

Organocatalytic Aza-Friedel–Crafts/Lactonization Domino Reaction of Naphthols and Phenols with 2-Acetamidoacrylate to Naphtho- and Benzofuranones Bearing a Quaternary Center at the C3 Position

Francesca Bartoccini, Michele Mari, Michele Retini, Silvia Bartolucci and Giovanni Piersanti*

Department of Biomolecular Sciences, University of Urbino “Carlo Bo”

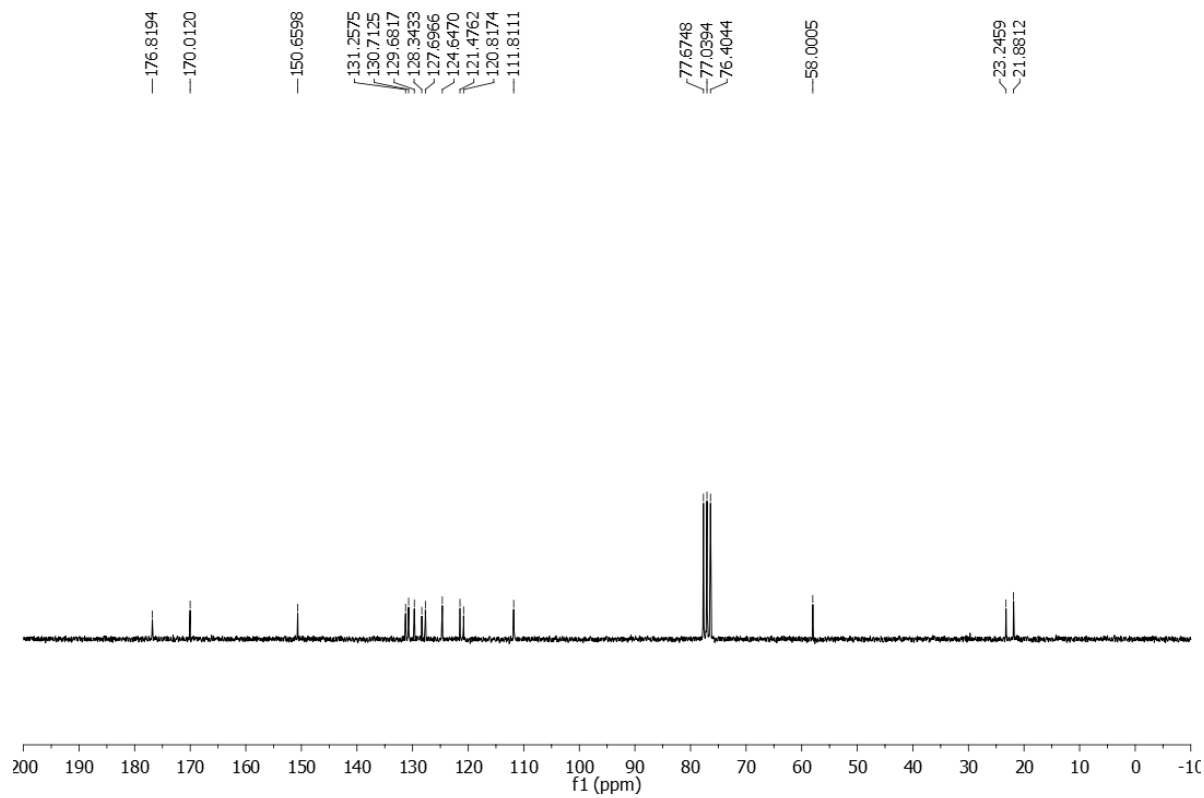
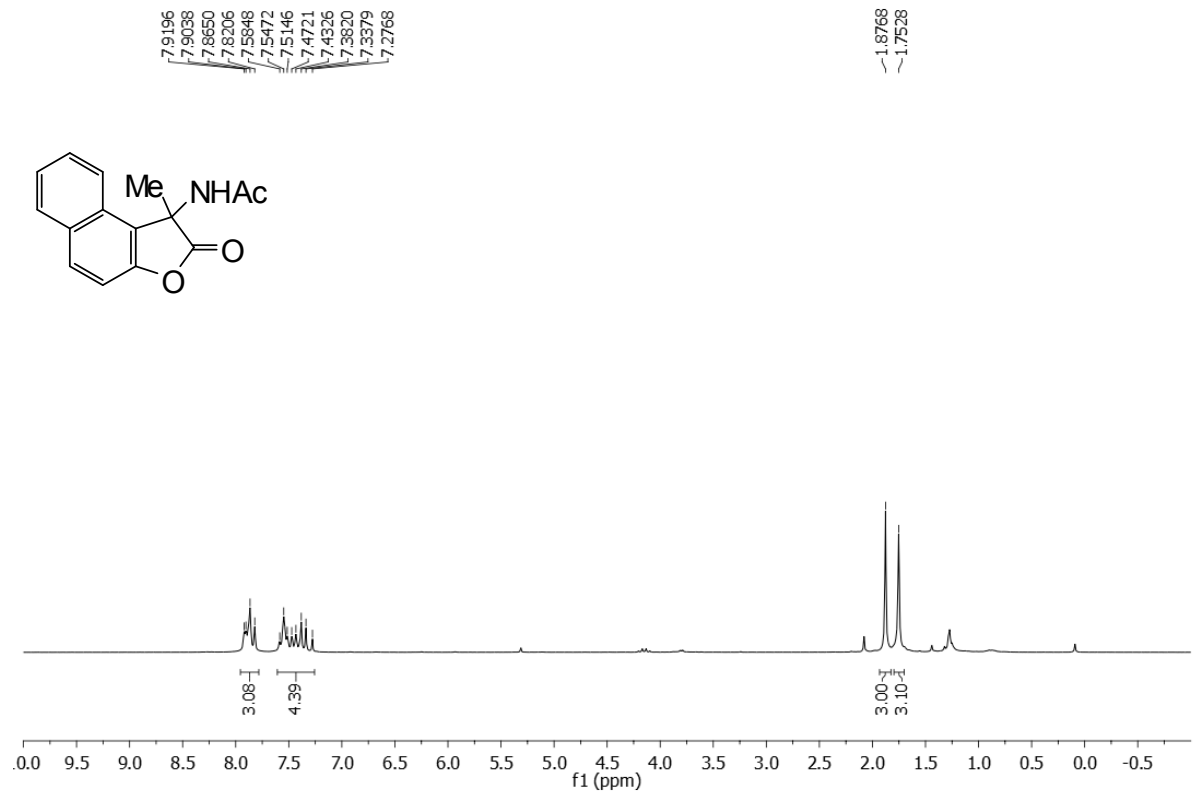
P.zza Rinascimento 6, 61029 Urbino, PU, Italy

