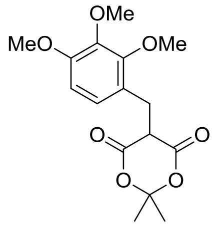
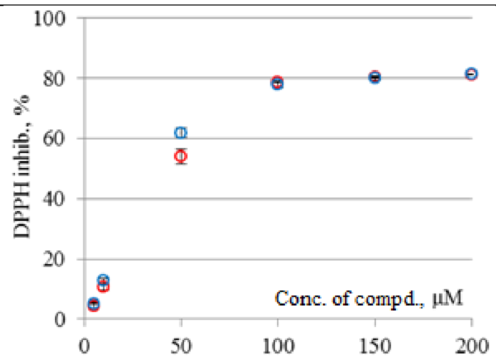
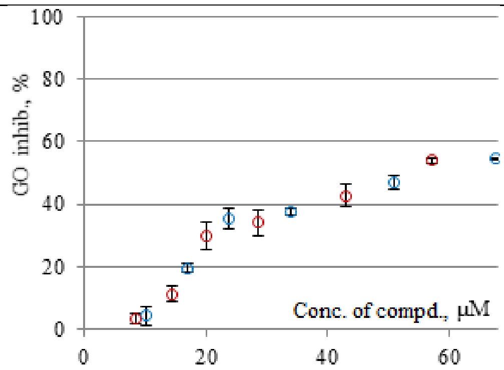
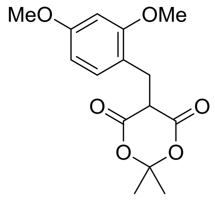
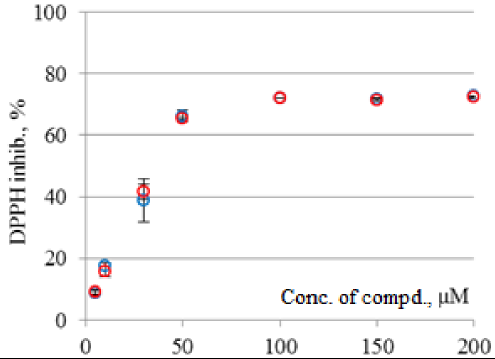
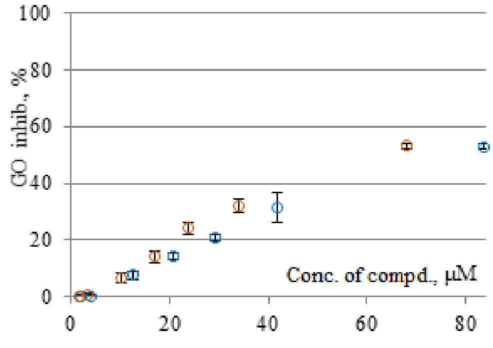
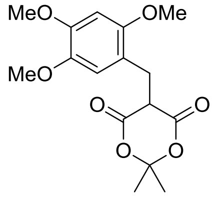
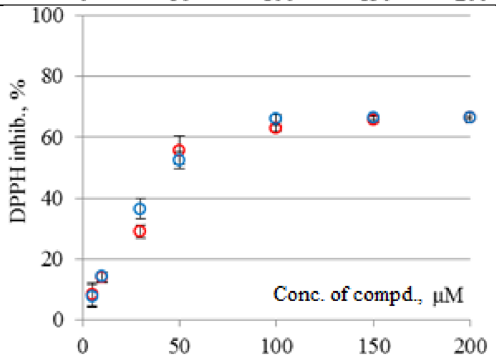
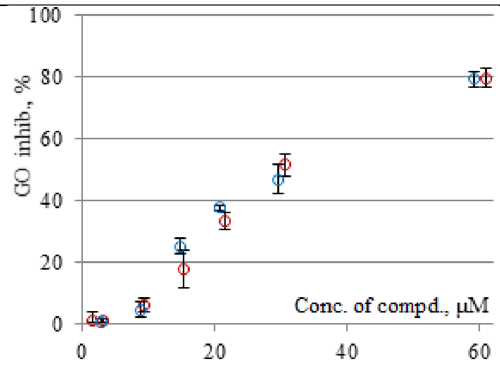
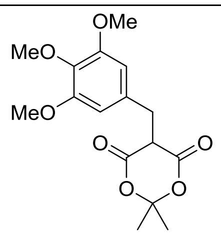
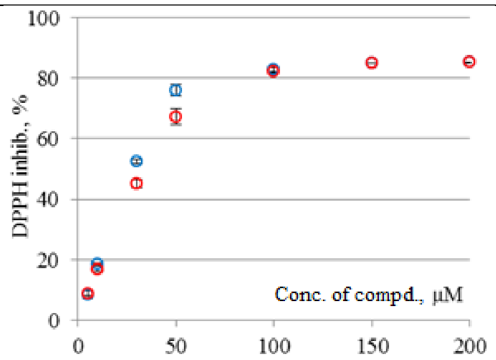
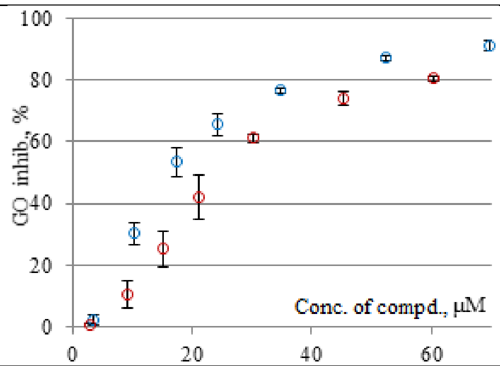
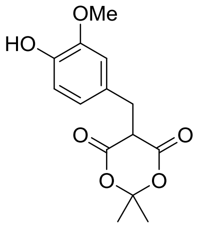
Table S1

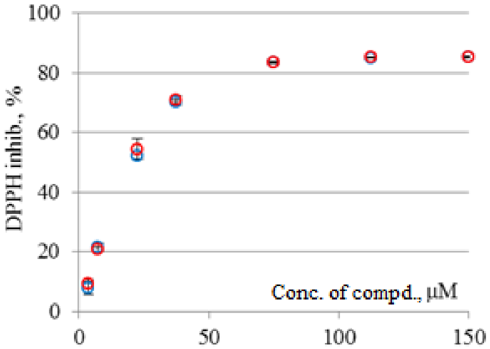
Correlation between concentration of antioxidant and inhibition of free radical*

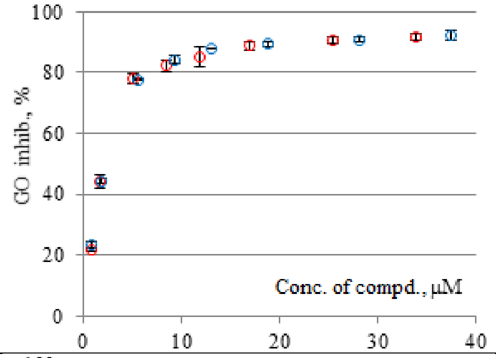
Structure and abbreviation of the compound	DPPH test	GO test
 **1a**		
 **1b**		
 **1c**		
 **1d**		

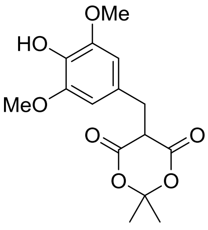
* The data are presented as a mean ± standard deviation from three measurements. Different colors of bulletins present results from two unattached experiments.


