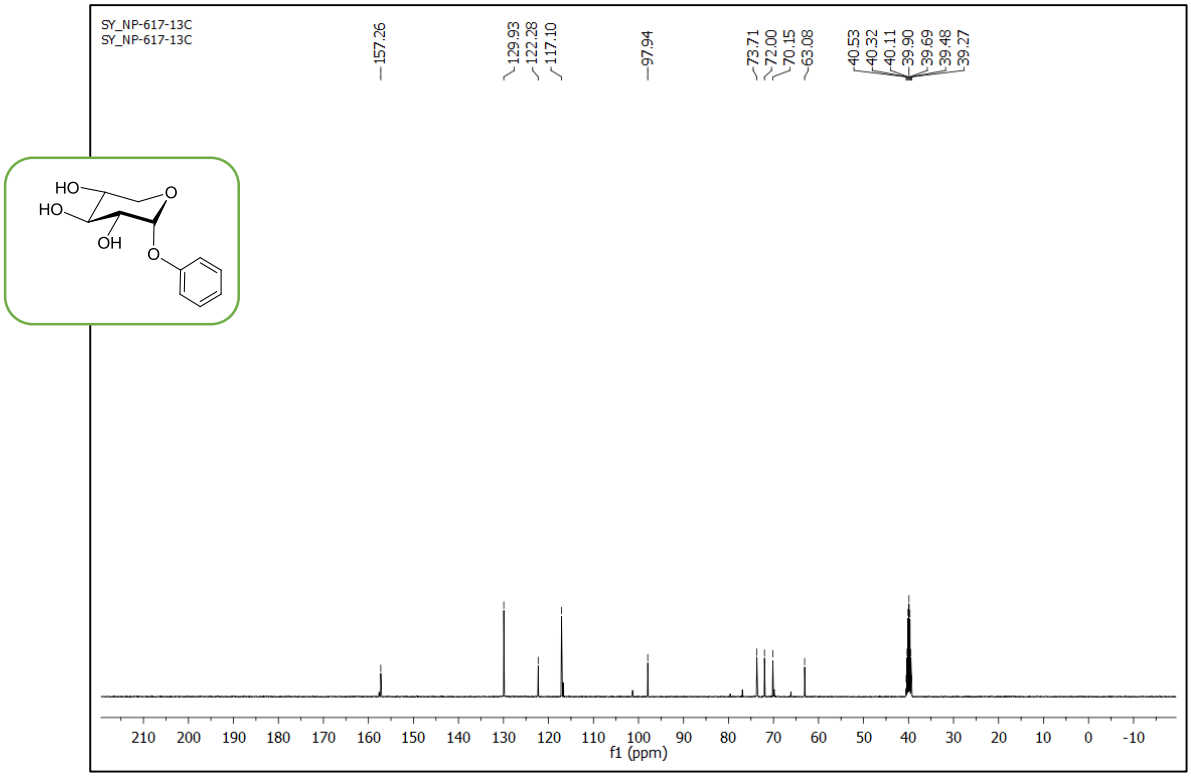

Figure S58. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3'a**.

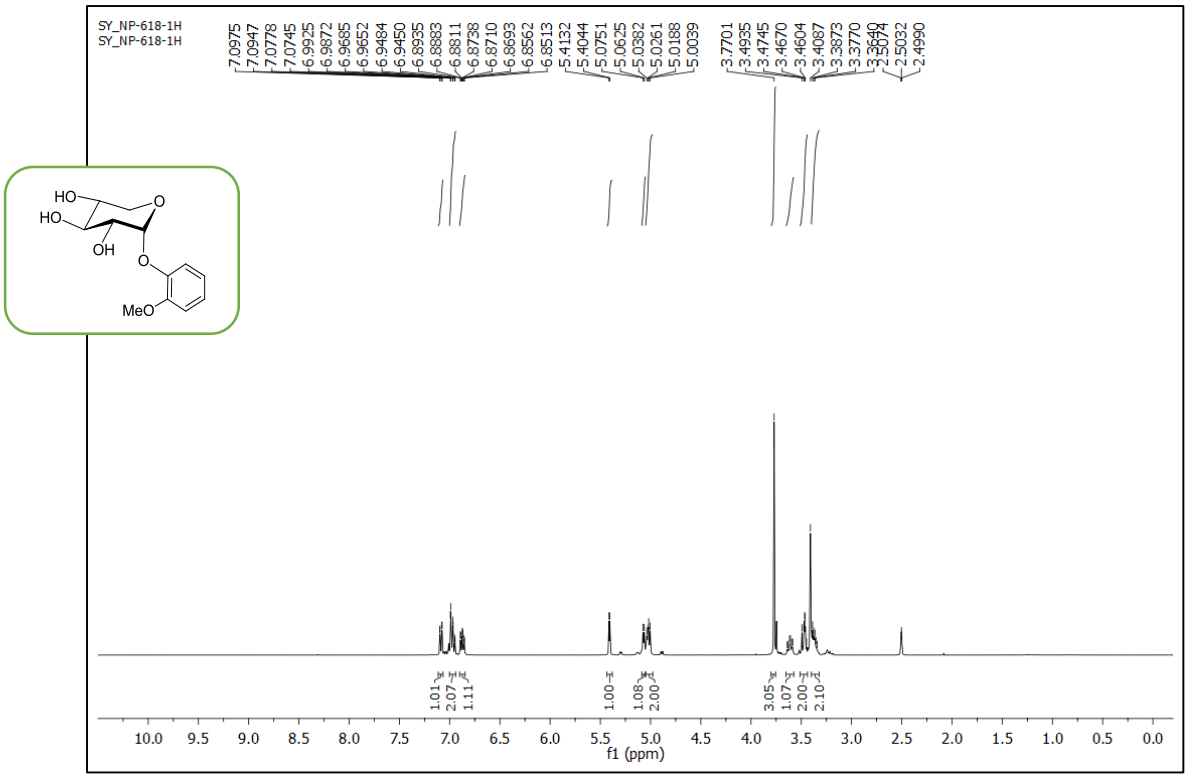

Figure S59. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3'b**.