*e-mail: giovanni.piersanti@uniurb.it

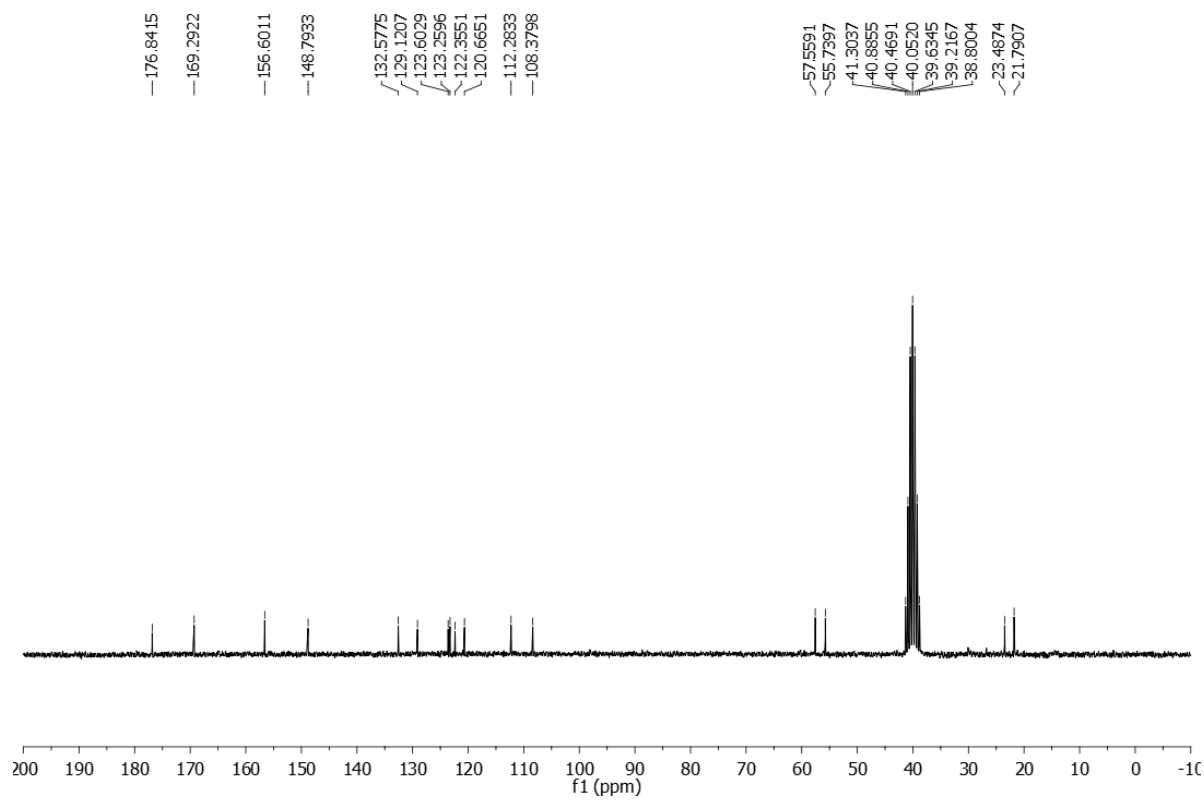
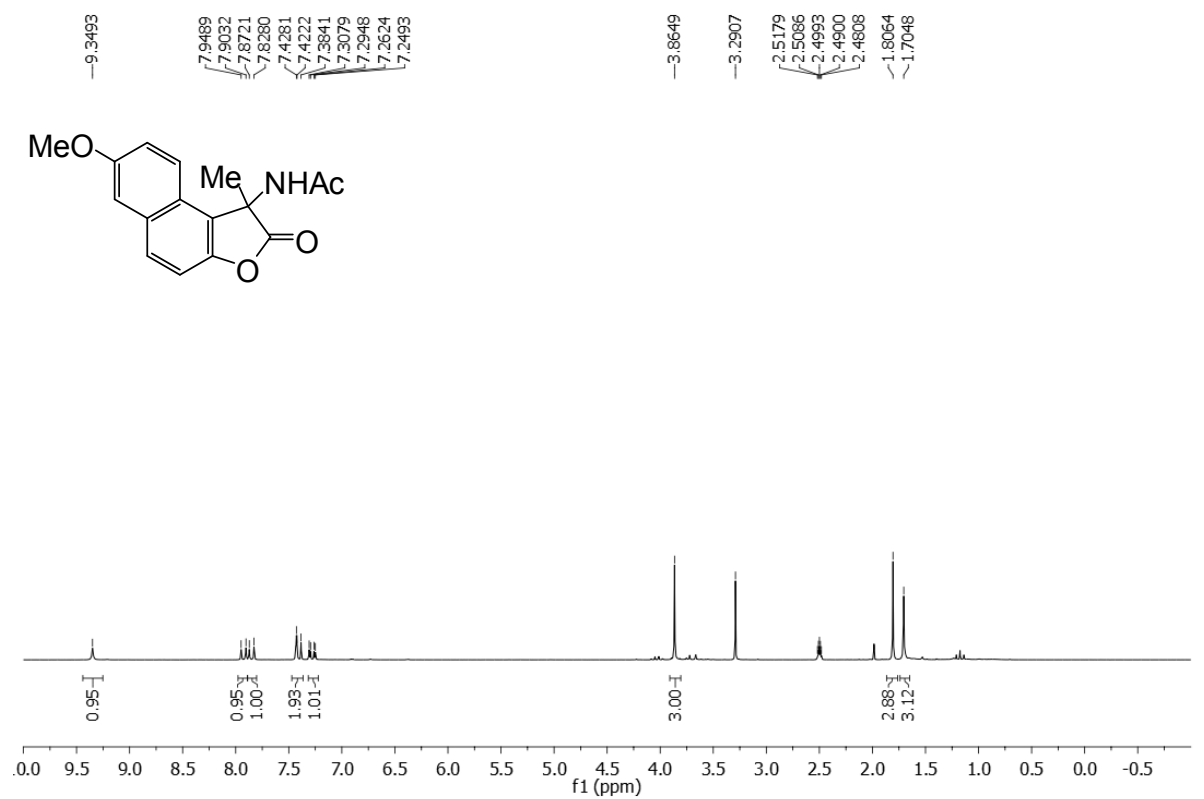
Table of Contents

1. Copies of ^1H NMR and ^{13}C NMR spectra for compounds 3a-p	S2
2. Copies of HPLC chromatogram	S18

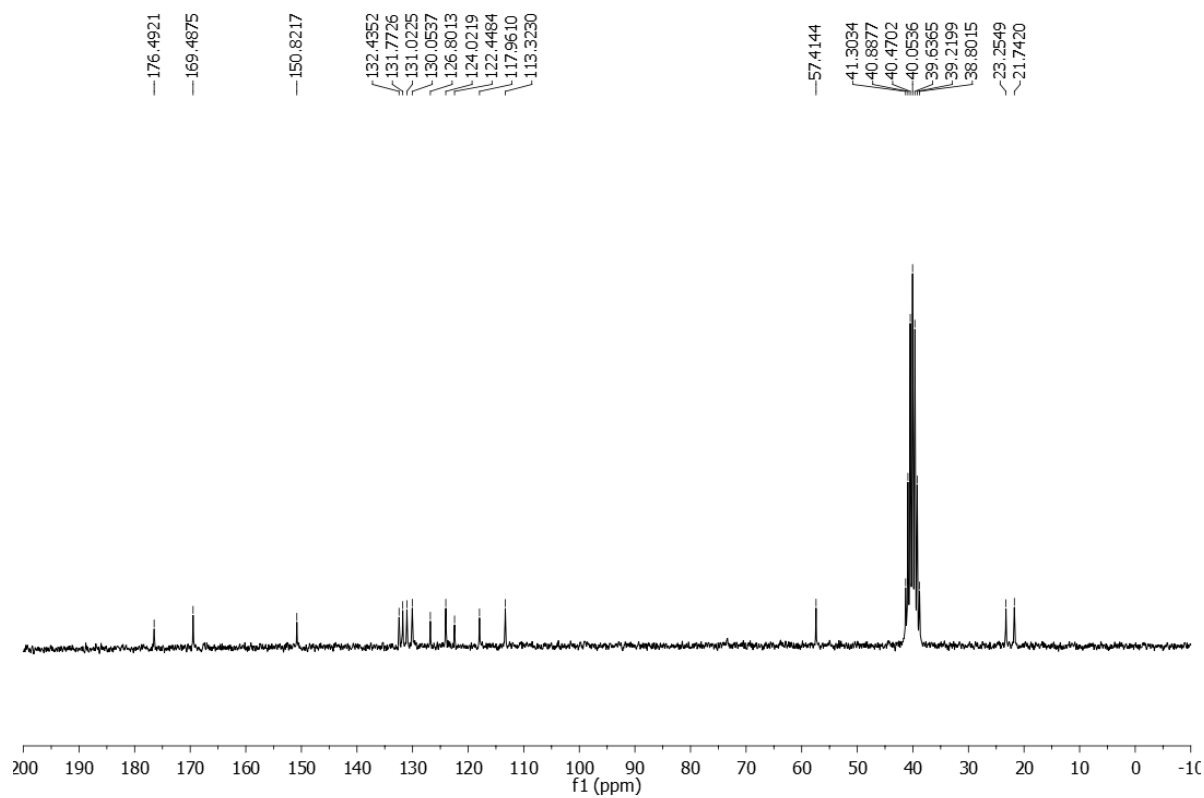
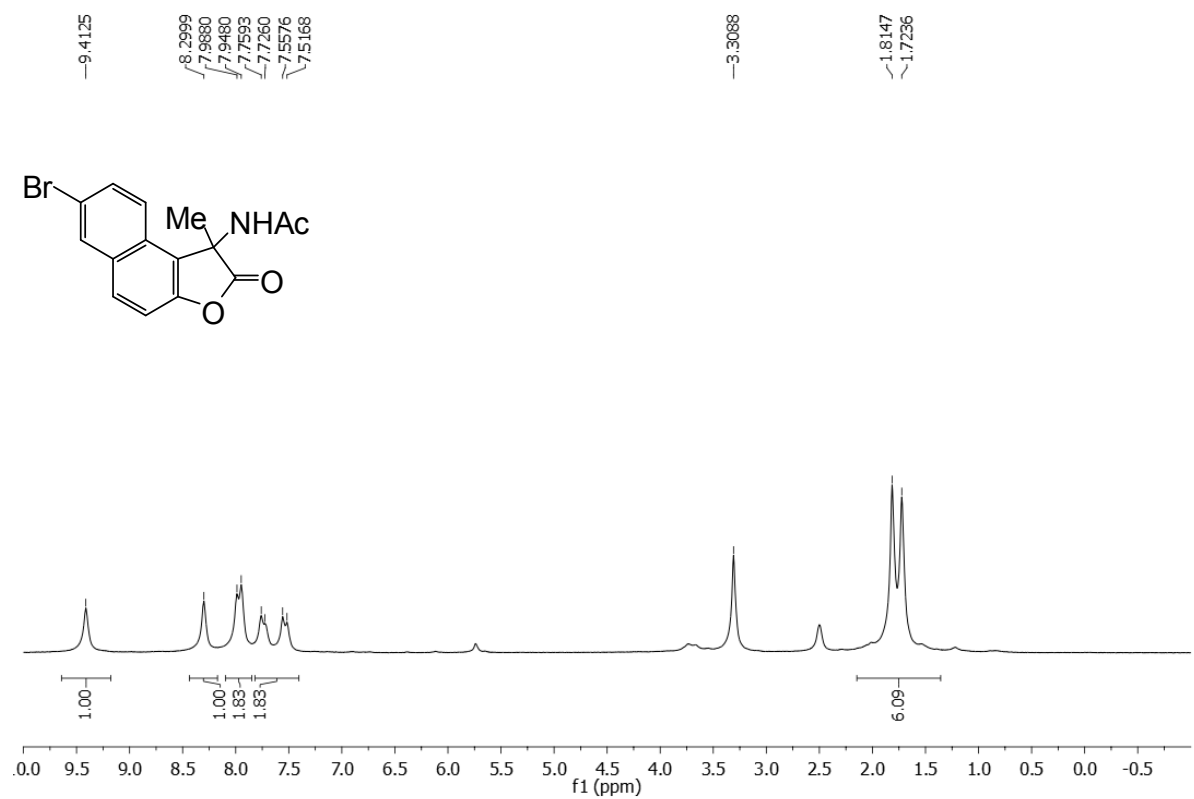
***N*-(1-Methyl-2-oxo-1,2-dihydronaphtho[2,1-*b*]furan-1-yl)acetamide (3a)**