OMe
HO
O
O
O
O

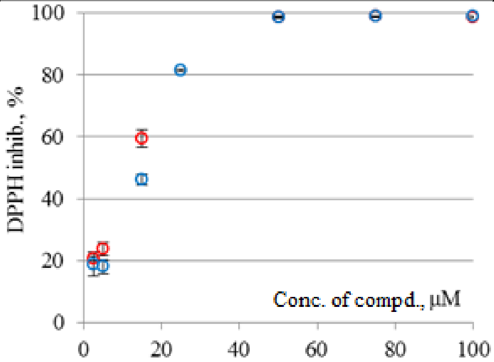
1e

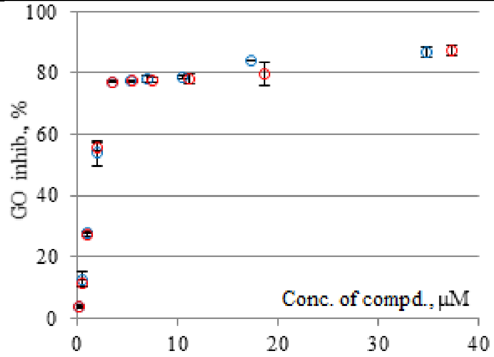

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150

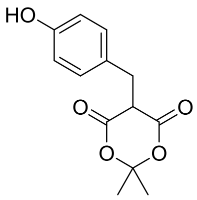

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
10
20
30
40


OMe
HO
MeO
O
O
O
O

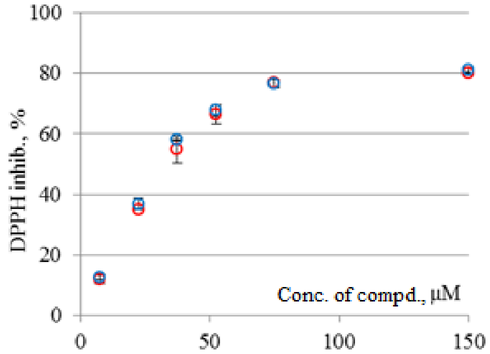
1f

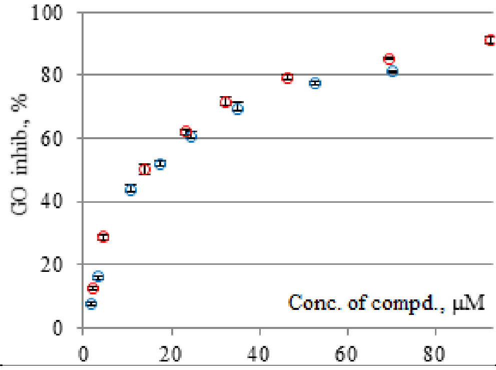

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80
100

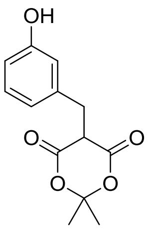

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
10
20
30
40


HO
O
O
O
O

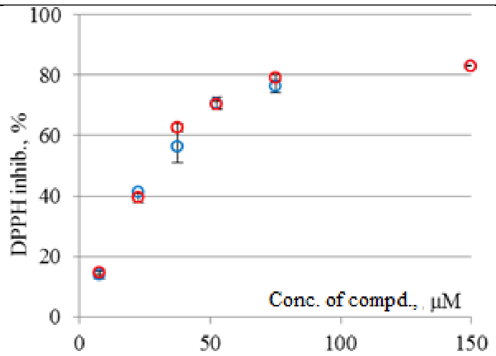
1g

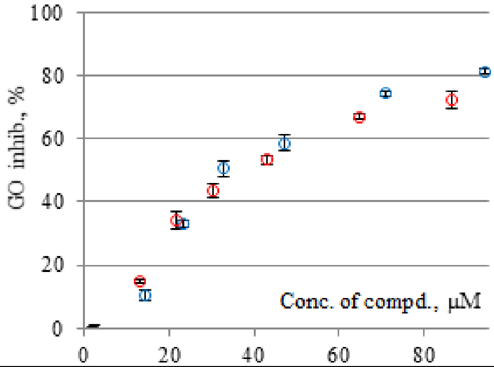

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150

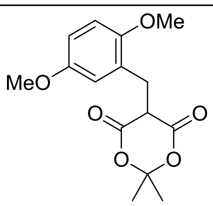

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80


OH
O
O
O
O

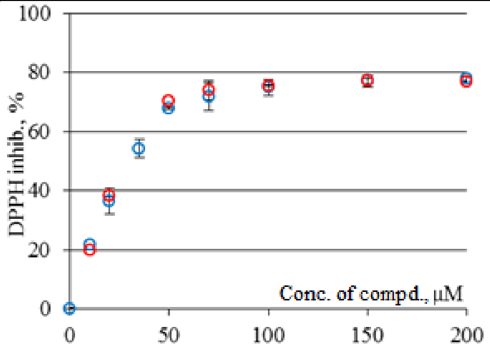
1h

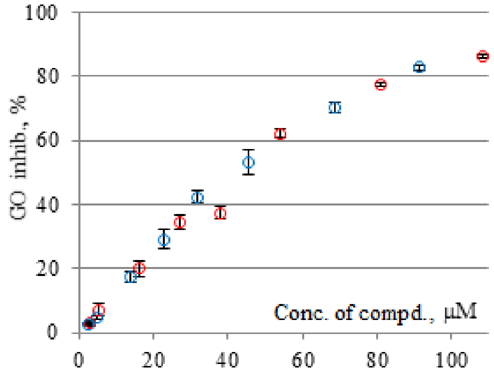

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150

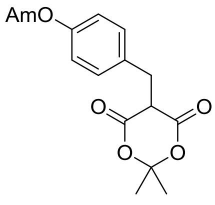

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80


OMe
MeO
O
O
O
O

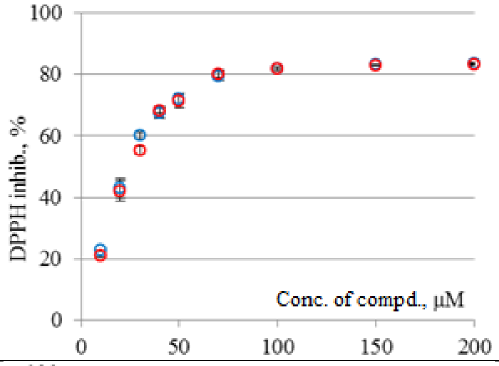
1i

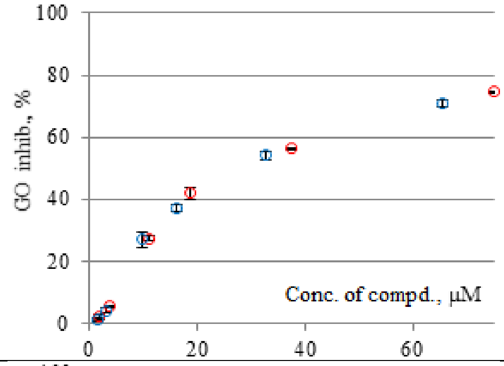

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200

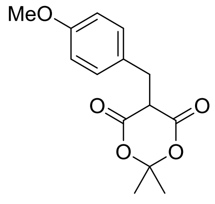

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80
100


AmO
O
O
O
O

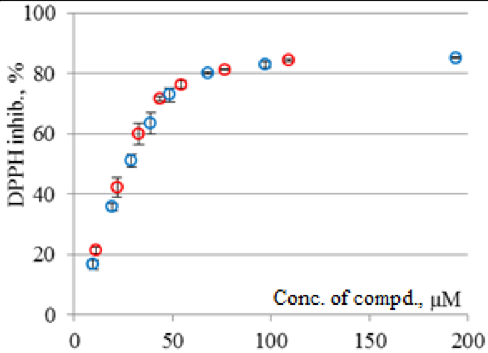
1j

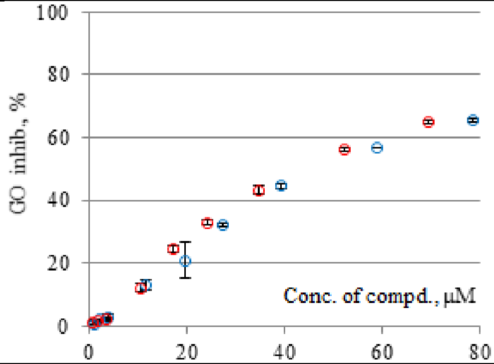

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200

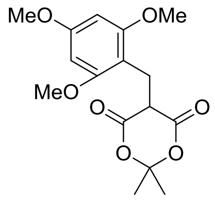

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60


MeO
O
O
O
O

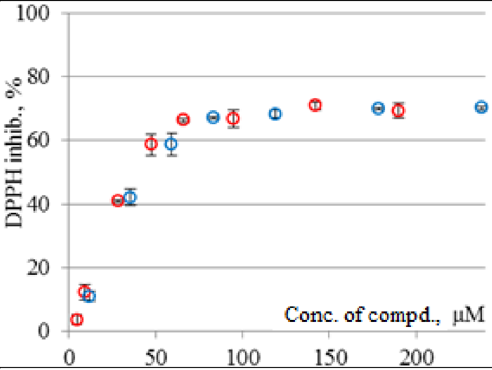
1k

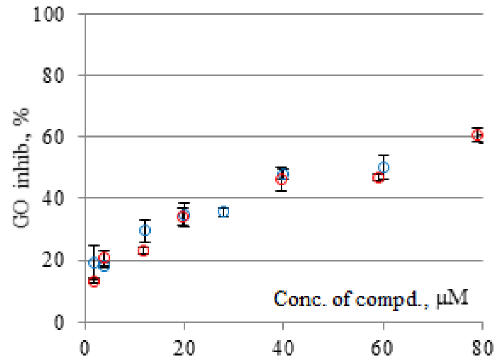

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200

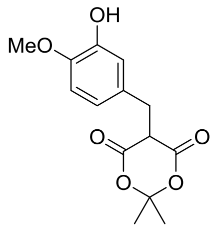

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80


MeO
OMe
MeO
O
O
O
O

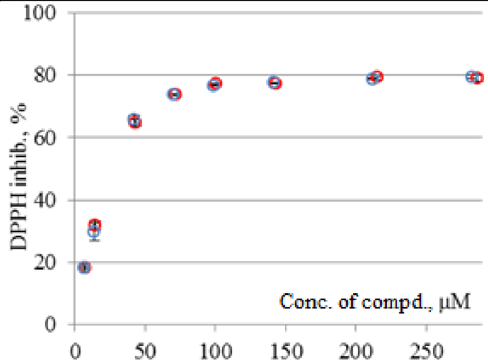
1l

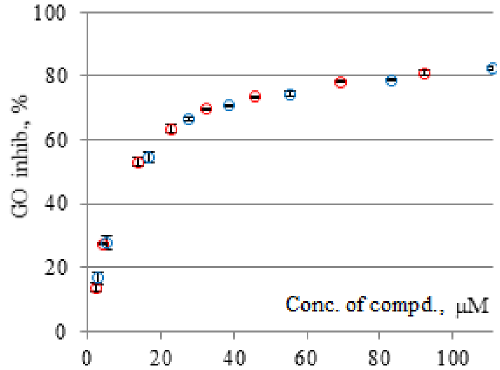

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200

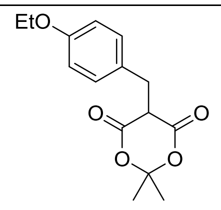

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80


OH
MeO
O
O
O
O

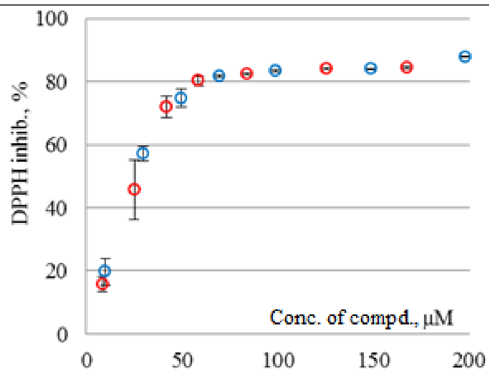
1m

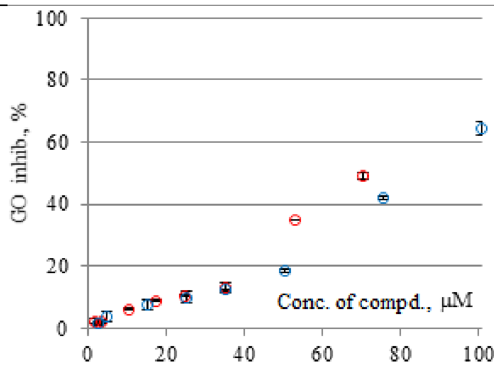

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200
250

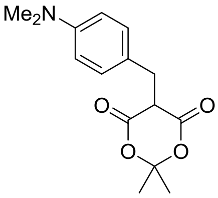

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80
100


EtO
O
O
O
O

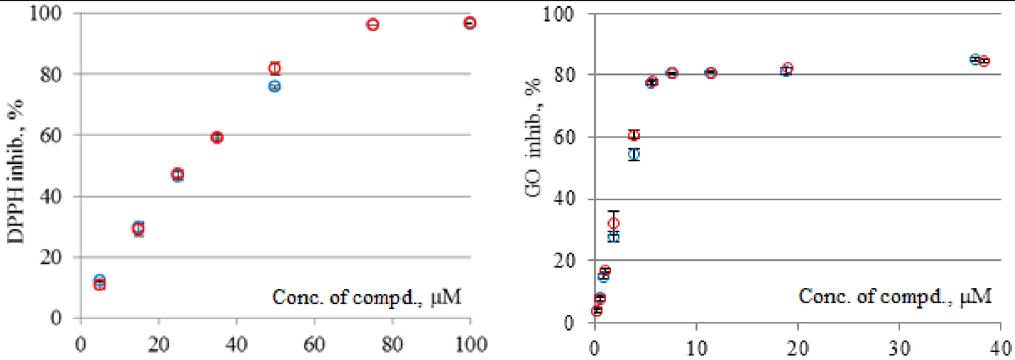
1n

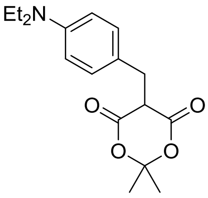

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200


GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80
100

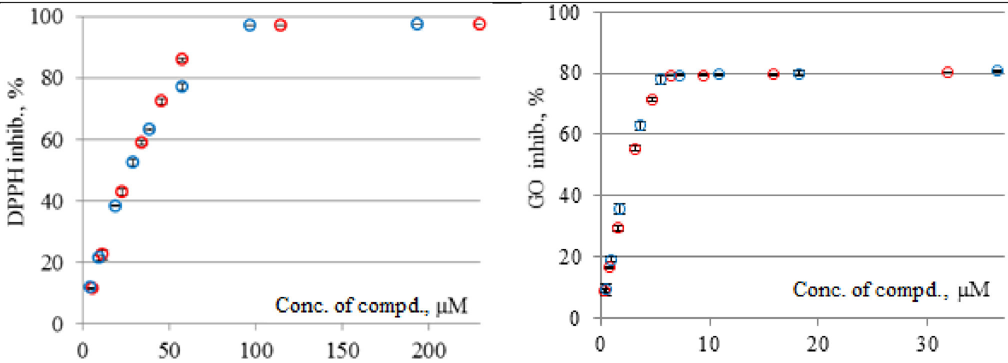

Me$_2$N

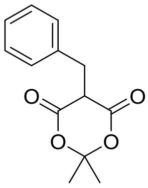
1o


DPPH inhib., %
Conc. of compd., μM
GO inhib., %
Conc. of compd., μM

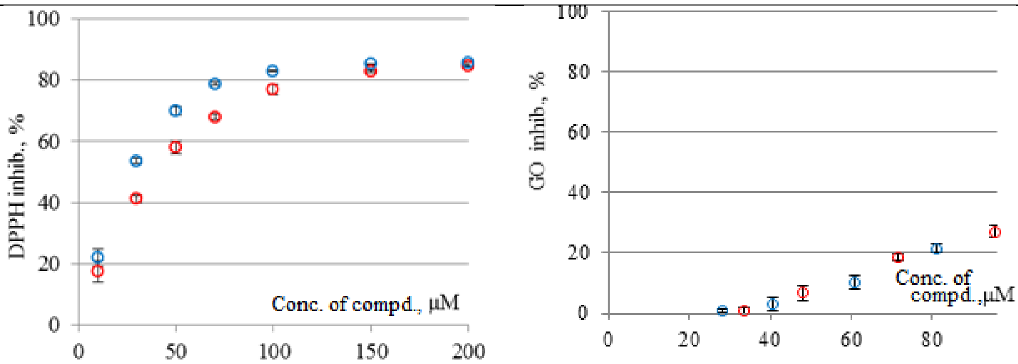

Et$_2$N

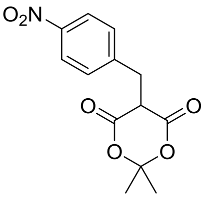
1p


DPPH inhib., %
Conc. of compd., μM
GO inhib., %
Conc. of compd., μM

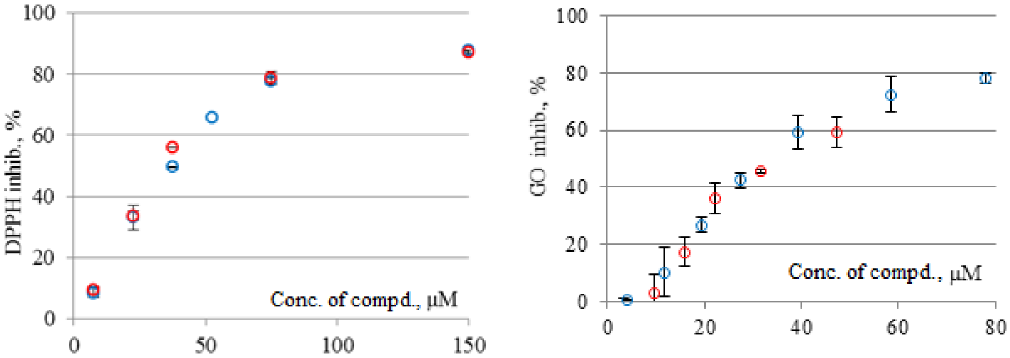


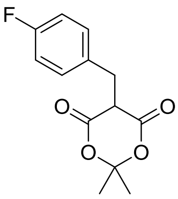
1q


DPPH inhib., %
Conc. of compd., μM
GO inhib., %
Conc. of compd.,μM

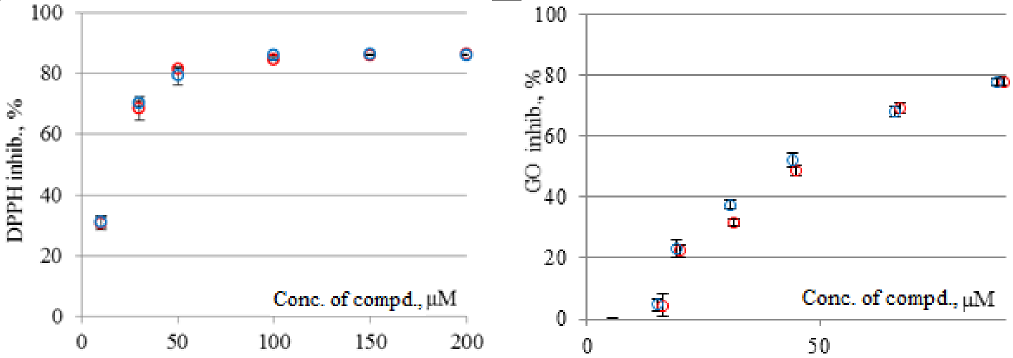

O$_2$N

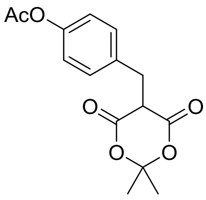
1r


DPPH inhib., %
Conc. of compd., μM
GO inhib., %
Conc. of compd., μM

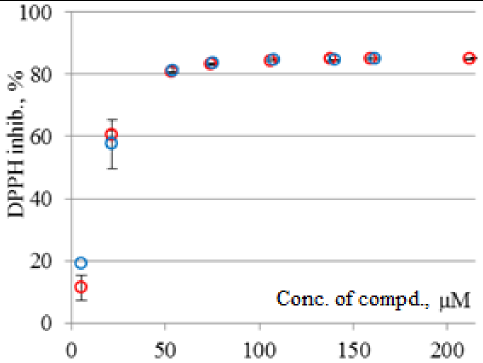

F