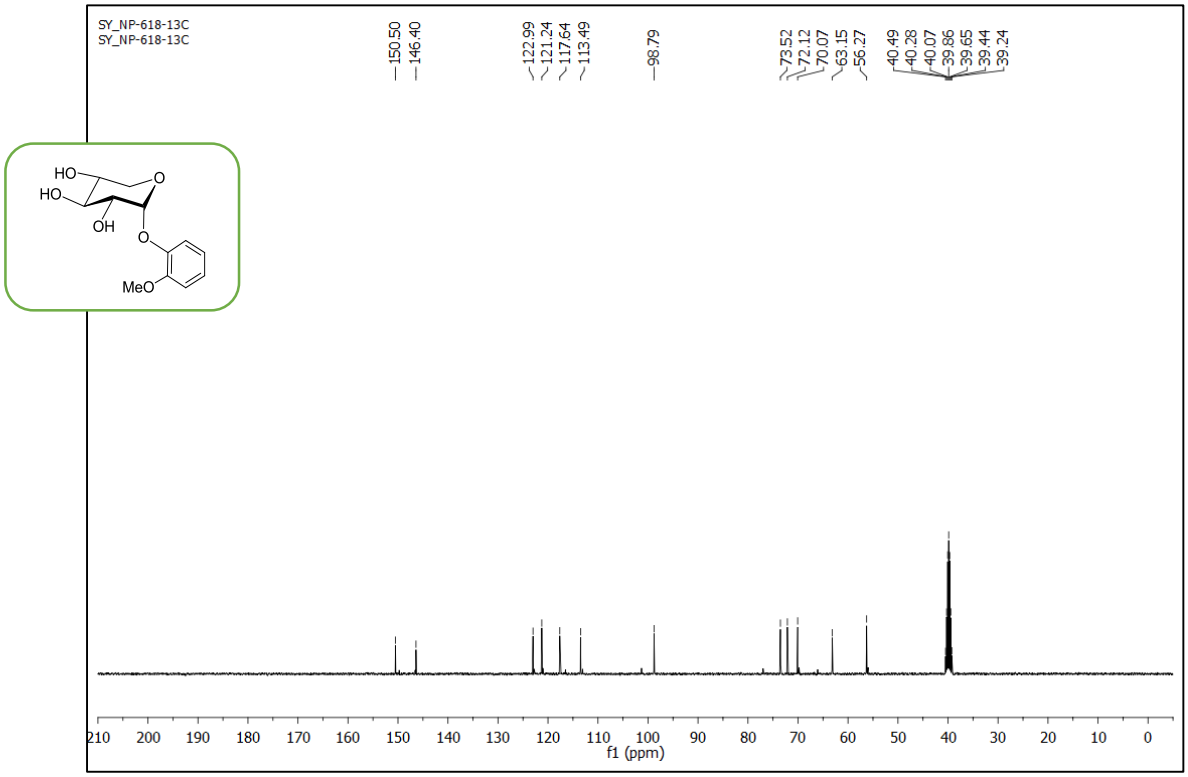

Figure S60. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3'b**.

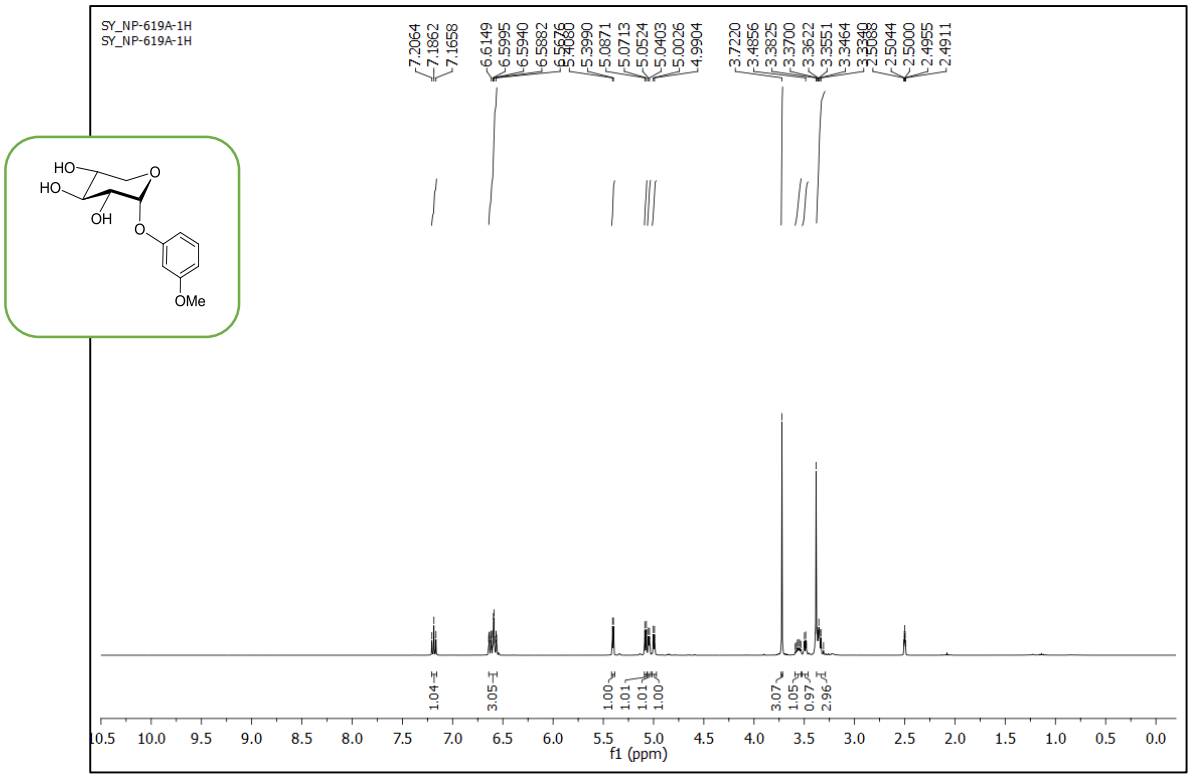

Figure S61. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3'c**.