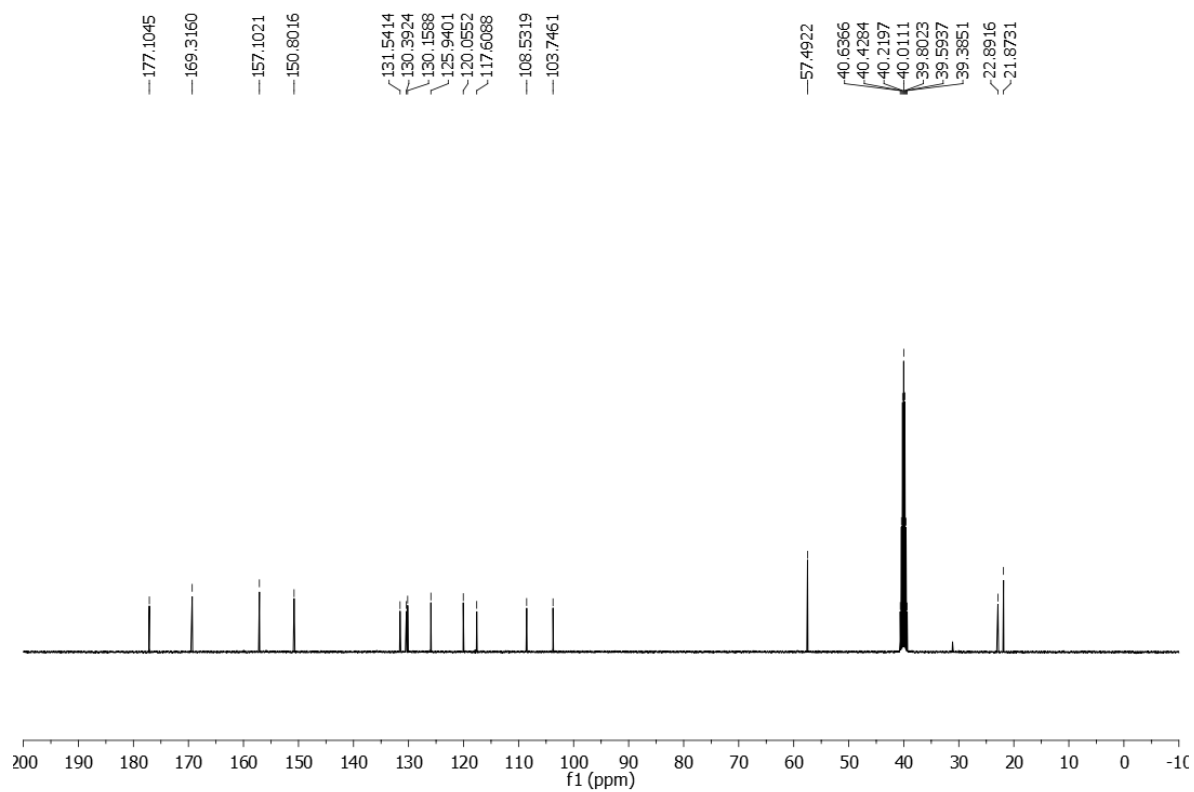
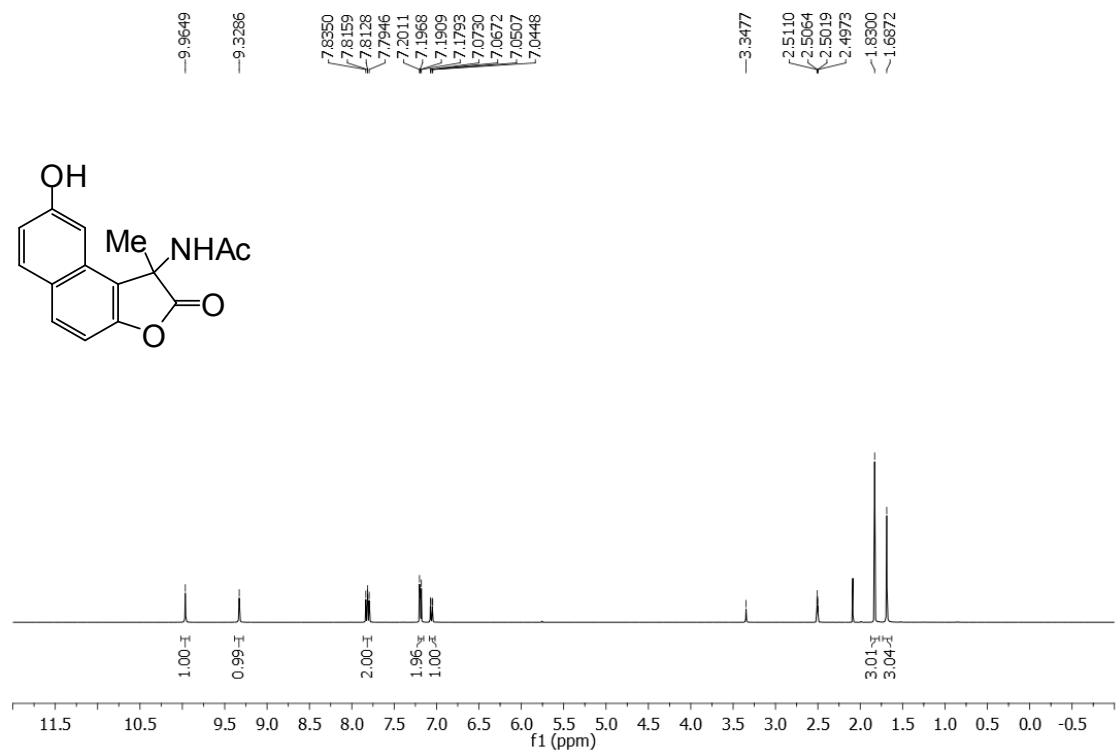
***N*-(7-Methoxy-1-methyl-2-oxo-1,2-dihydronaphtho[2,1-*b*]furan-1-yl)acetamide (3b)**