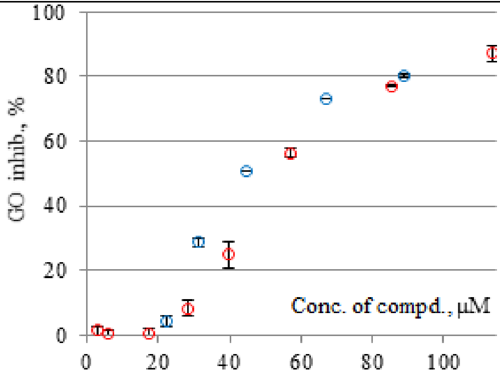
1s

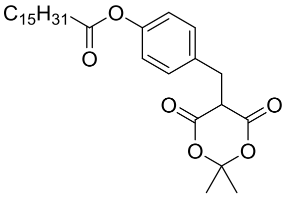

DPPH inhib., %
Conc. of compd., μM
GO inhib., %
Conc. of compd., μM


AcO
O
O
O
O

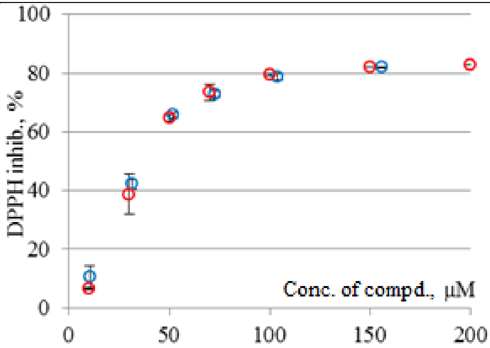
1t

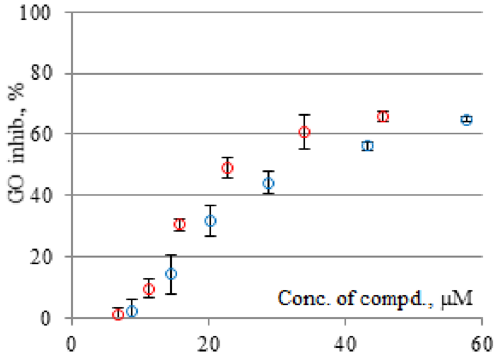

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200

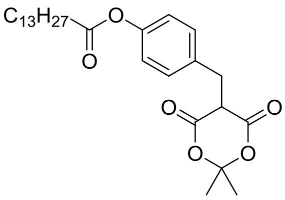

GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60
80
100


C15H31
O
O
O
O
O
O

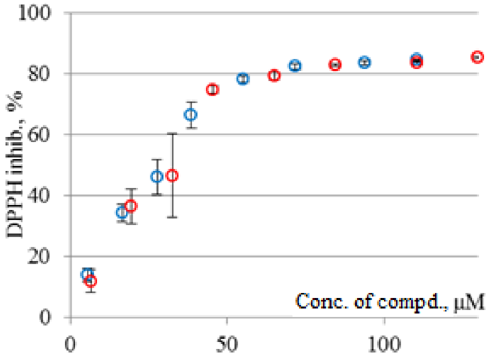
1u

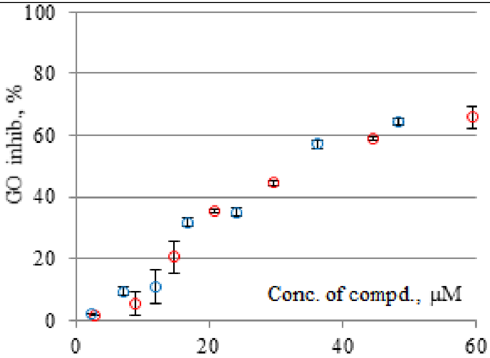

DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100
150
200


GO inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
20
40
60


C13H27
O
O
O
O
O
O

1v


DPPH inhib., %
Conc. of compd., μM
0
20
40
60
80
100
0
50
100


GO inhib., %
Conc. of compd., μM
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40
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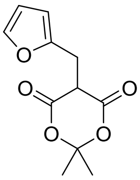
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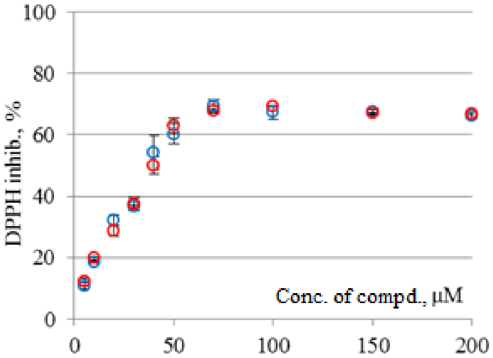
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Conc. of compd., μM
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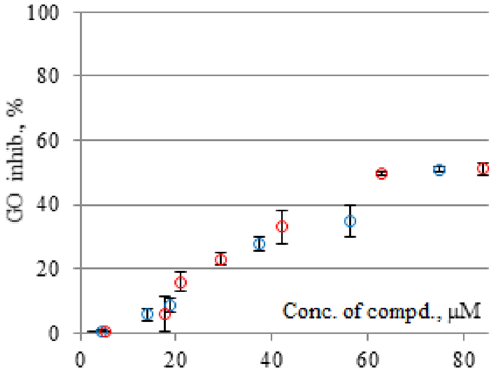
GO inhib., %
Conc. of compd., μM
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100
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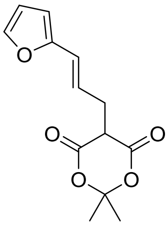
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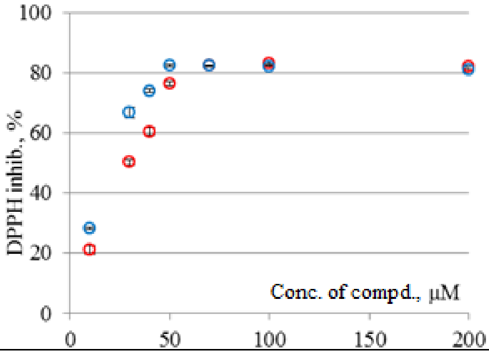
DPPH inhib., %
Conc. of compd., μM
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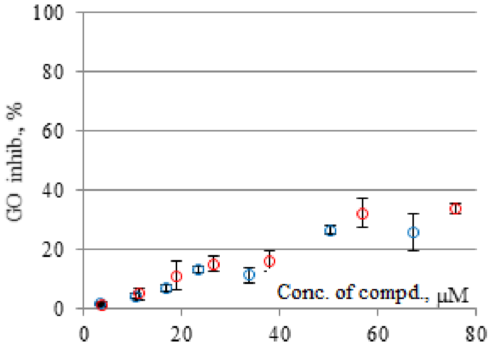
GO inhib., %
Conc. of compd., μM
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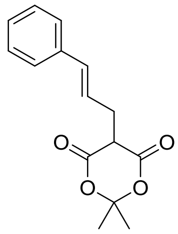

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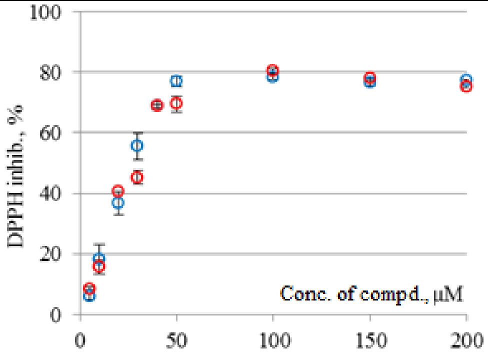
DPPH inhib., %
Conc. of compd., μM
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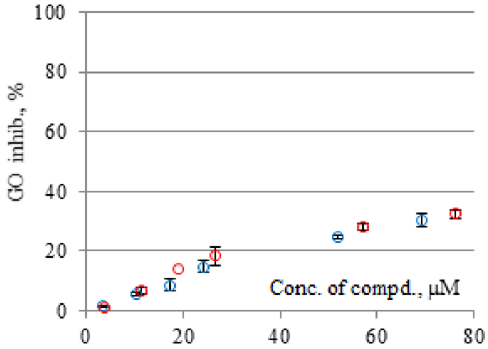
GO inhib., %
Conc. of compd., μM
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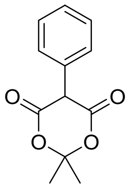

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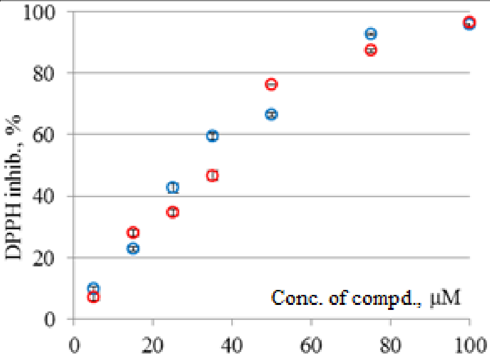
DPPH inhib., %
Conc. of compd., μM
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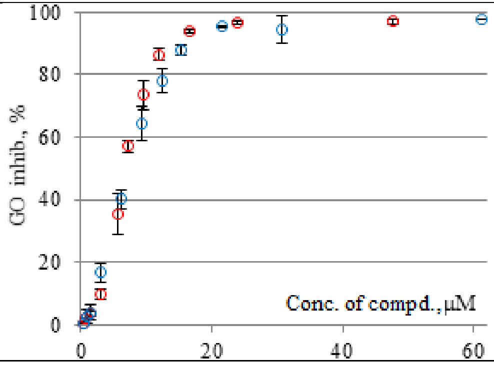
GO inhib., %
Conc. of compd., μM
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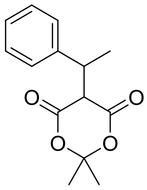

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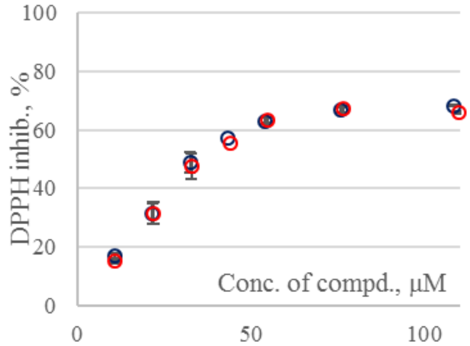
DPPH inhib., %
Conc. of compd., μM
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40
60
80
100
0
50
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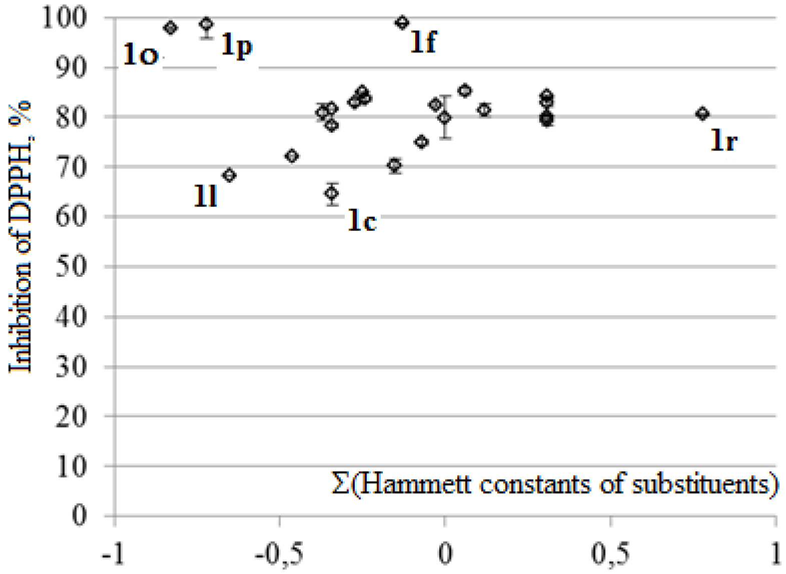


Figure S1. Correlation between electronic effects of the substituents and inhibition of DPPH, when molar ratio DPPH:antioxidant is 1:1.

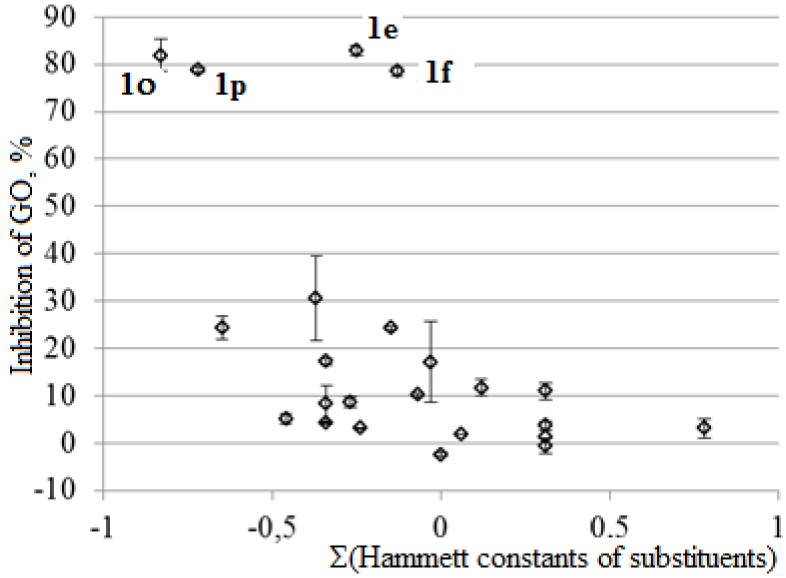


Figure S2. Correlation between electronic effects of the substituents and inhibition of GO, when molar ratio GO:antioxidant is 1:1.

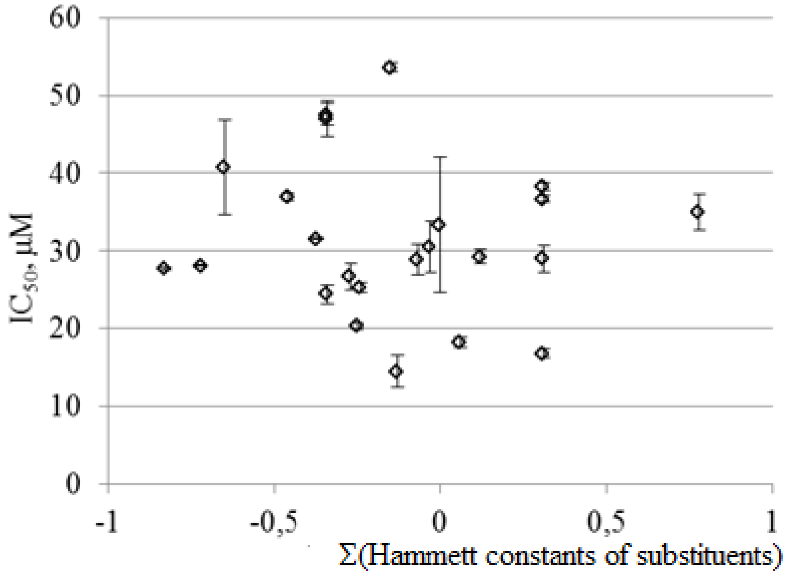


Figure S3. Correlation between electronic effects of the substituent and IC_{50} (DPPH assay)

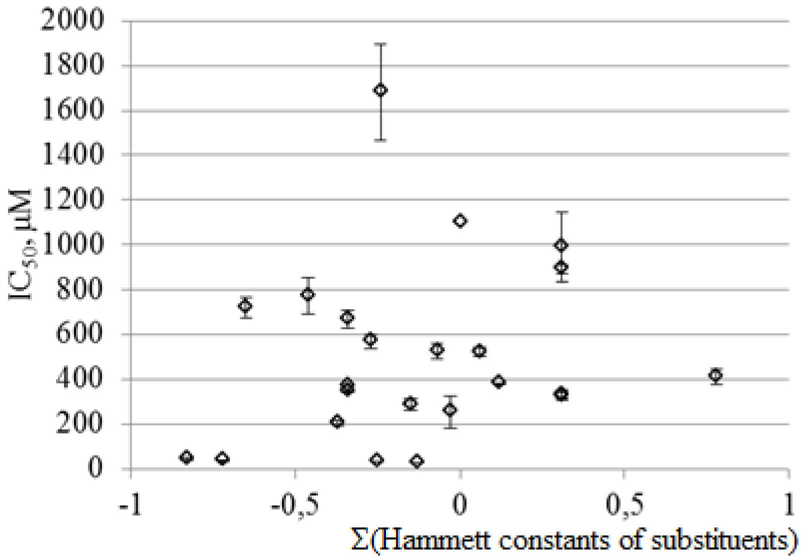


Figure S4. Correlation between electronic effects of the substituent and IC_{50} (GO assay)