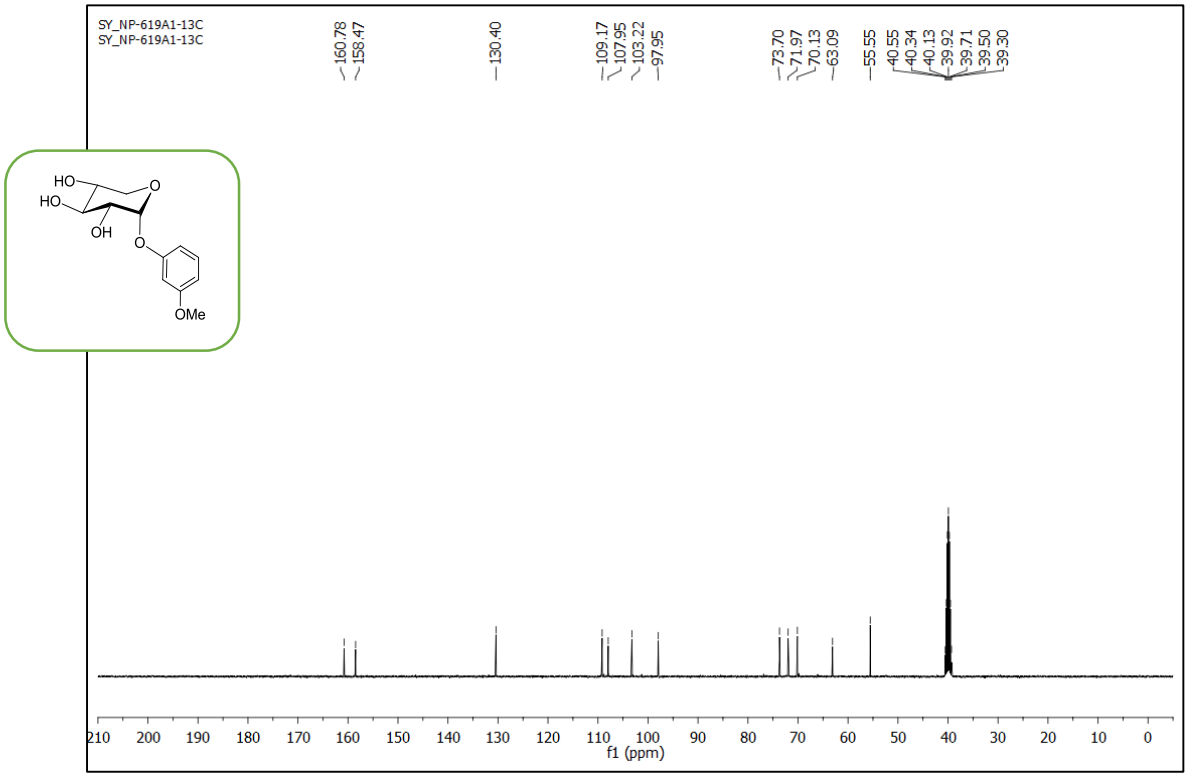

Figure S62. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3'c**.