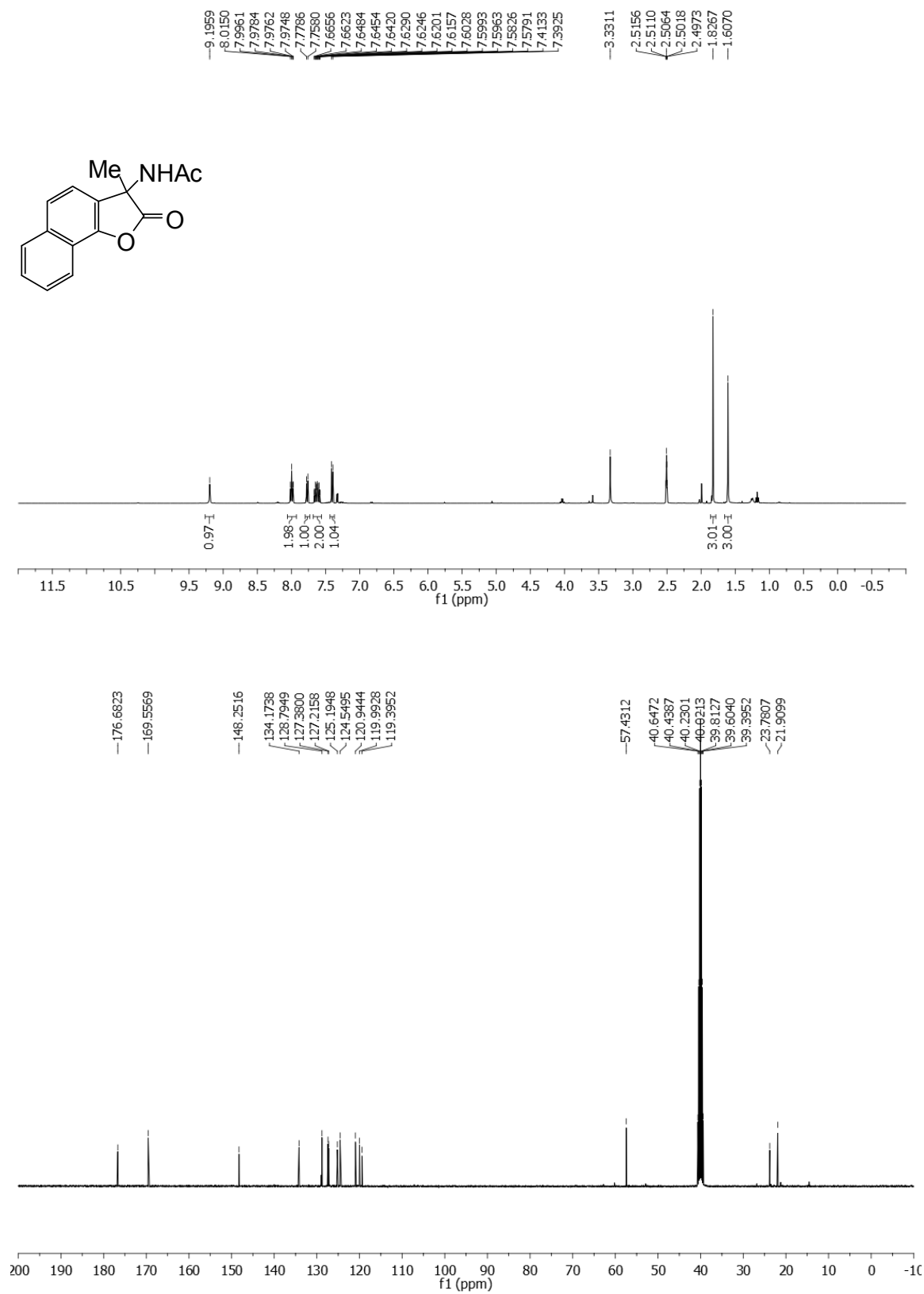
***N*-(7-Bromo-1-methyl-2-oxo-1,2-dihydronaphtho[2,1-*b*]furan-1-yl)acetamide (3c)**



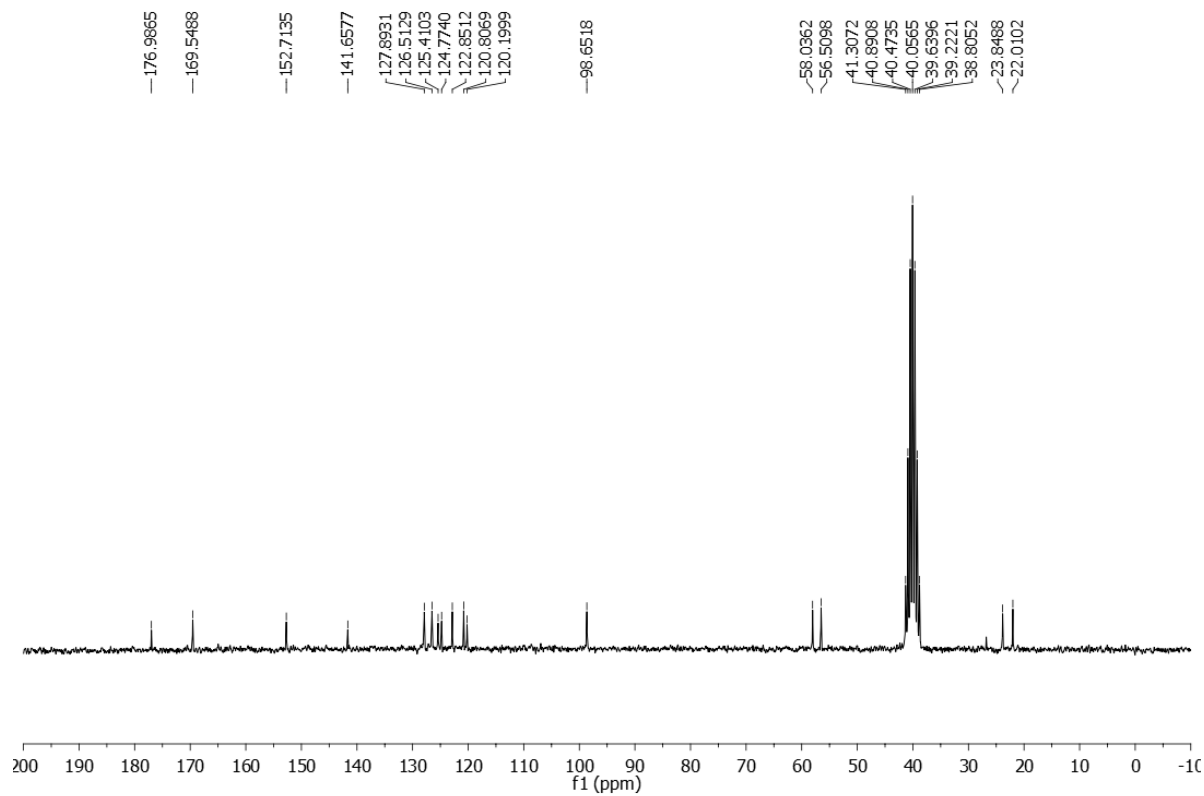
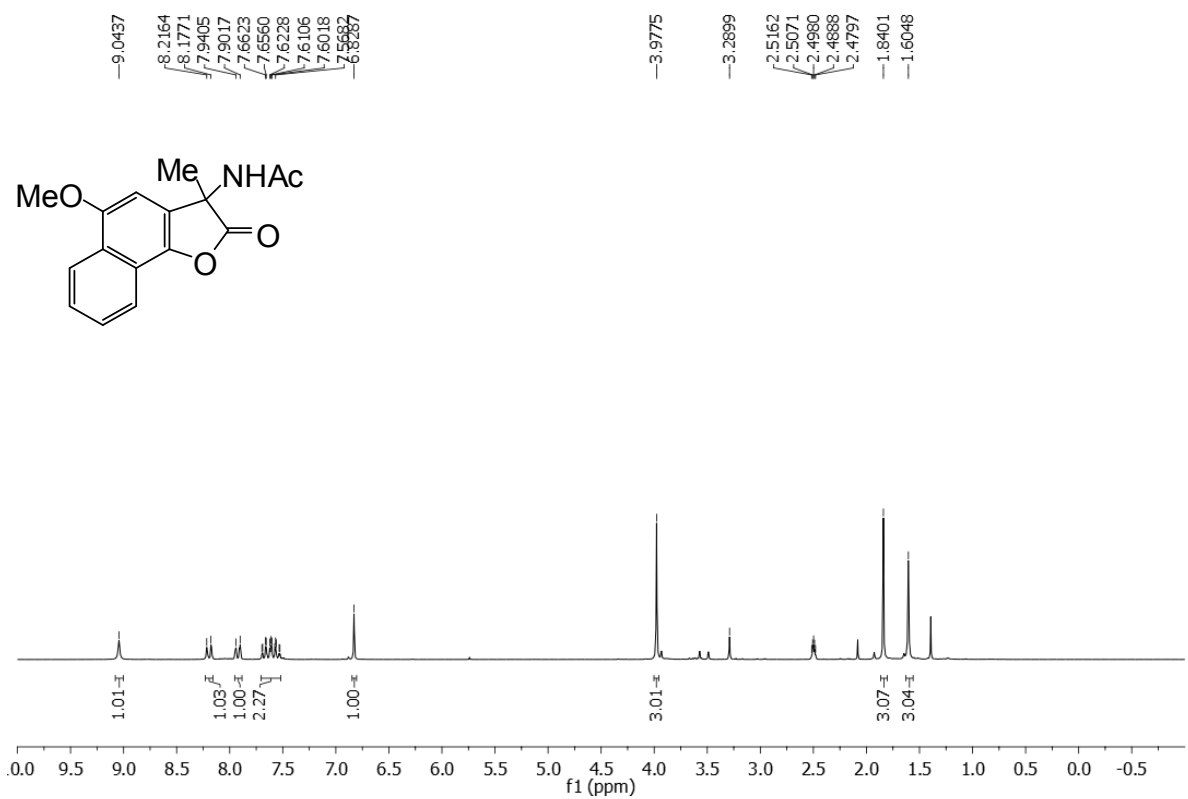
***N*-(6-hydroxy-3-methyl-2-oxo-2,3-dihydronaphtho[1,2-*b*]furan-3-yl)acetamide (3d)**