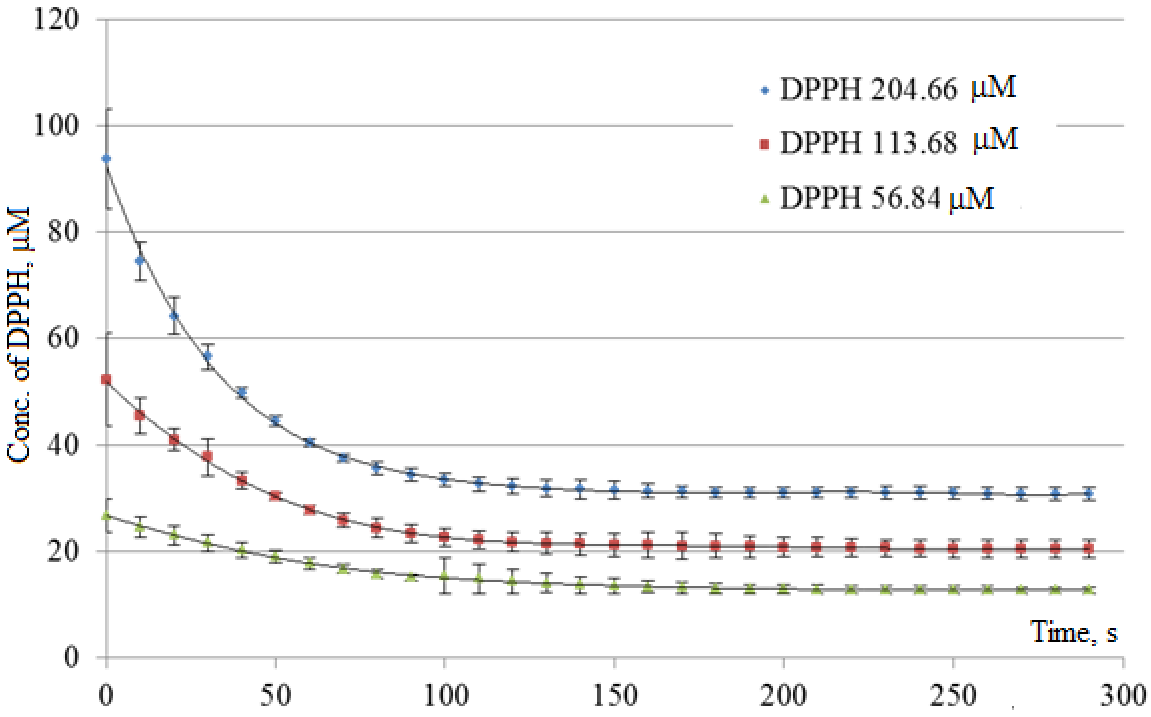


Figure S5. Kinetic curves of the reaction of arylmethyl Meldrum`s acid **1 b** and DPPH

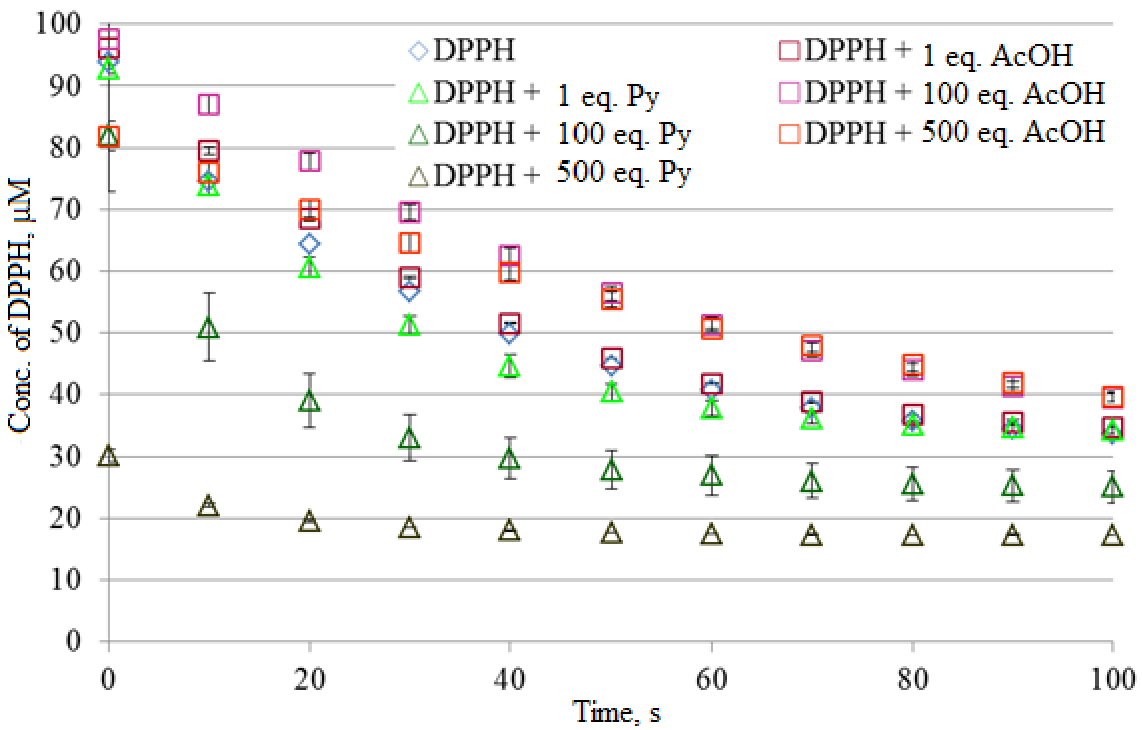


Figure S6. Kinetic curves of the reaction of arylmethyl Meldrum`s acid **1 b** and DPPH with and without additives of pyridine and acetic acid (conc. of DPPH stock solution 204.66 μM)

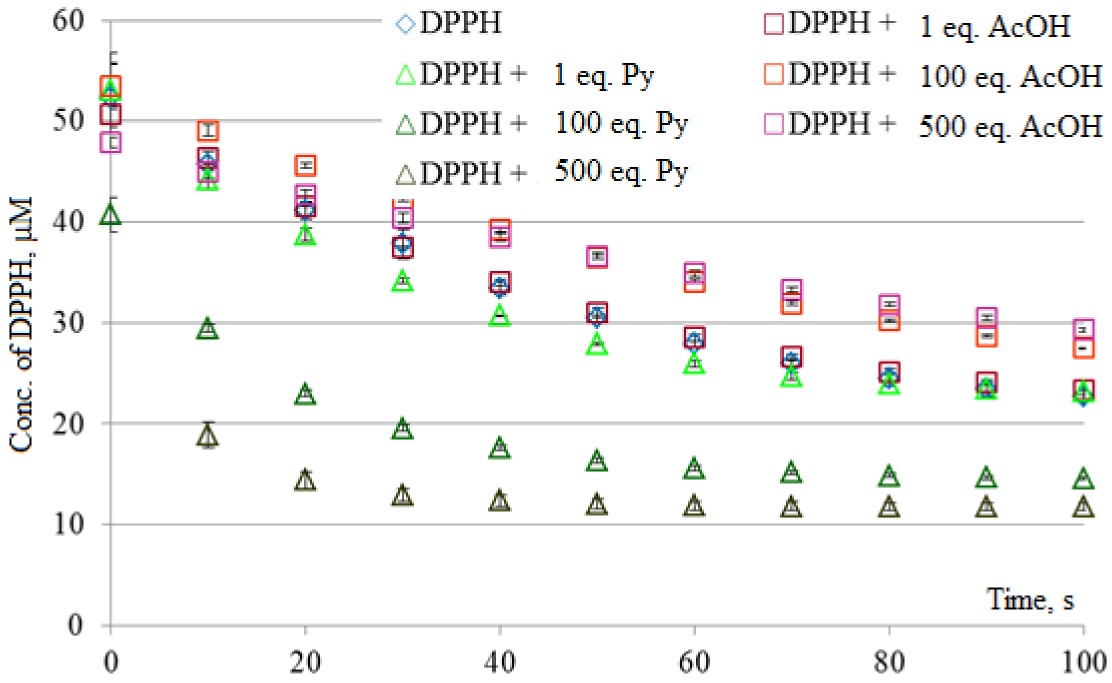


Figure S7. Kinetic curves of the reaction of arylmethyl Meldrum`s acid **1 b** and DPPH with and without additives of pyridine and acetic acid (conc. of DPPH stock solution 113.68 µM)

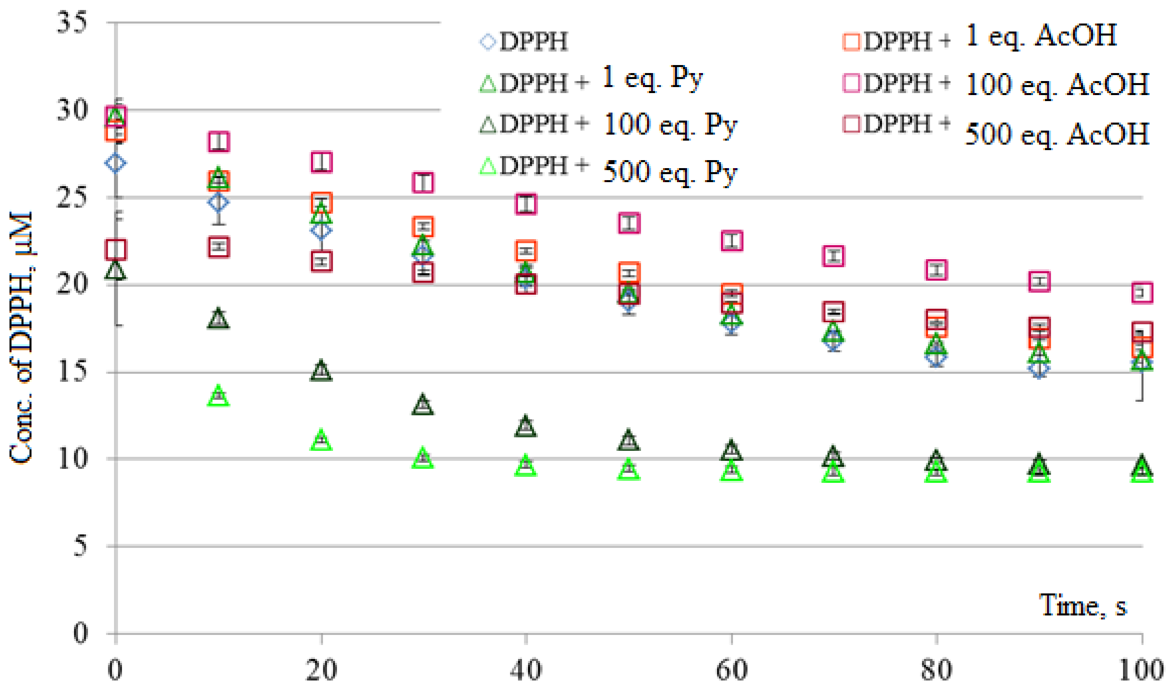


Figure S8. Kinetic curves of the reaction of arylmethyl Meldrum`s acid **1 b** and DPPH with and without additives of pyridine and acetic acid (conc. of DPPH stock solution 56.84 µM)

Experimental procedure for the kinetic experiments

DPPH in ethanol (~56, ~112 or ~205 µM; 1.5 mL) and arylmethyl Meldrum`s acid **1 b** (5850 µM; 1.5 mL) with and without additive of pyridine (Py) or acetic acid (AcOH) (See Table S2) was mixed in cuvette and UV/Vis absorption was monitored every 10 s at 515 nm. The duration of experiment – 10 min.

Table S2

Solution of antioxidant

Entry	Additive	Amount, eq.
1	-	-
2	AcOH	1

3	AcOH	100
4	AcOH	500
5	Py	1
6	Py	100
7	Py	500

The amount of DPPH was calculated through calibration curve (R^2 = 0.9991):

$$c_{DPPH} = (A + 0.0642)/0.0114$$

Each experiment was carried triple. The results are presented as mean ± standard deviation.

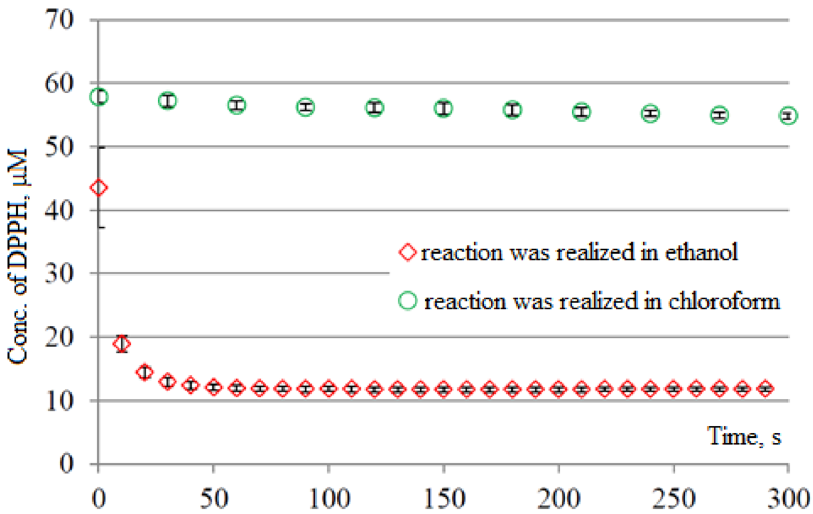


Figure S9. Kinetic curves of the reaction of arylmethyl Meldrum`s acid **1 b** and DPPH in ethanol and chloroform

Experimental procedure

The experiments were realized analogous to the described above. When the reaction was realized in chloroform, both DPPH and arylmethyl Meldrum`s acid was dissolved in chloroform. The duration of the experiment was 300 s.