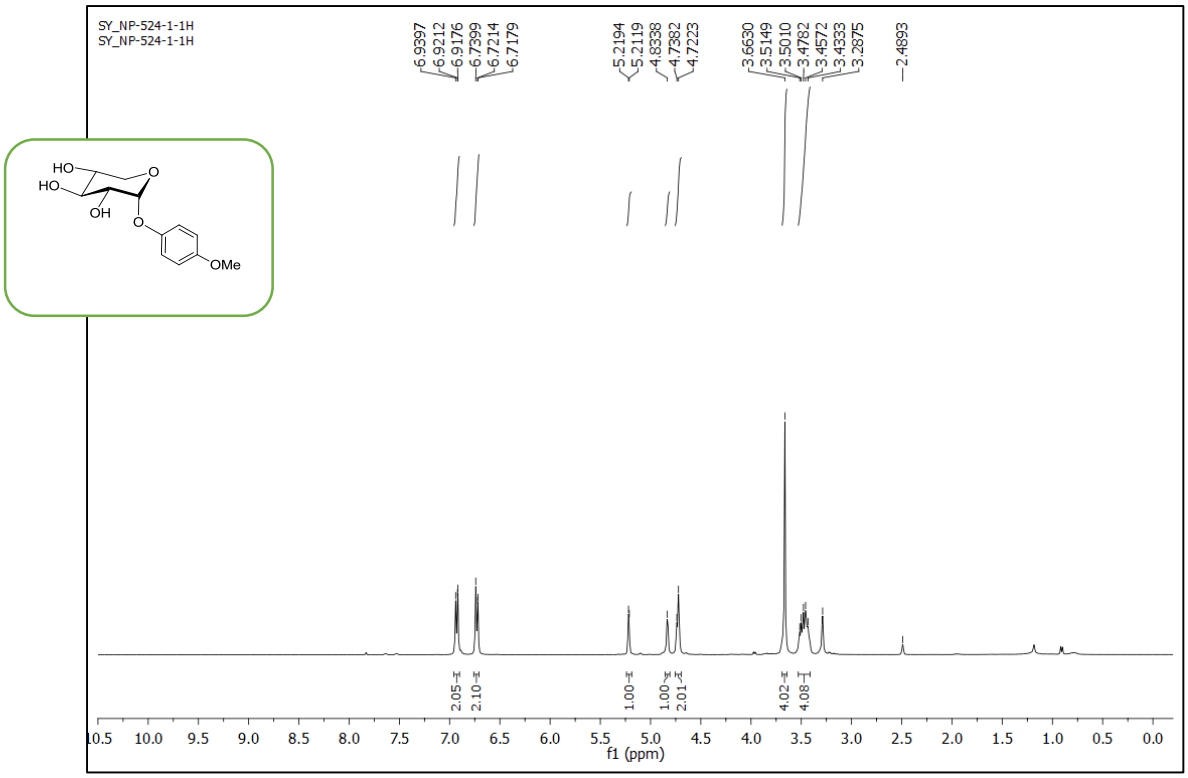

Figure S63. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **3'd**.

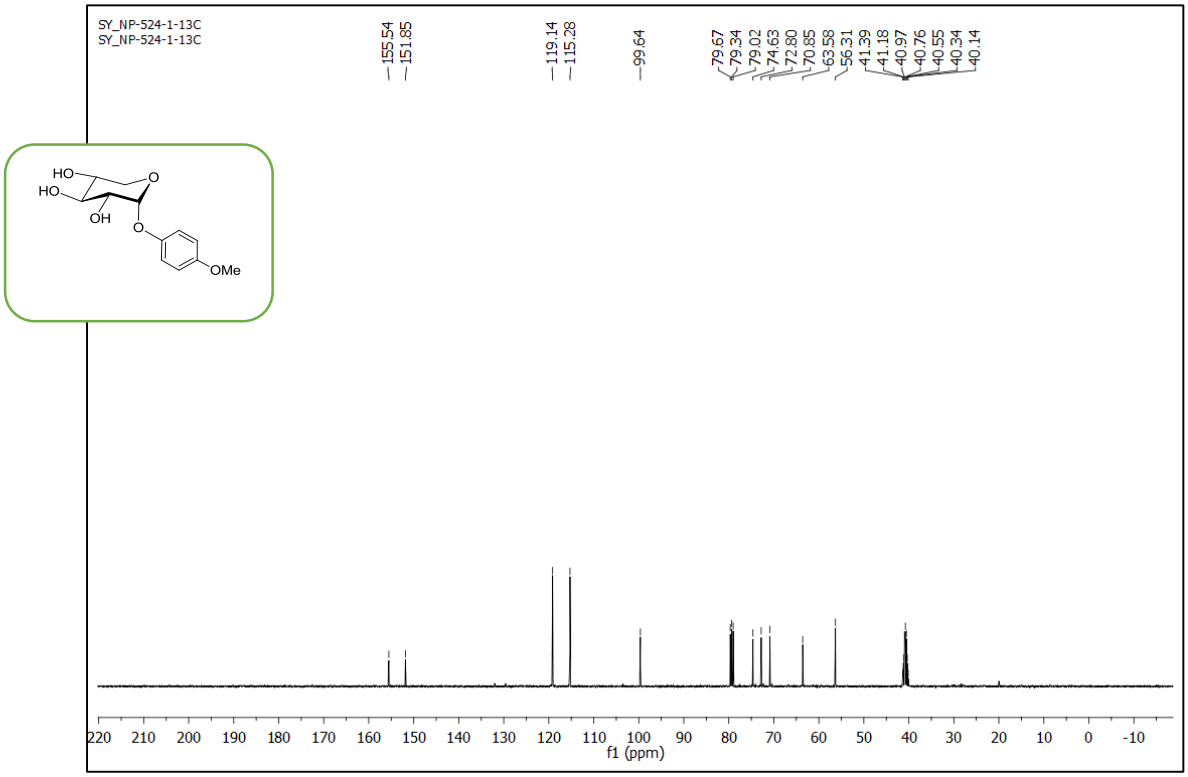

Figure S64. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **3'd**.