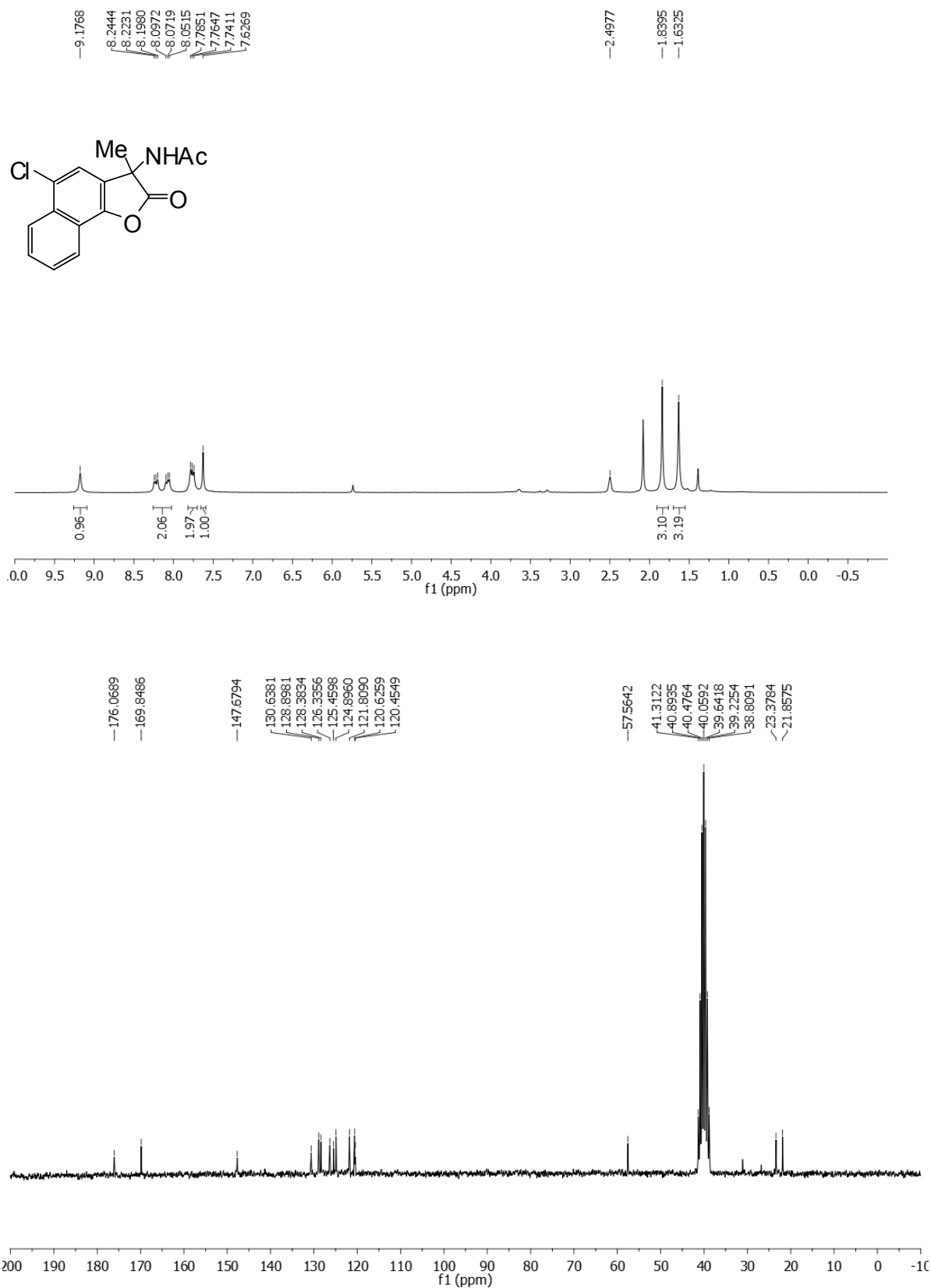
***N*-(3-Methyl-2-oxo-2,3-dihydronaphtho[1,2-*b*]furan-3-yl)acetamid3 (3g)**