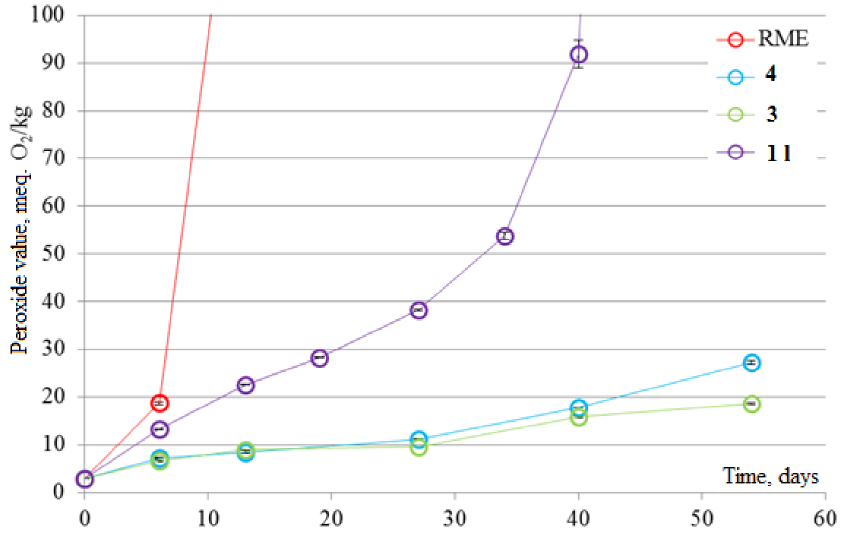


Figure S10. The impact of arylmethyl Meldrum`s acids **1 l**, **3** and **4** on the oxidative stability of rapeseed oil methyl esters (RME).†

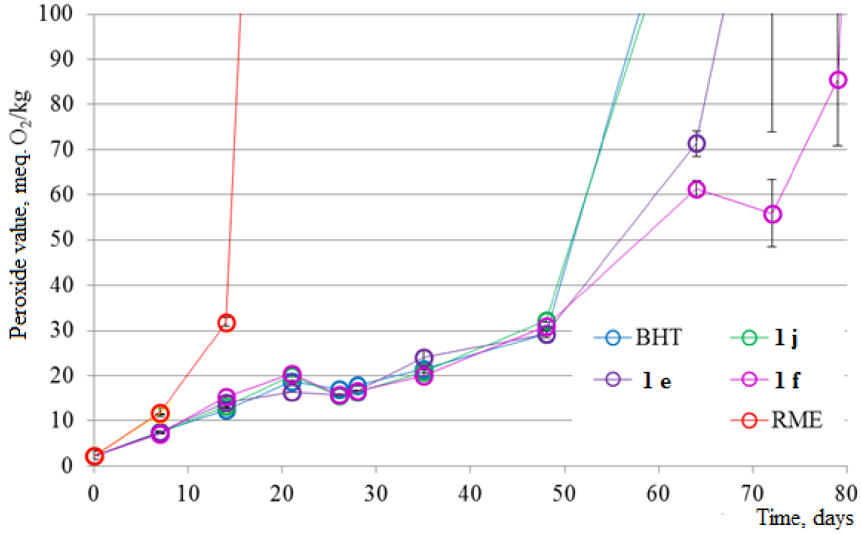


Figure S11. The impact of arylmethyl Meldrum`s acids **1 e**, **f**, **j** and BHT on the oxidative stability of RME.

† The data of peroxide values are presented as mean ± standard deviation from two unattached experiments

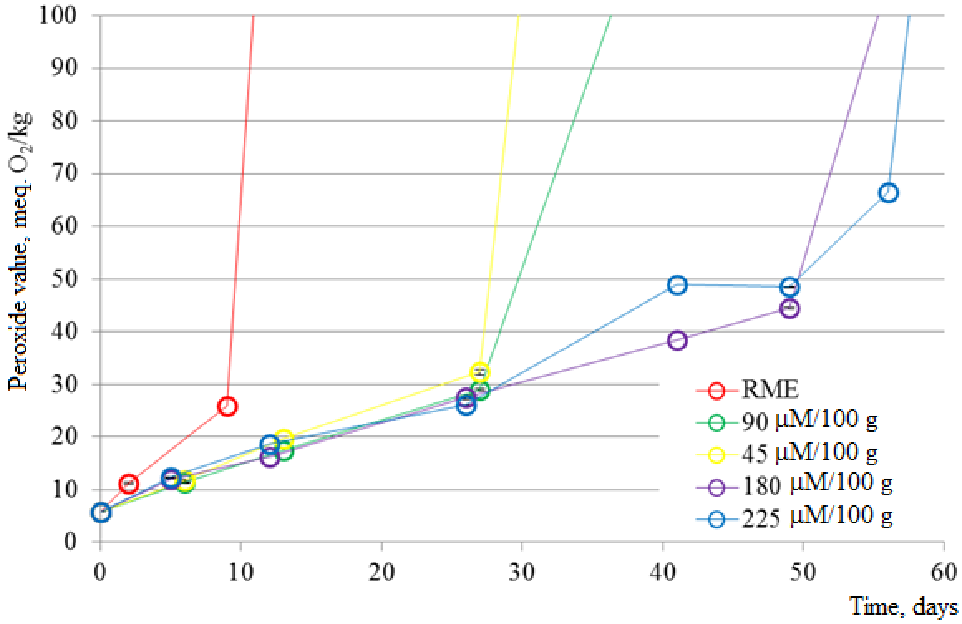


Figure S12. The impact of arylmethyl Meldrum`s acids **1 j** (different concentrations) on the oxidative stability of RME.

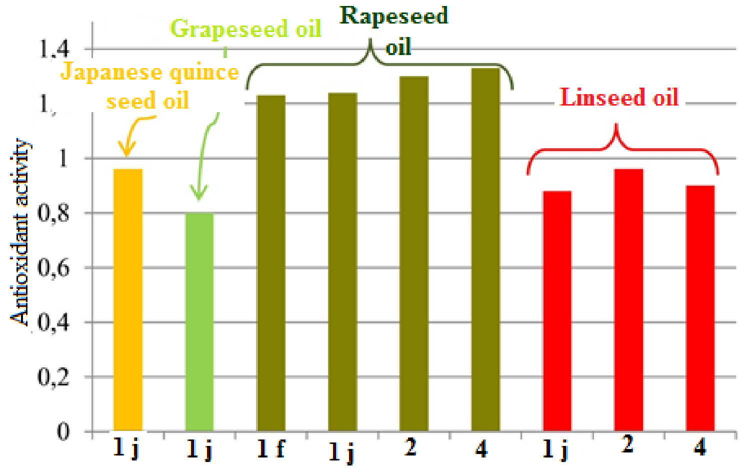
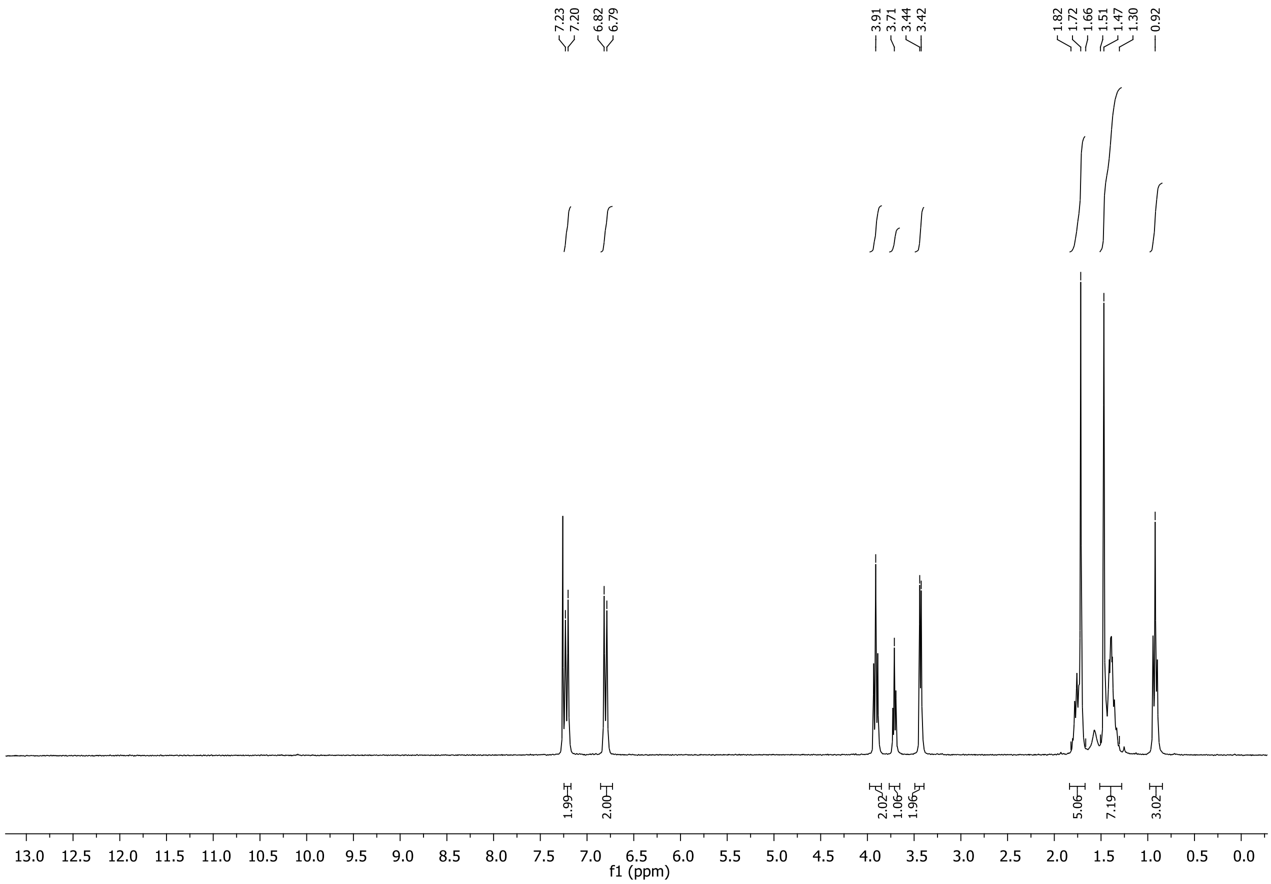
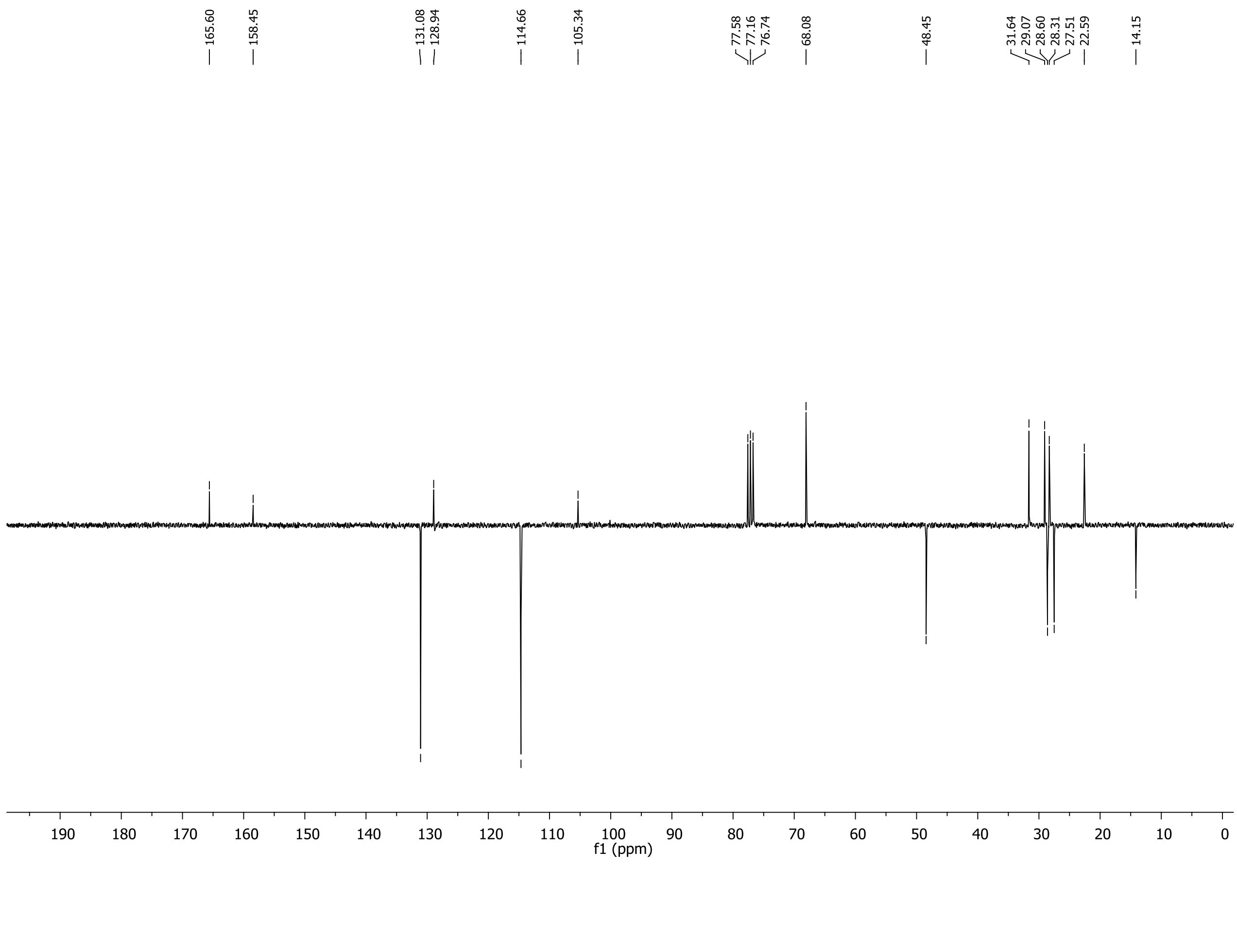


Figure S13. The impact of substituted Meldrum`s acids on the oxidative stability of different vegetable oils. Amount of the additive 90 µmol/100 g