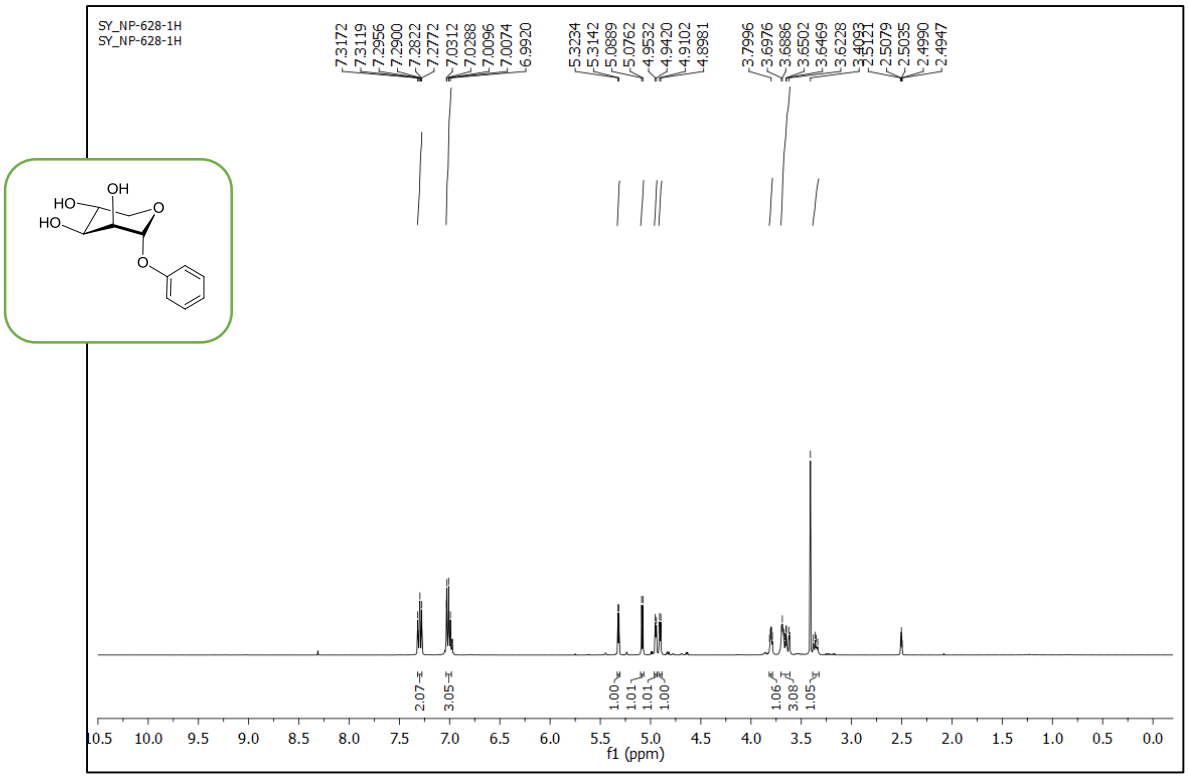

Figure S65. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4'a**.

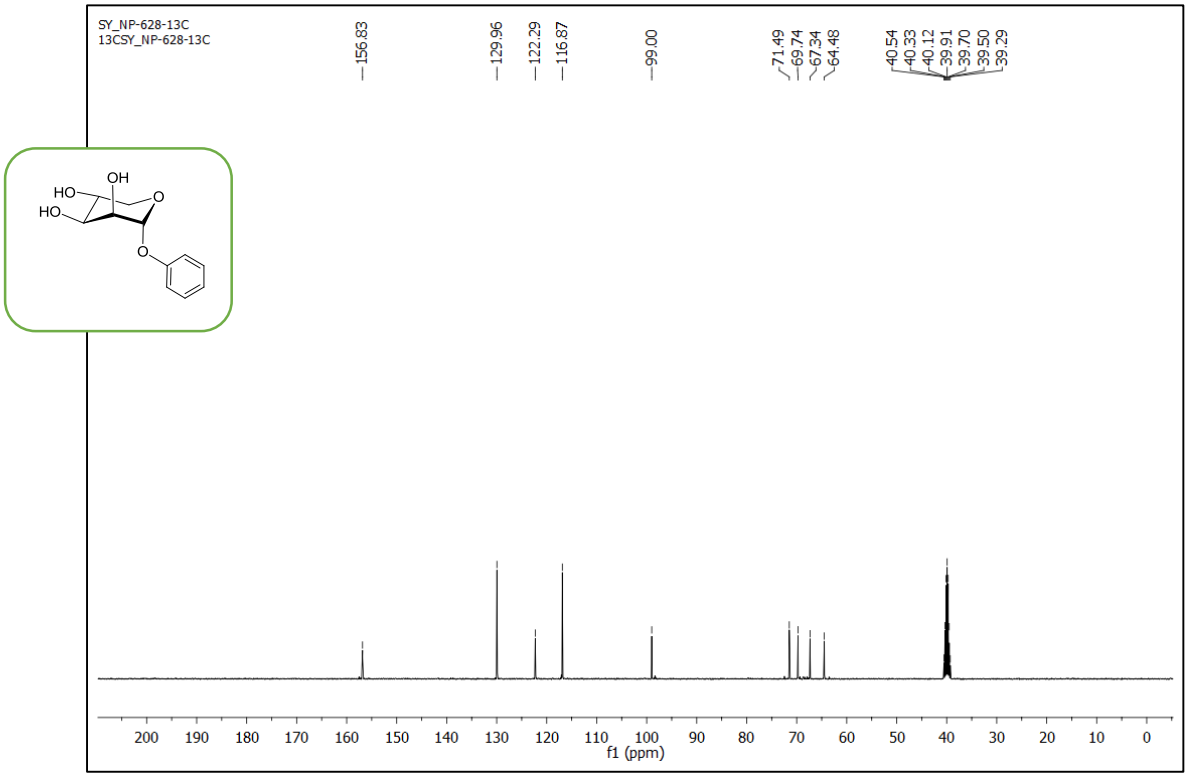

Figure S66. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4'a**.