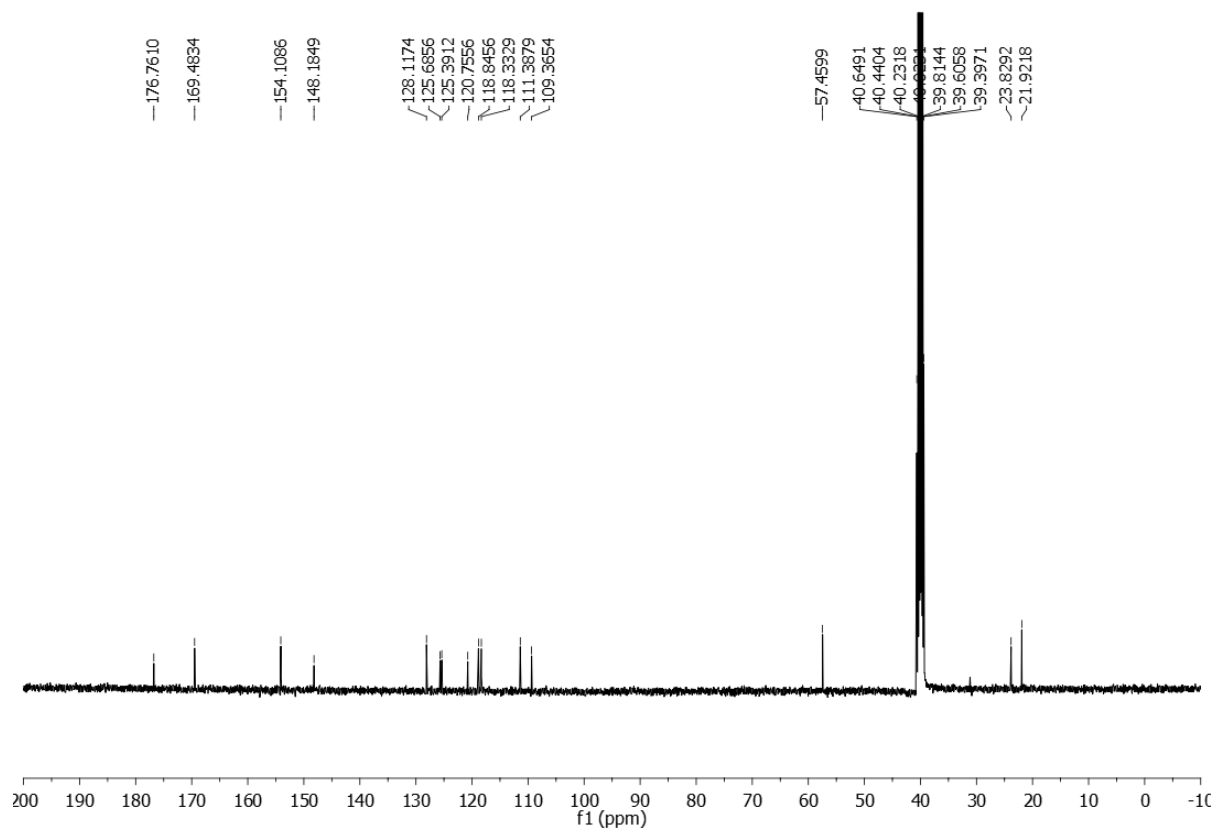
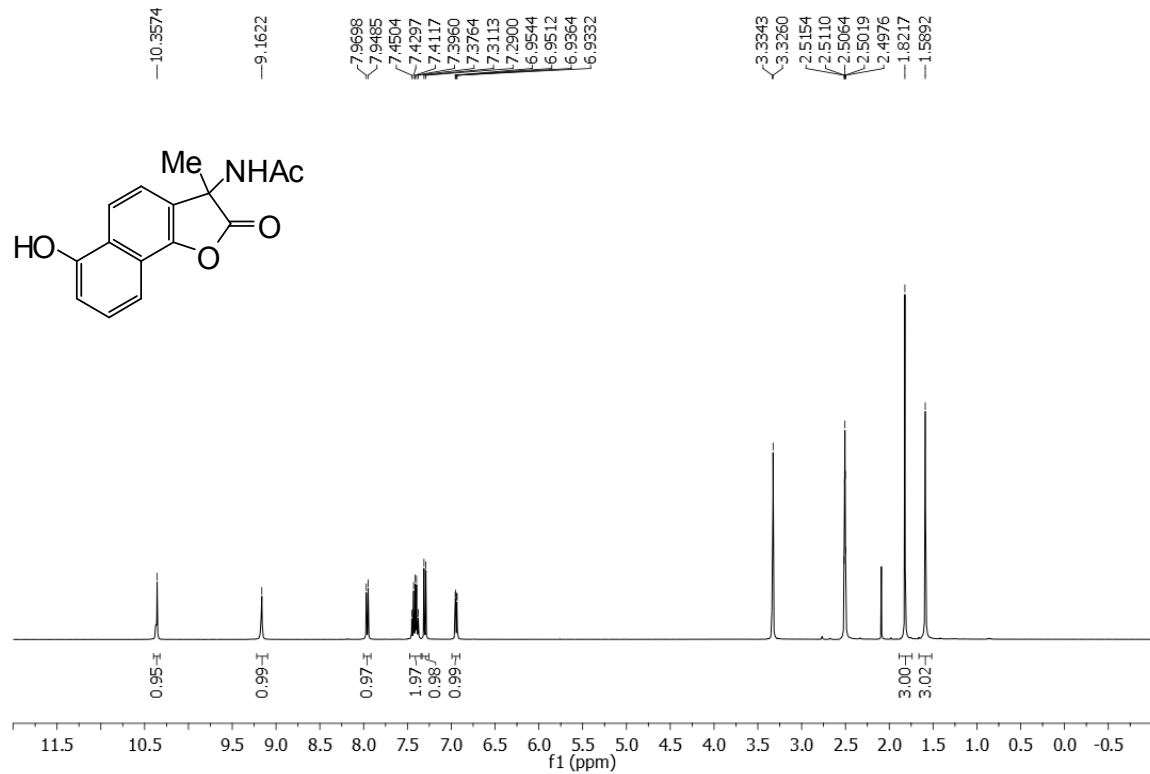
***N*-(5-Methoxy-3-methyl-2-oxo-2,3-dihydronaphtho[1,2-*b*]furan-3-yl)acetamide (3h)**