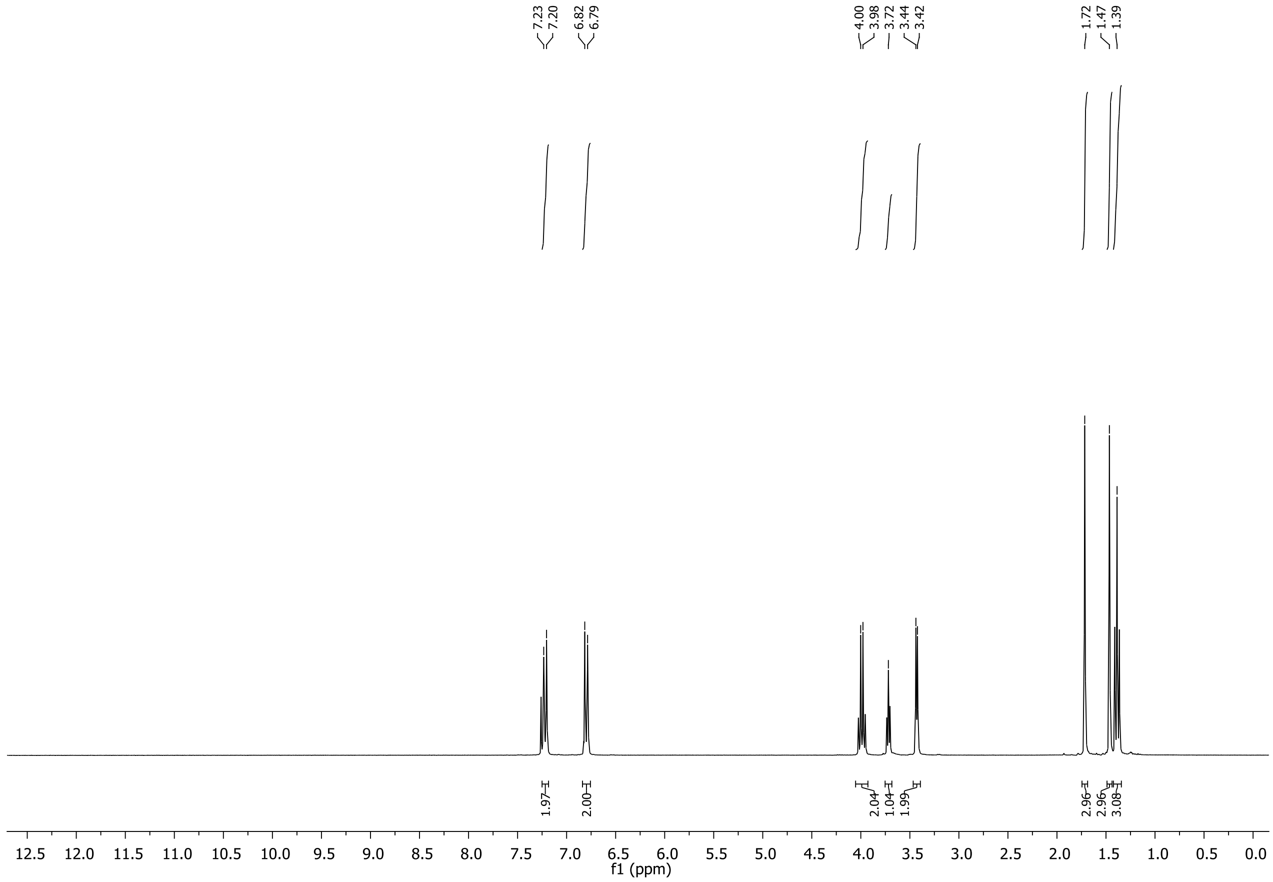
NMR spectra of the new compounds

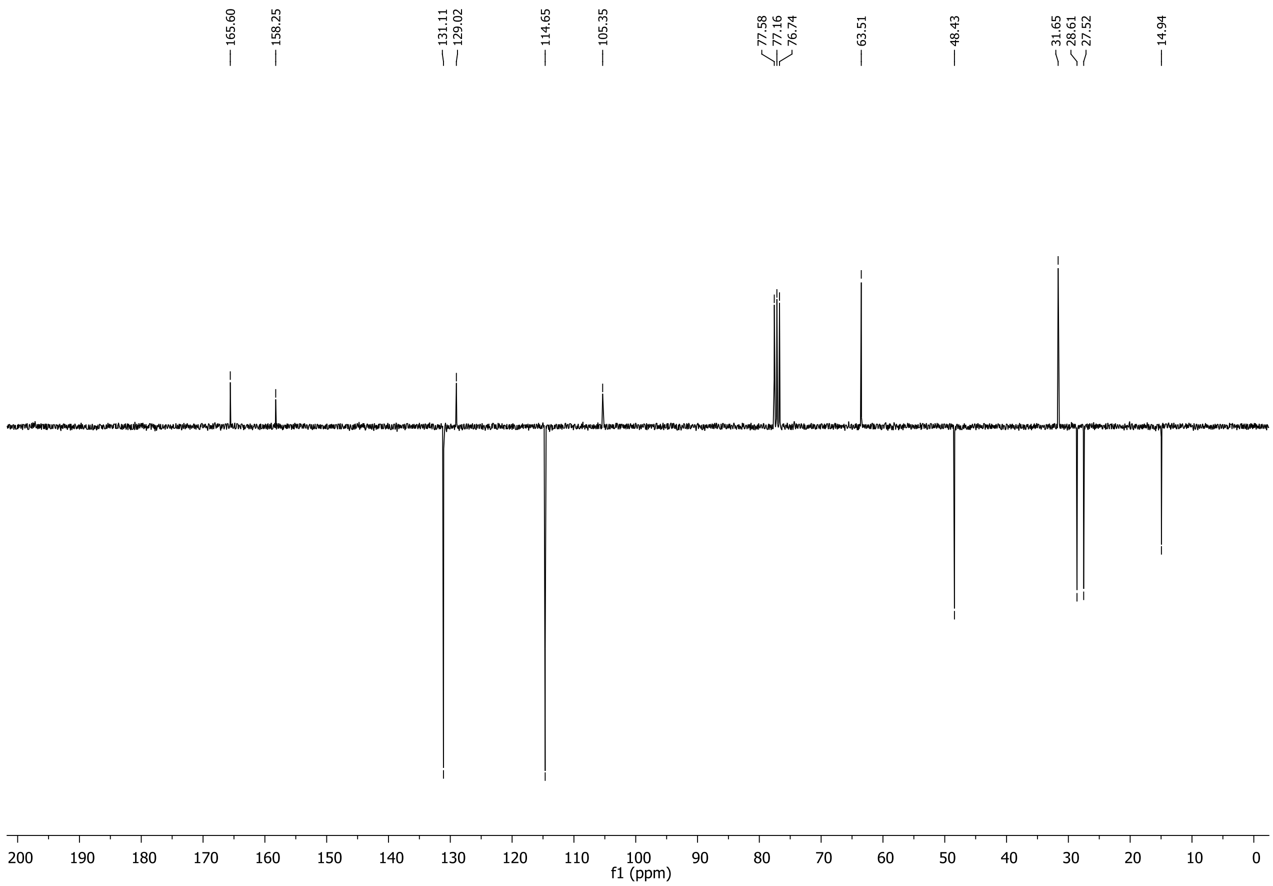
2,2-Dimethyl-5-(4-pentoxyphenyl)methyl-1,3-dioxane-4,6-dione (1j)



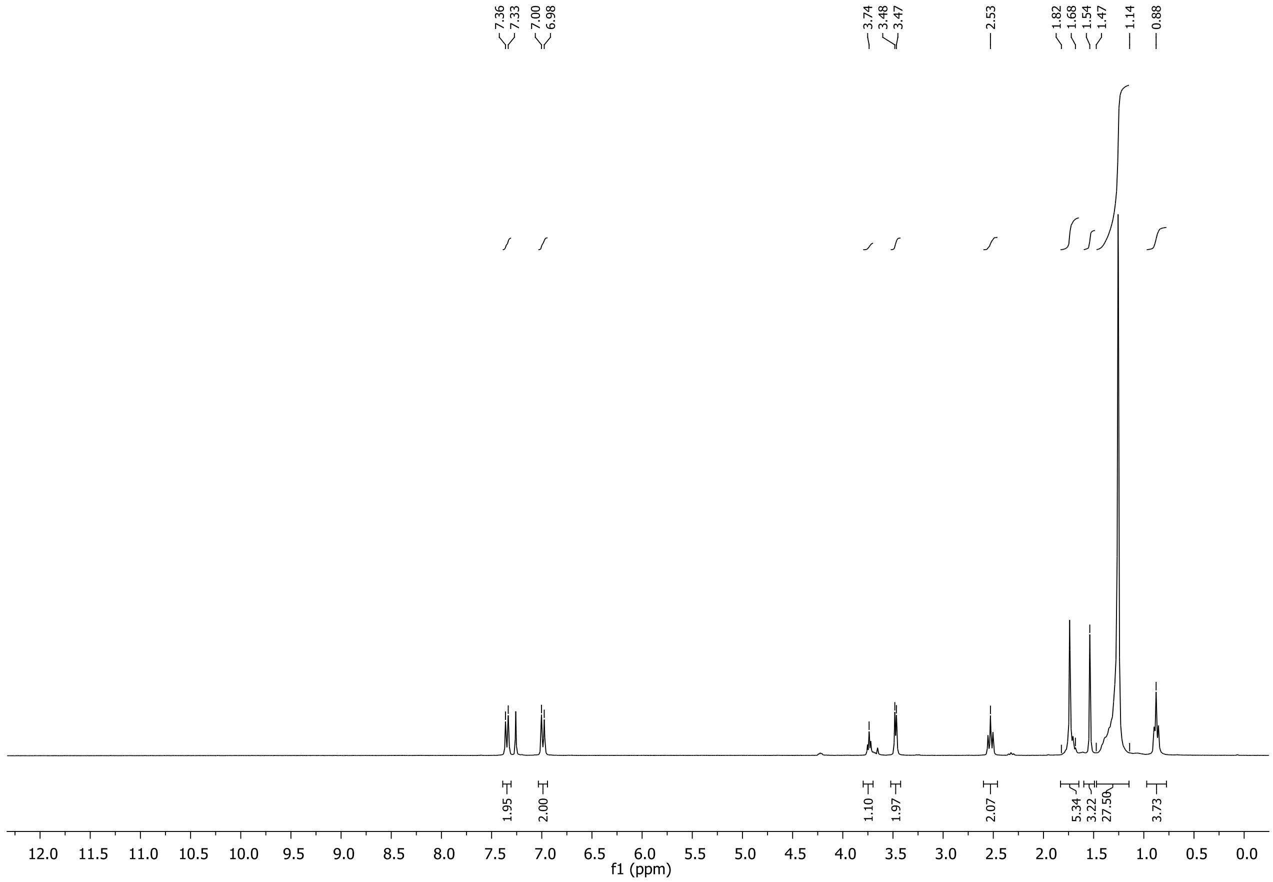


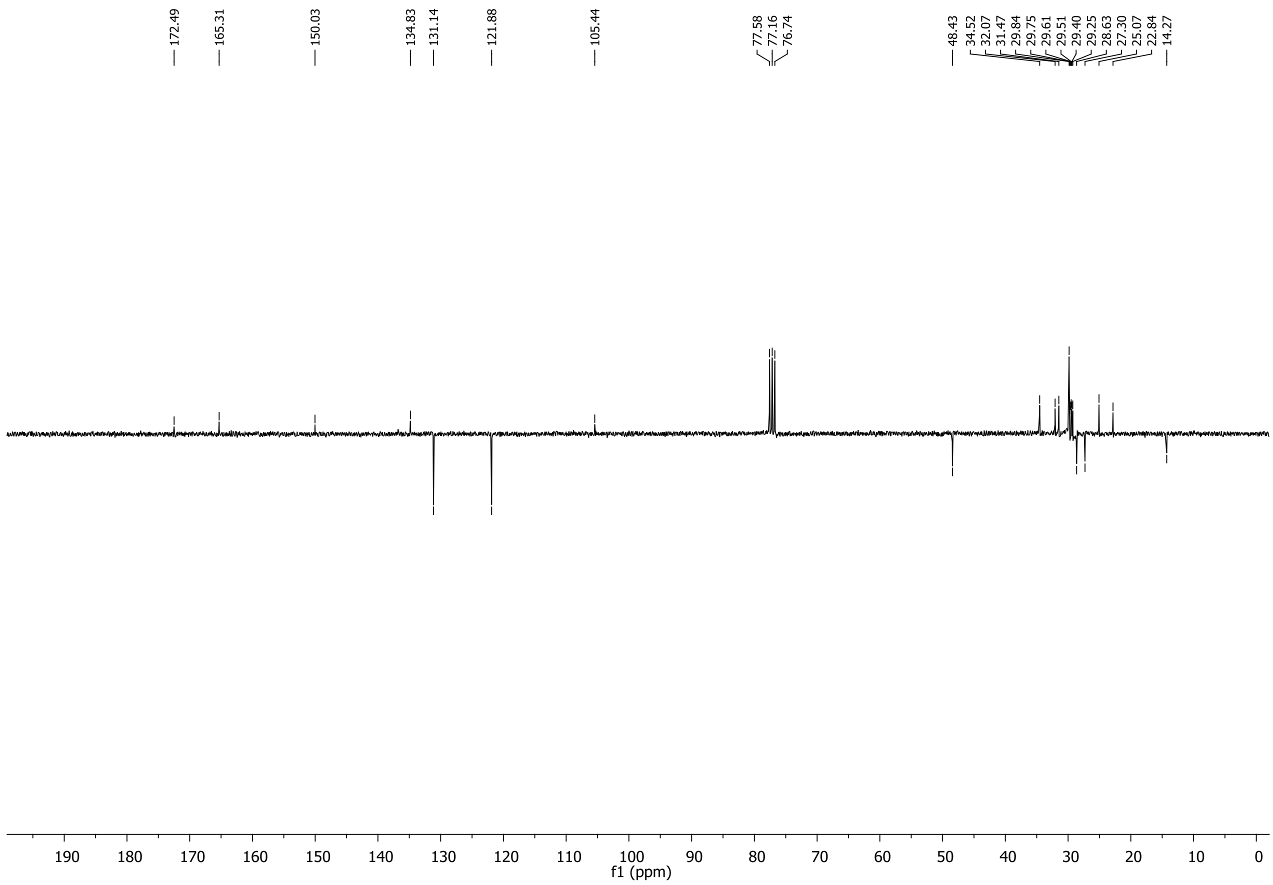
2,2-Dimethyl-5-(4-ethoxyphenyl)methyl-1,3-dioxane-4,6-dione (1 n)