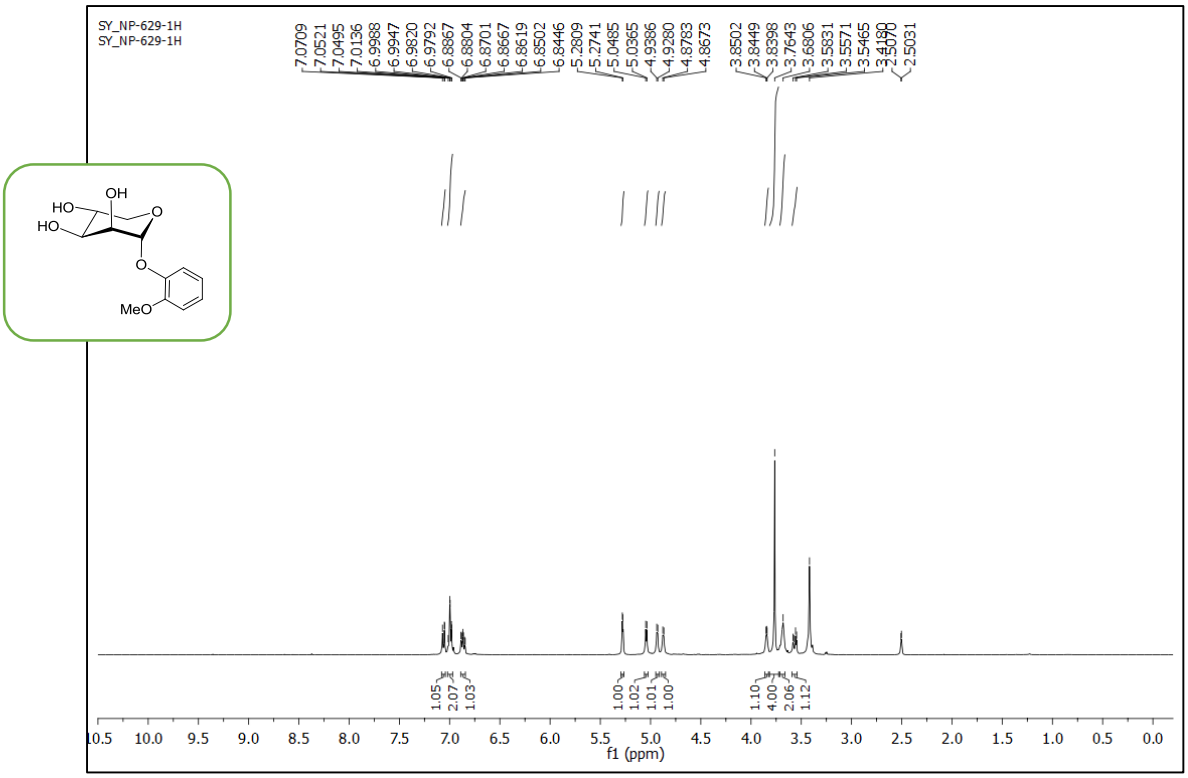

Figure S67. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4'b**.

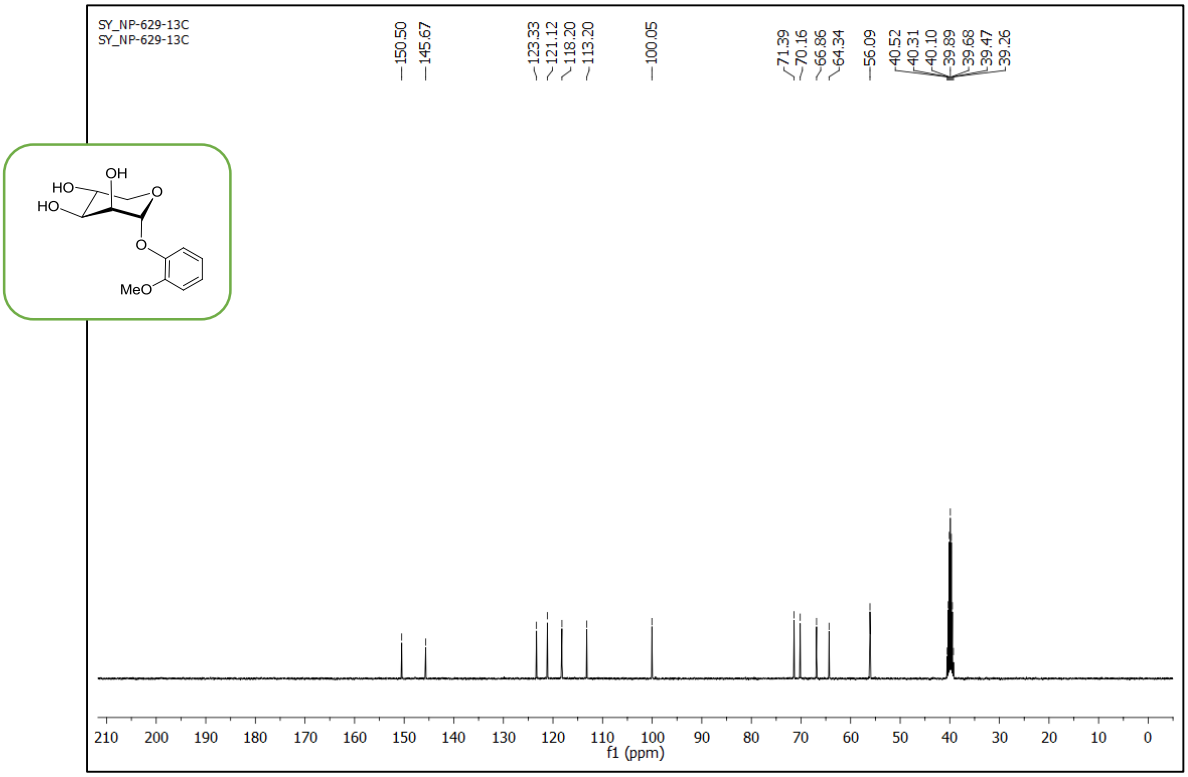

Figure S68. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4'b**.