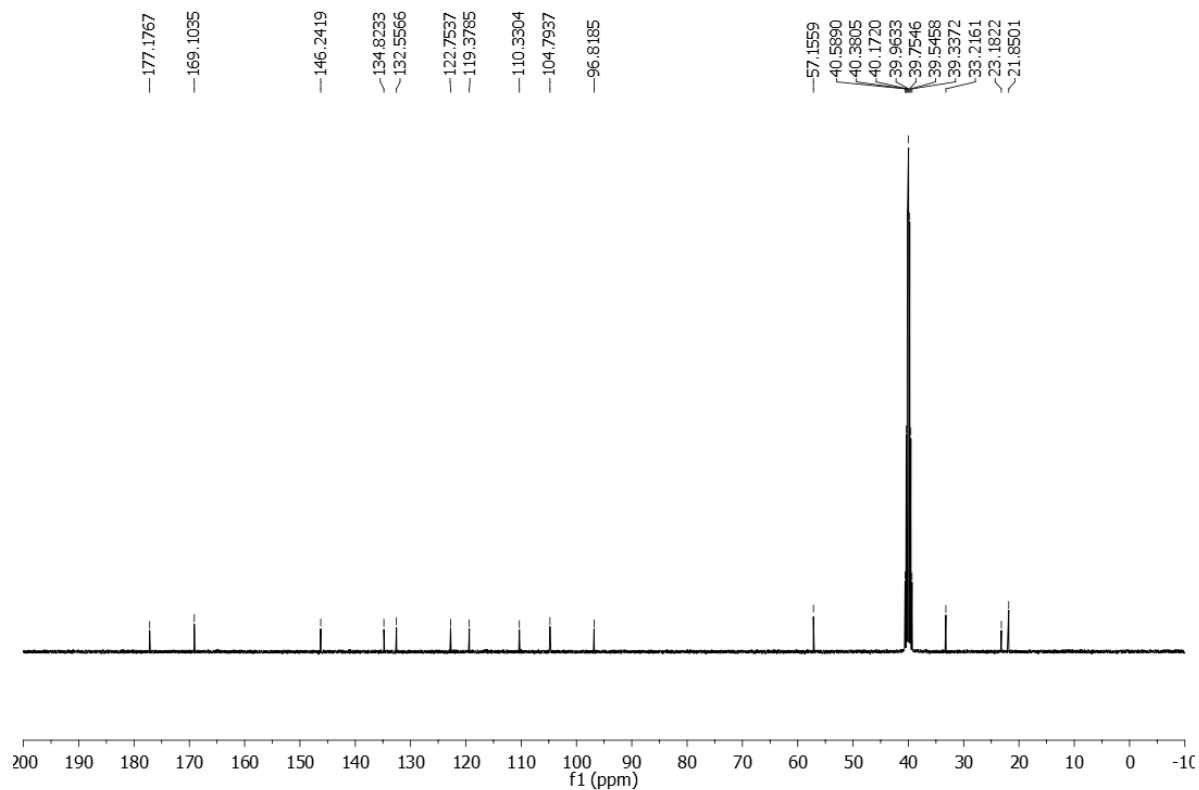
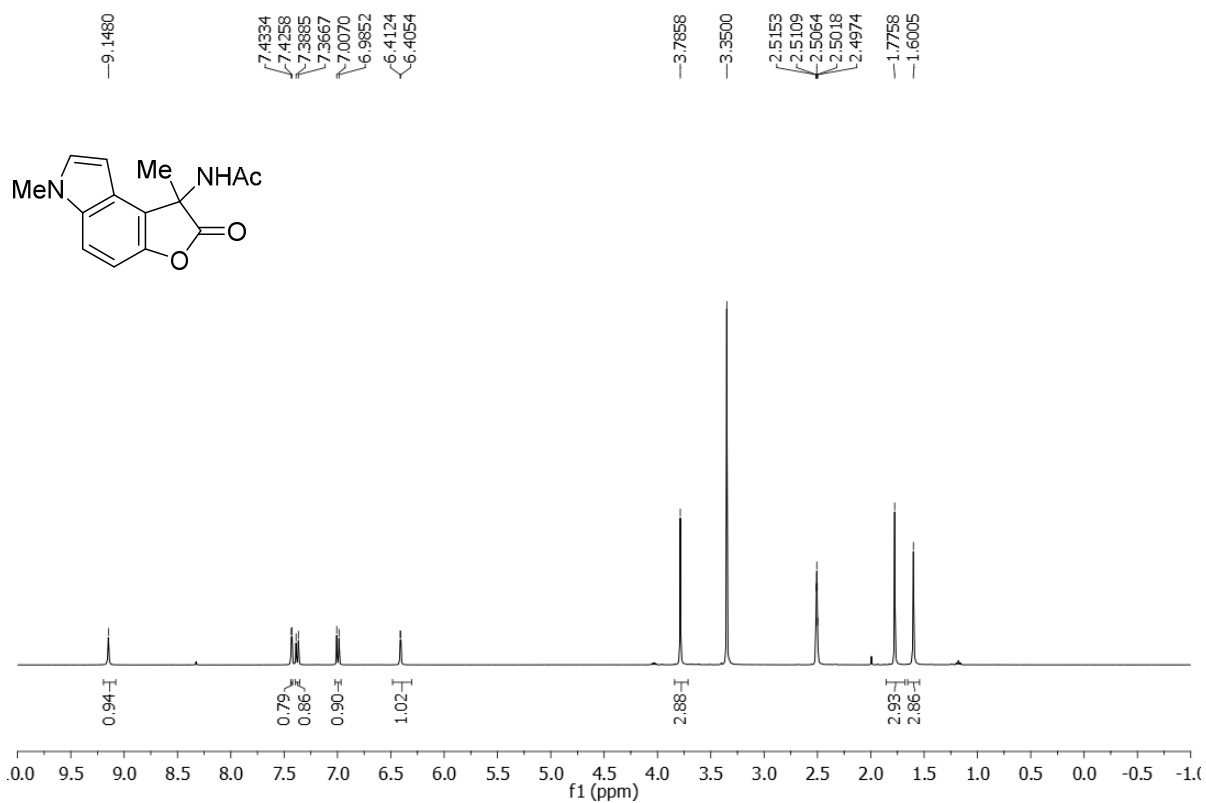
***N*-(5-Chloro-3-methyl-2-oxo-2,3-dihydronaphtho[1,2-*b*]furan-3-yl)acetamide (3i)**



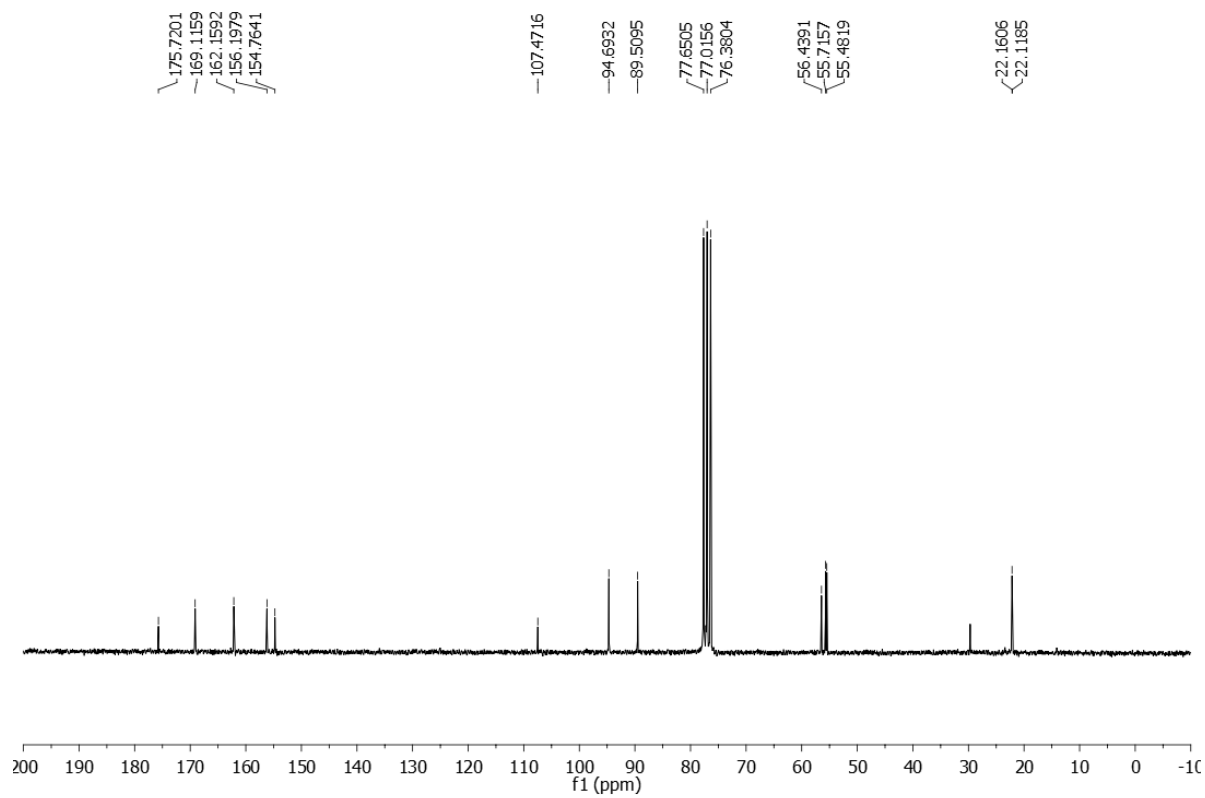
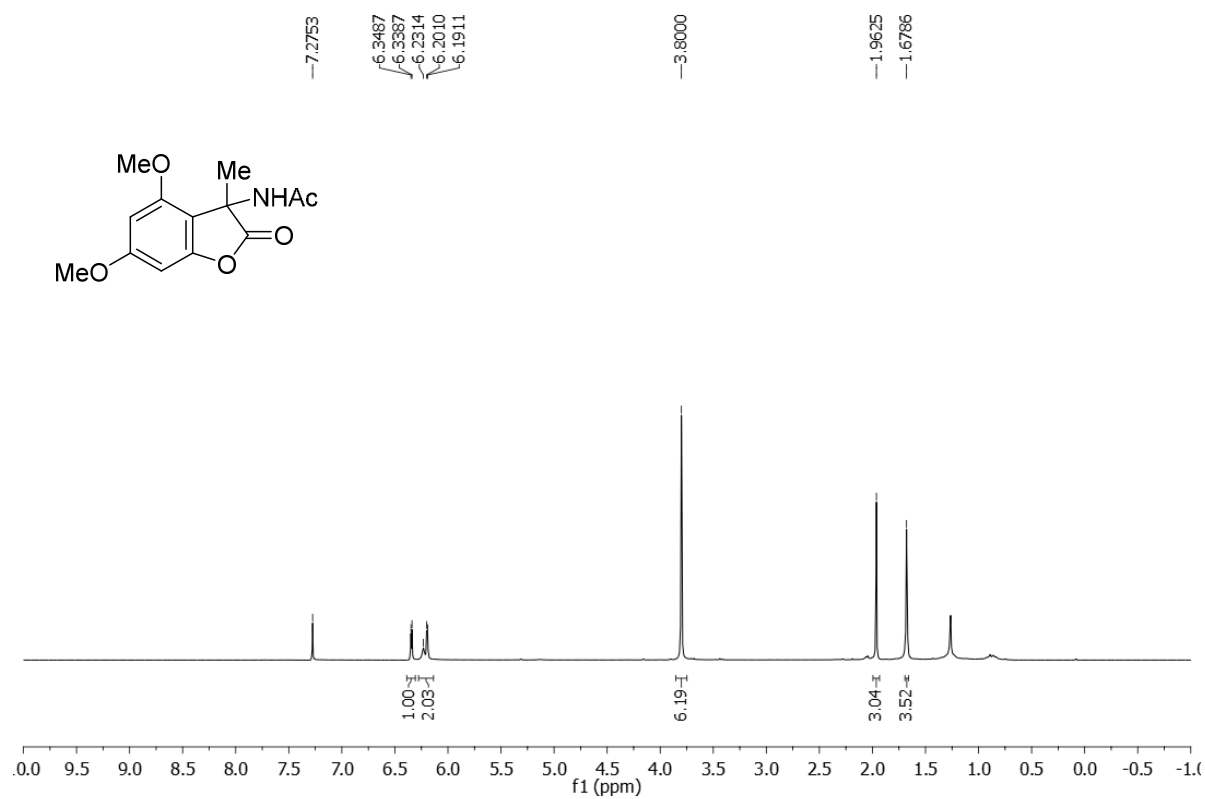
***N*-(6-hydroxy-3-methyl-2-oxo-2,3-dihydronaphtho[1,2-*b*]furan-3-yl)acetamide (3j)**