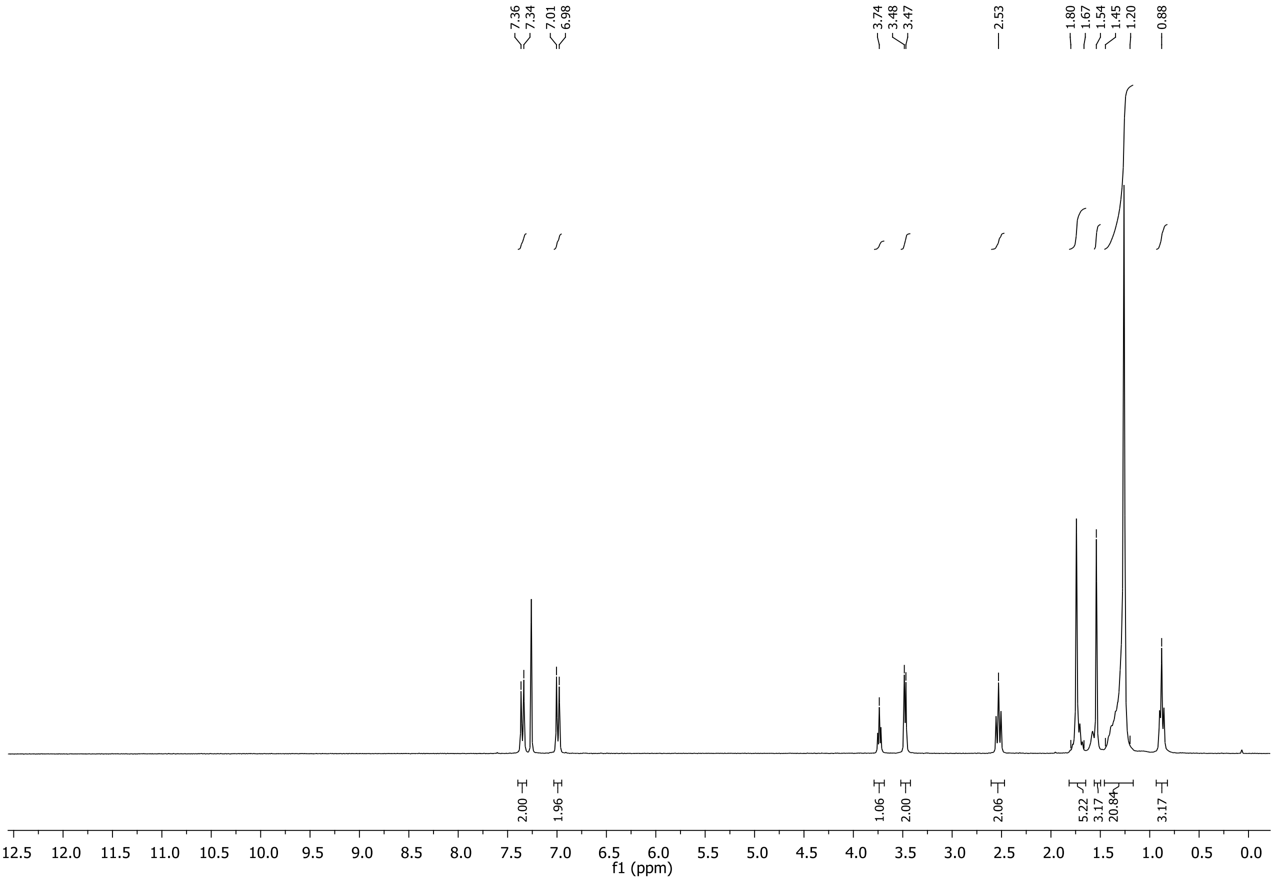


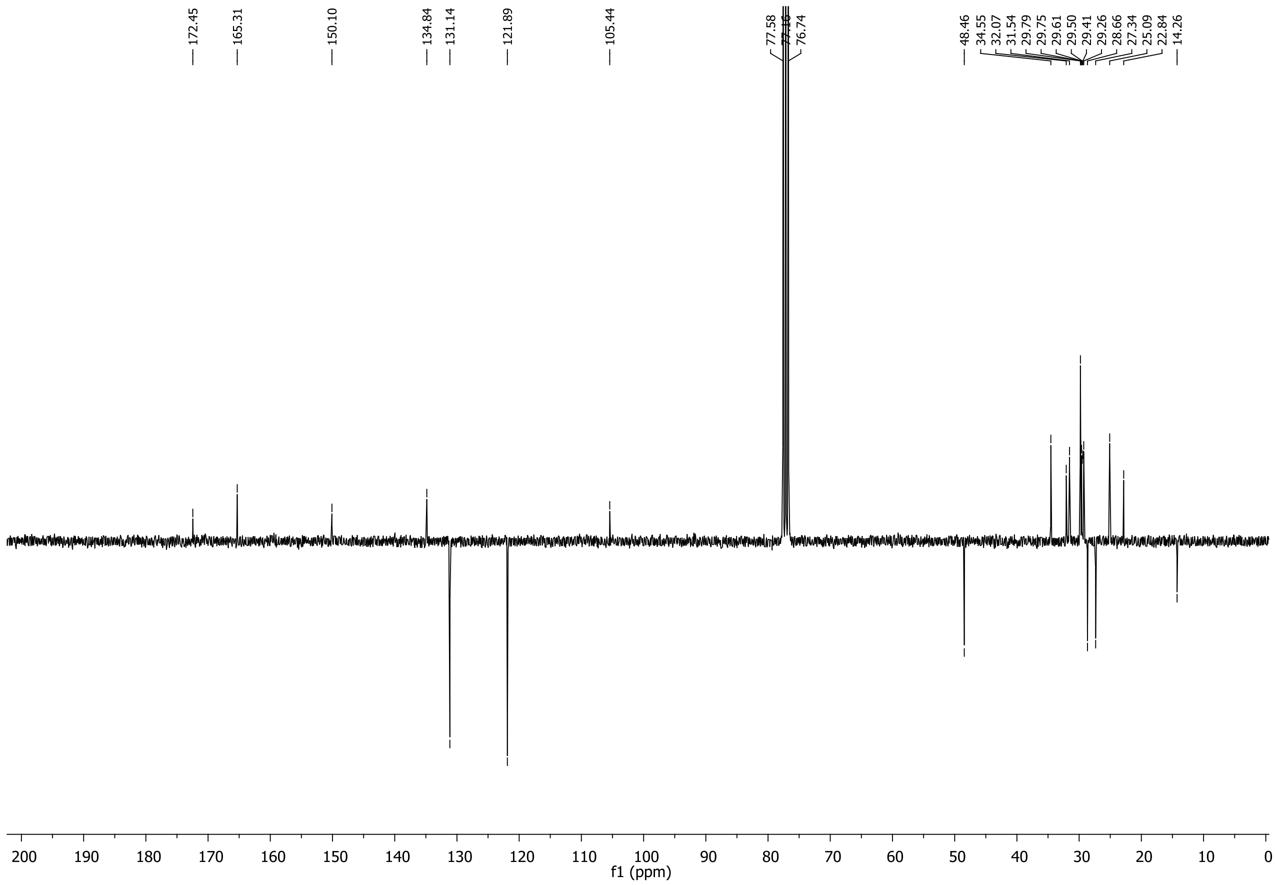
2,2-Dimethyl-5-(4-palmitoyloxyphenyl)methyl-1,3-dioxane-4,6-dione (1 u)



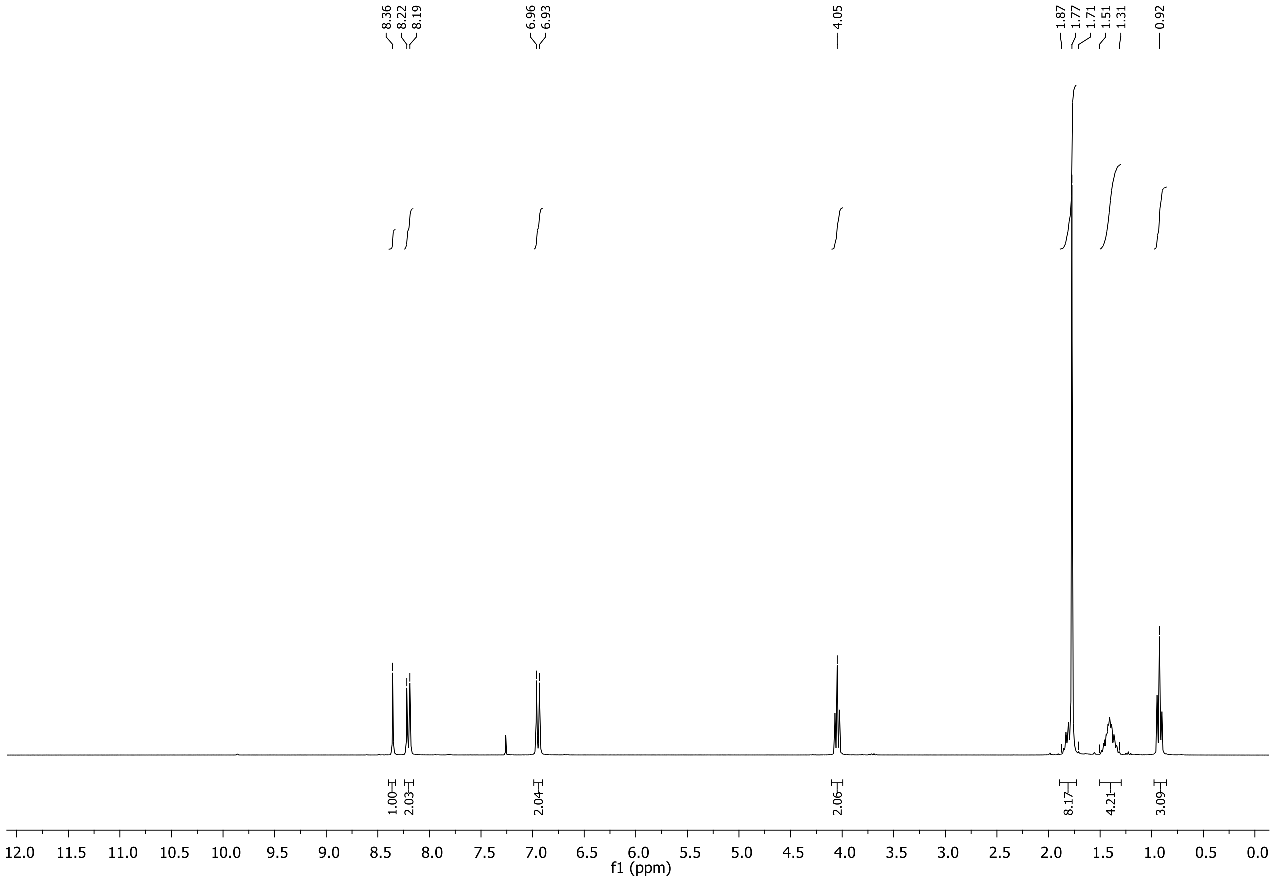


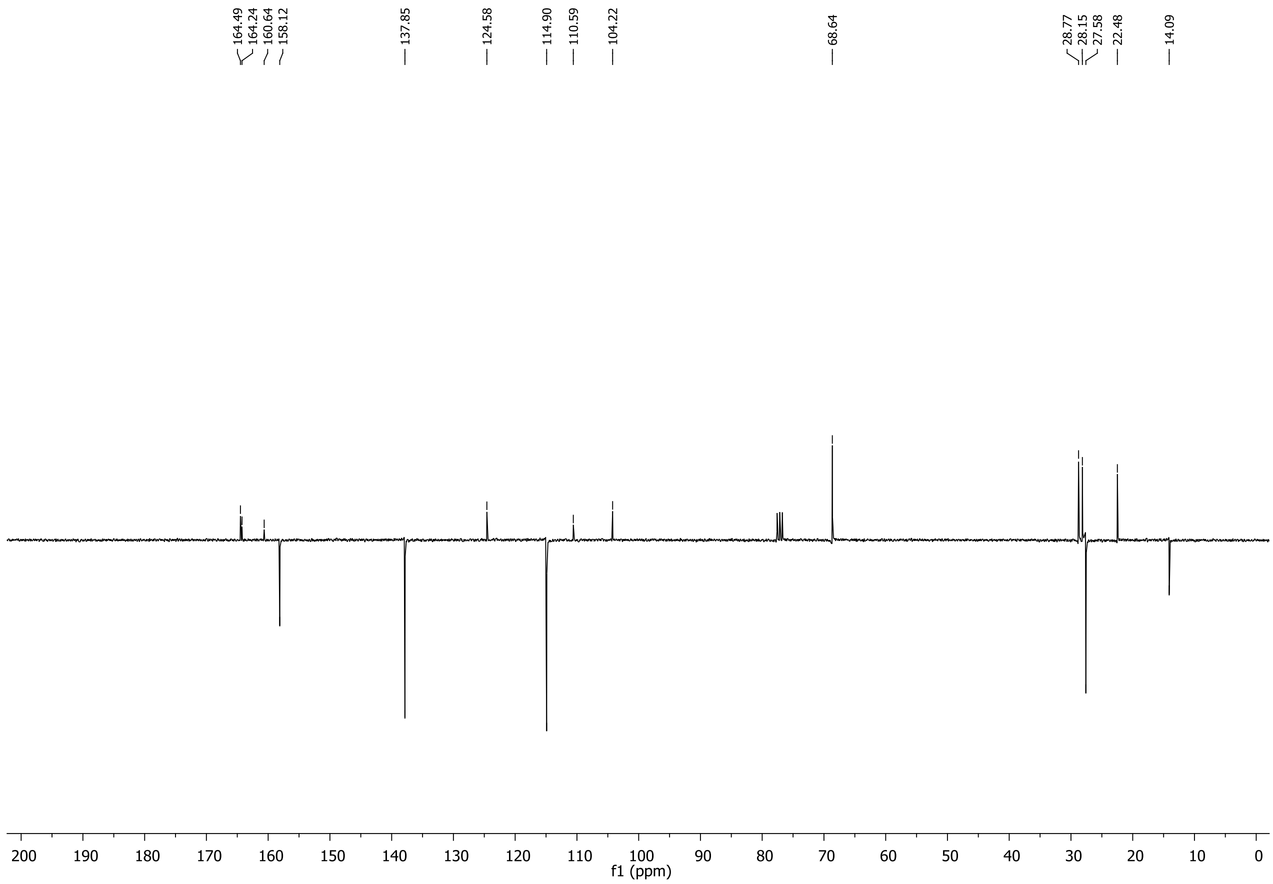
2,2-Dimethyl-5-(4-myristoyloxyphenyl)methyl-1,3-dioxane-4,6-dione (1 v)