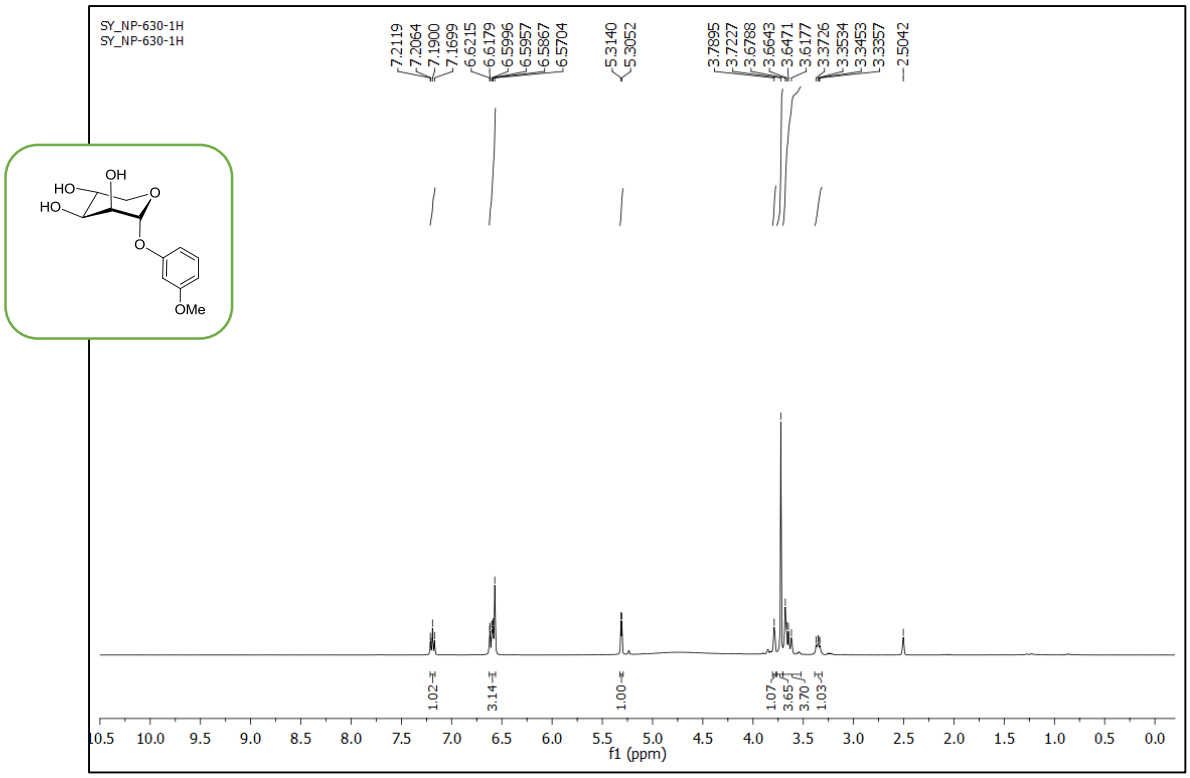

Figure S69. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4'c**.

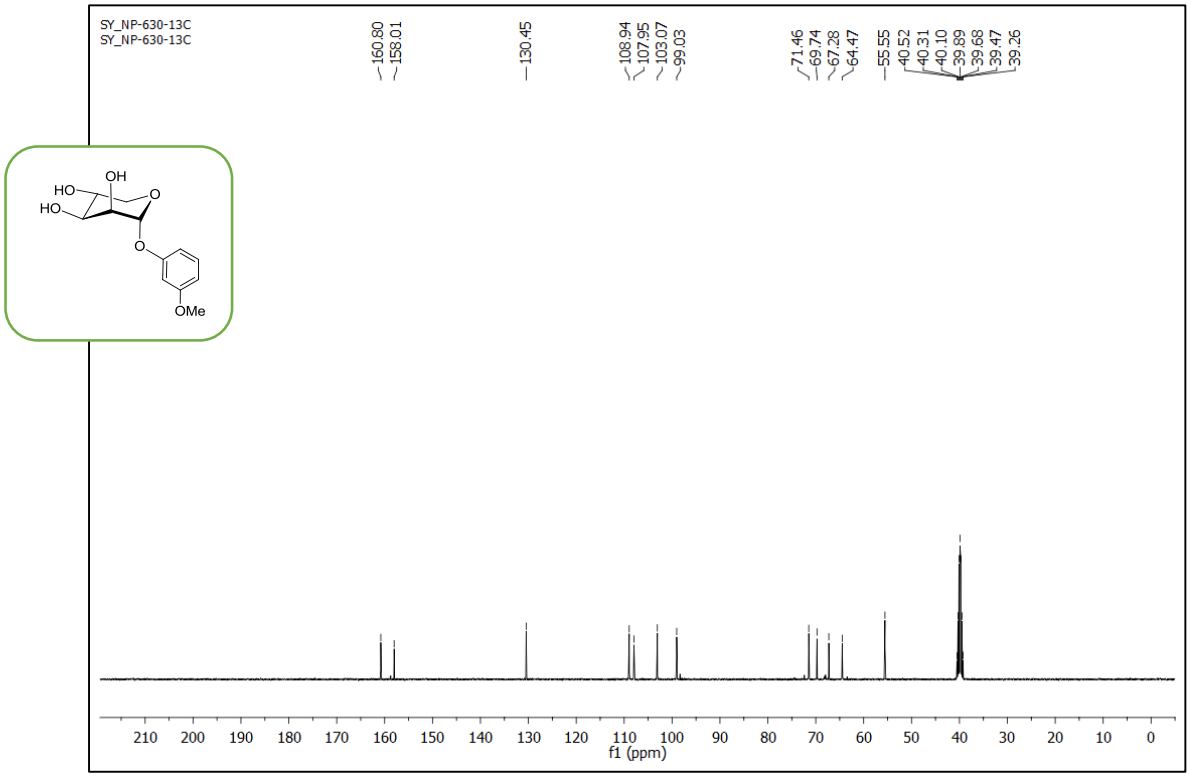

Figure S70. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4'c**.