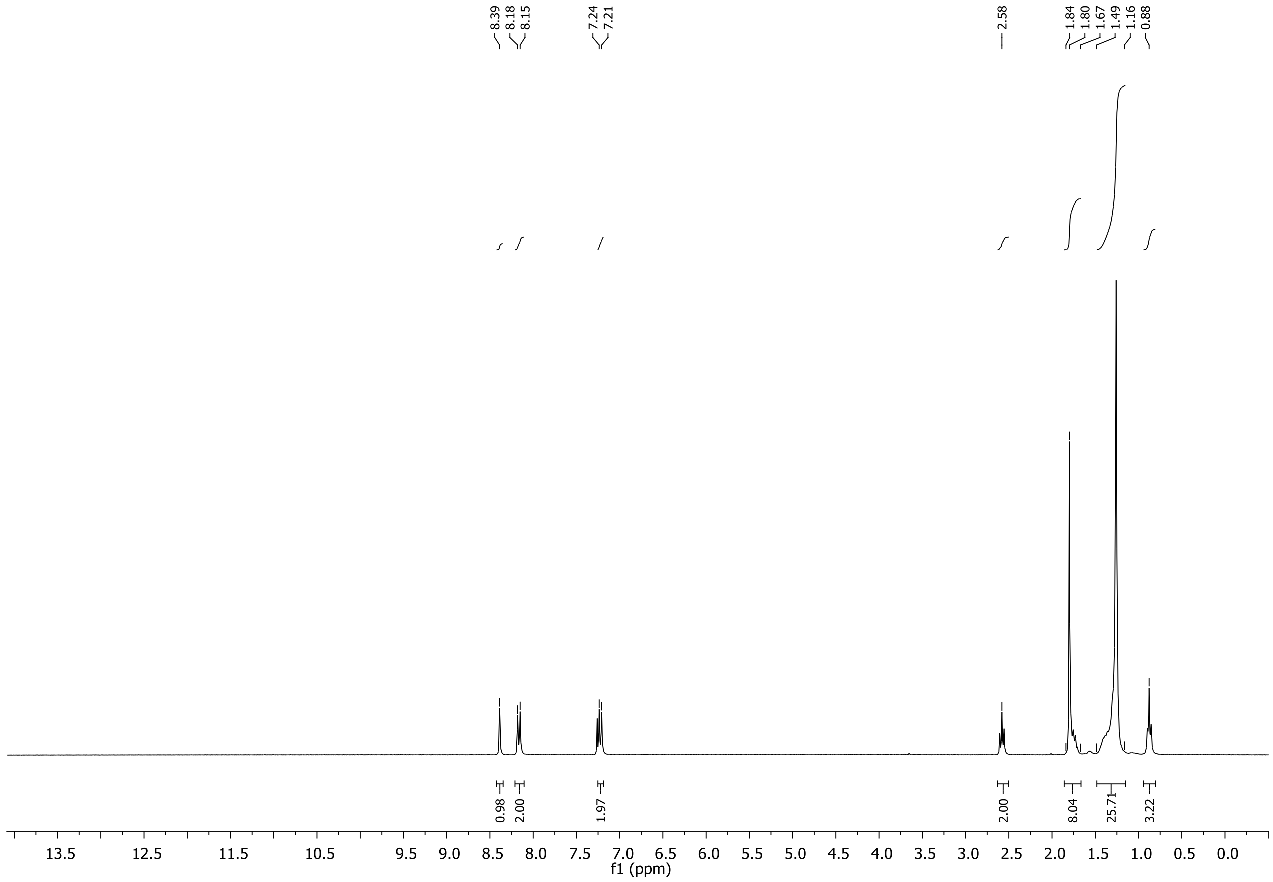


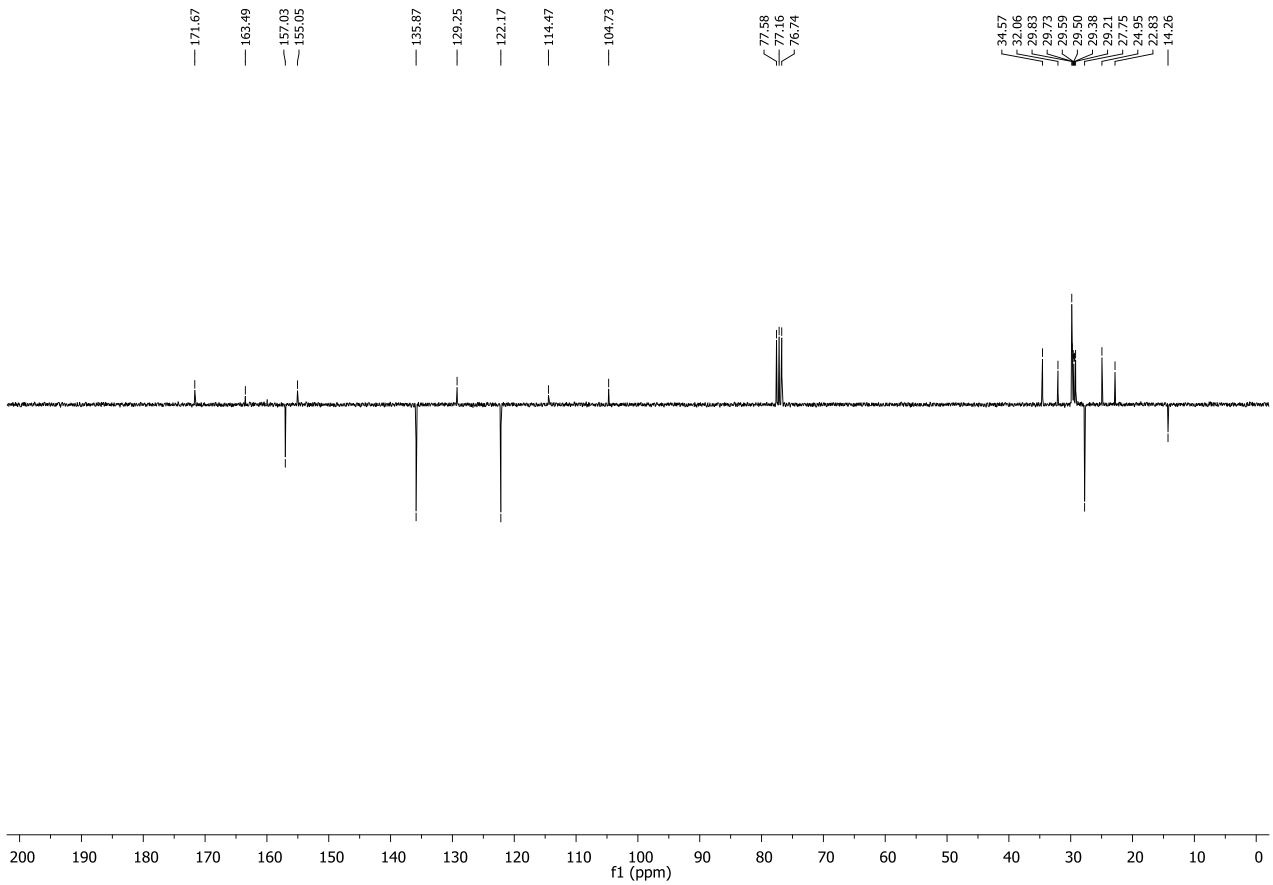
2,2-Dimethyl-5-(4-pentyloxyphenyl)methylene-1,3-dioxane-4,6-dione (10 j)



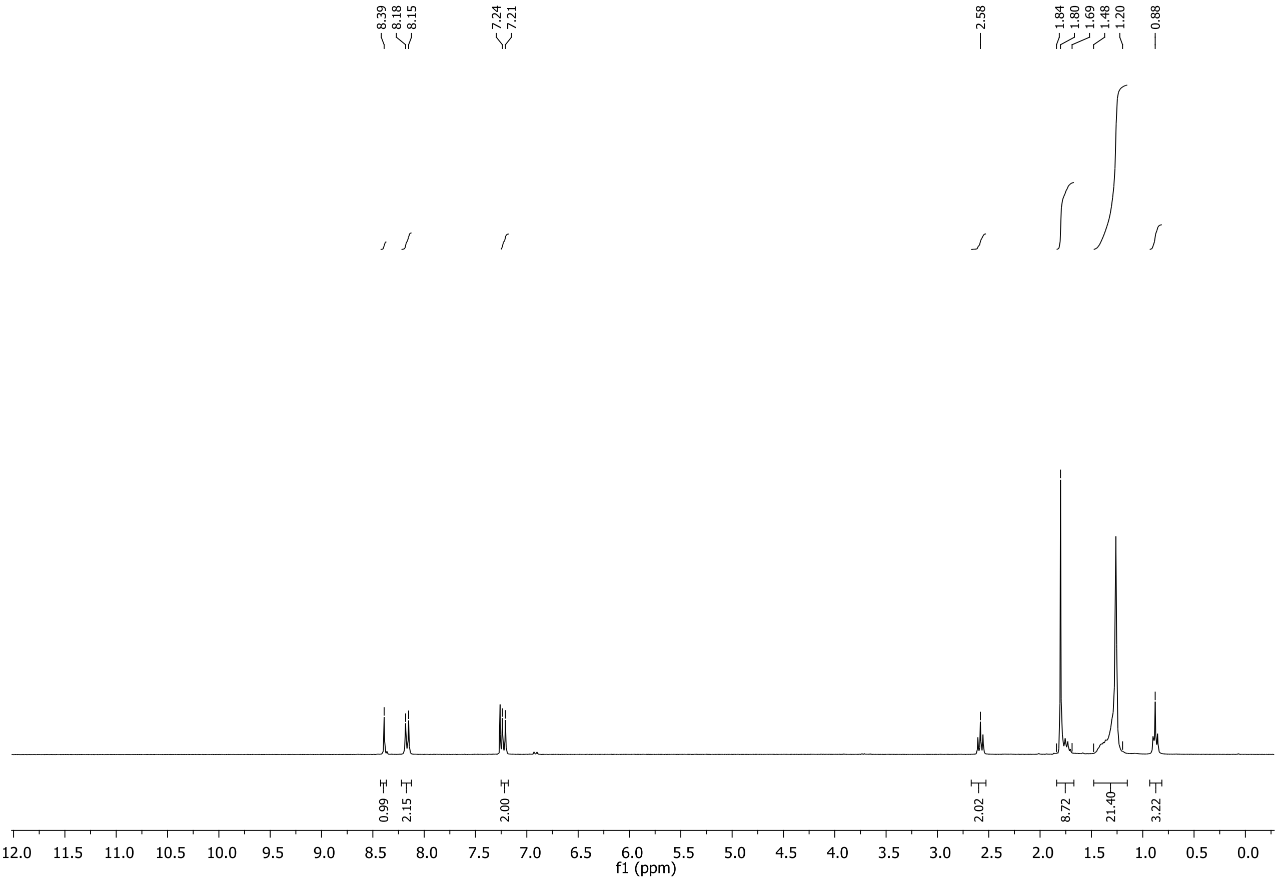


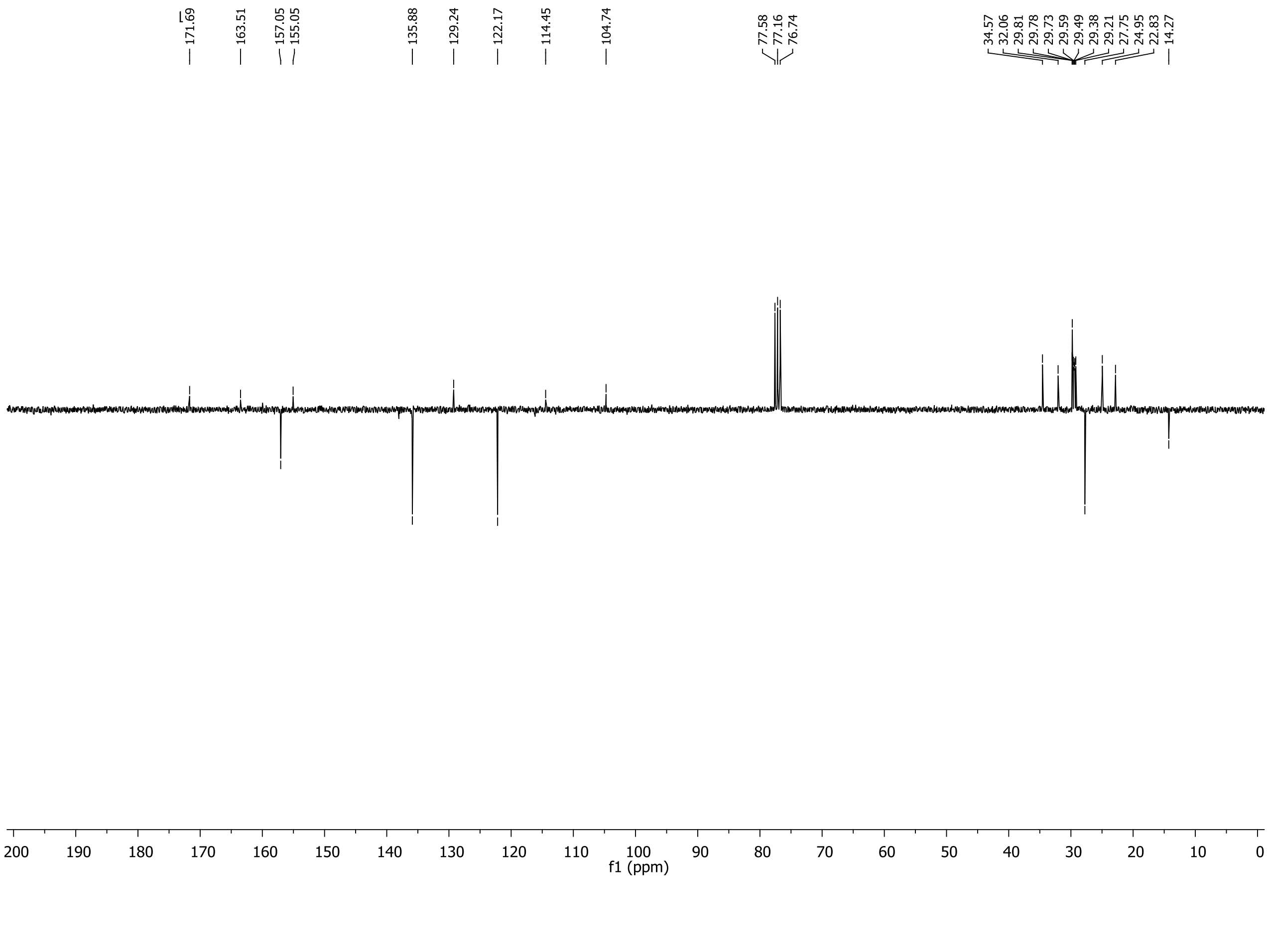
2,2-Dimethyl-5-(4-palmitoyloxyphenyl)methylene-1,3-dioxane-4,6-dione (10 u)





2,2-Dimethyl-5-(4-myristoyloxyphenyl)methylene-1,3-dioxane-4,6-dione (10 v)





5-(2,4-Dimethoxybenzyl)-2,2-dimethyl-5-[4-(1-phenyl-2-(2,4,6-trinitrophenyl)hydrazinyl)phenyl]-1,3-dioxane-4,6-dione (21)