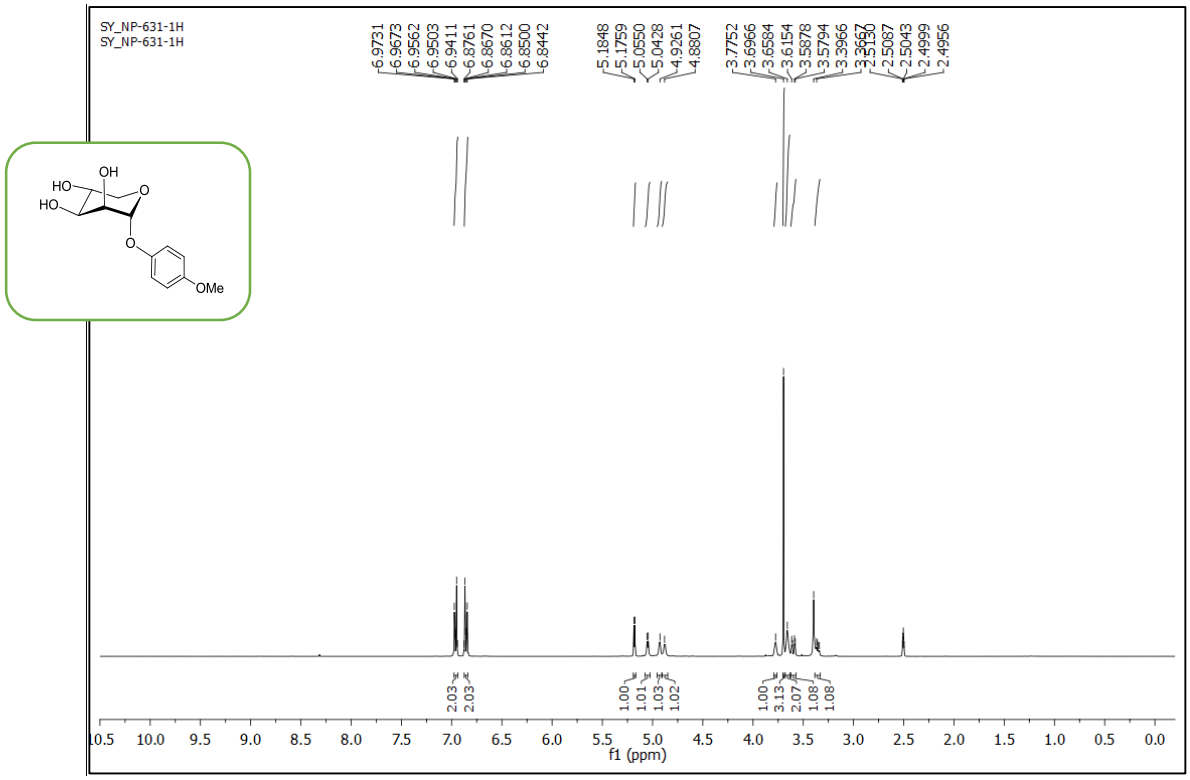

Figure S71. ^{1}H-NMR (400 MHz, DMSO-d6) spectra of **4'd**.

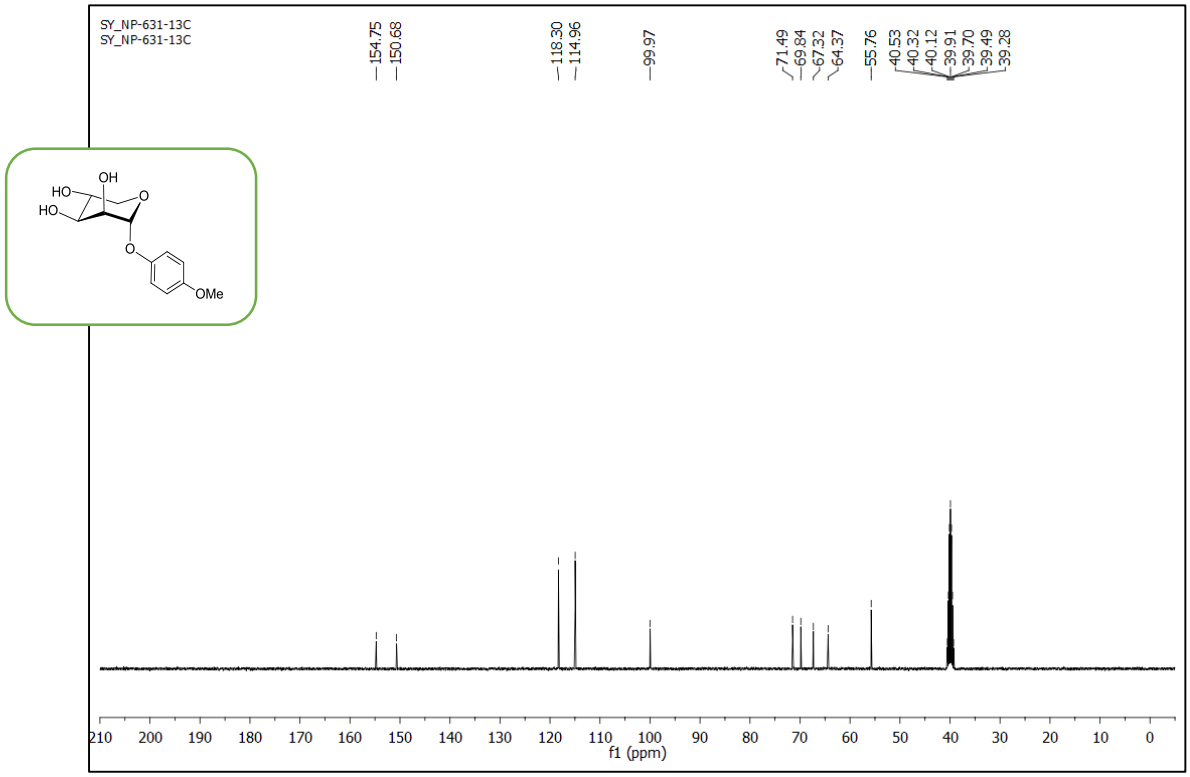

Figure S72. ^{13}C-NMR (100 MHz, DMSO-d6) spectra of **4'd**