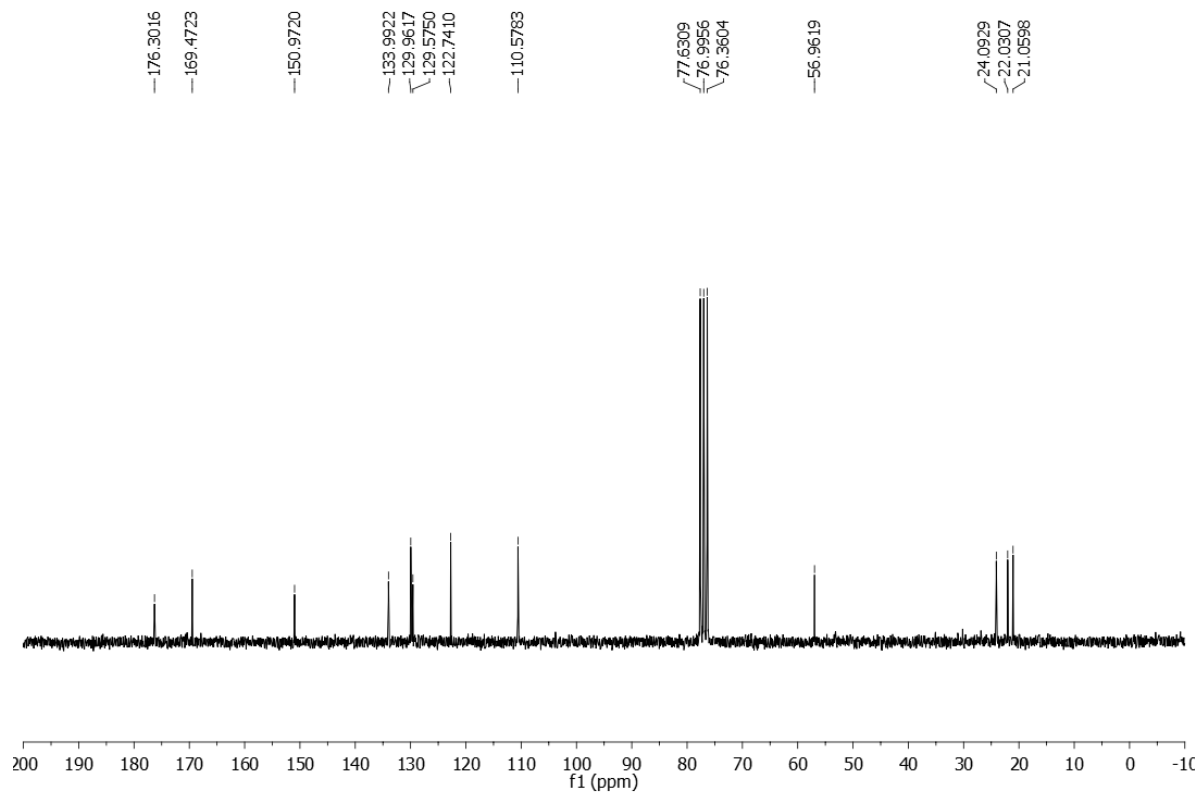
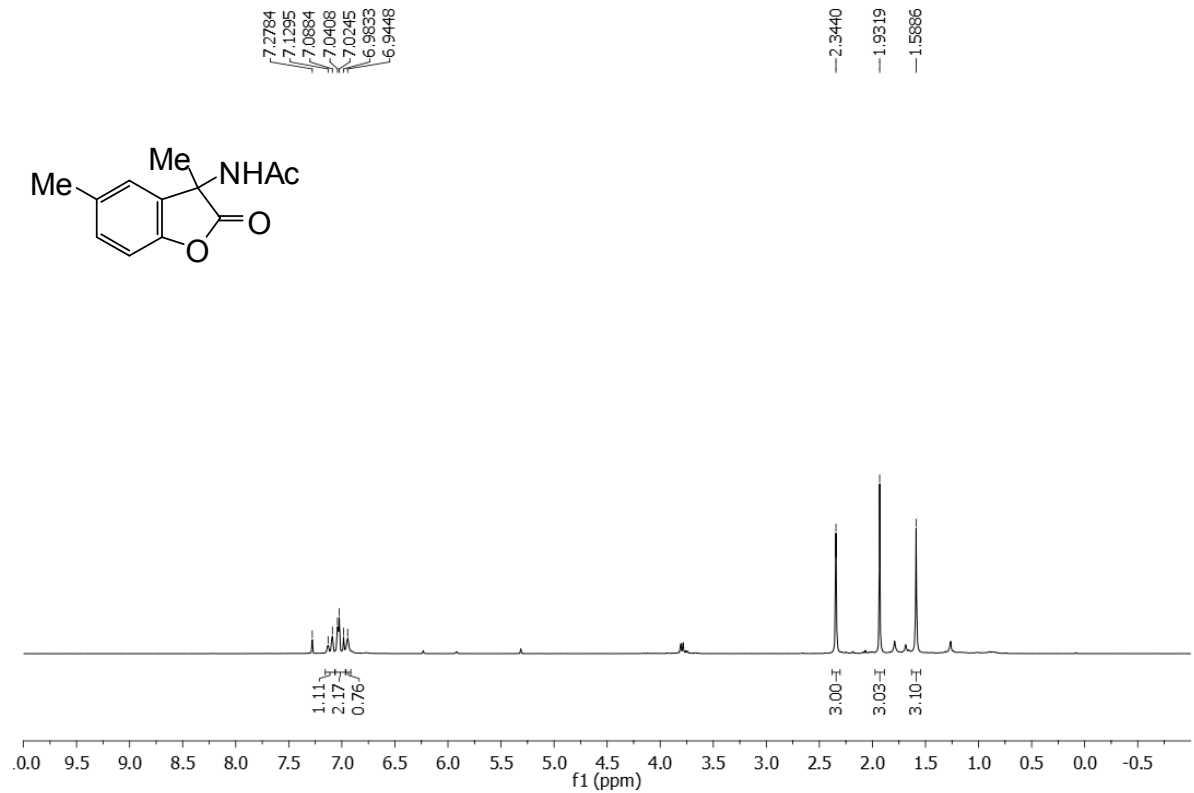
***N*-(1,6-dimethyl-2-oxo-1,6-dihydro-2*H*-furo[3,2-*e*]indol-1-yl)acetamide (3k)**



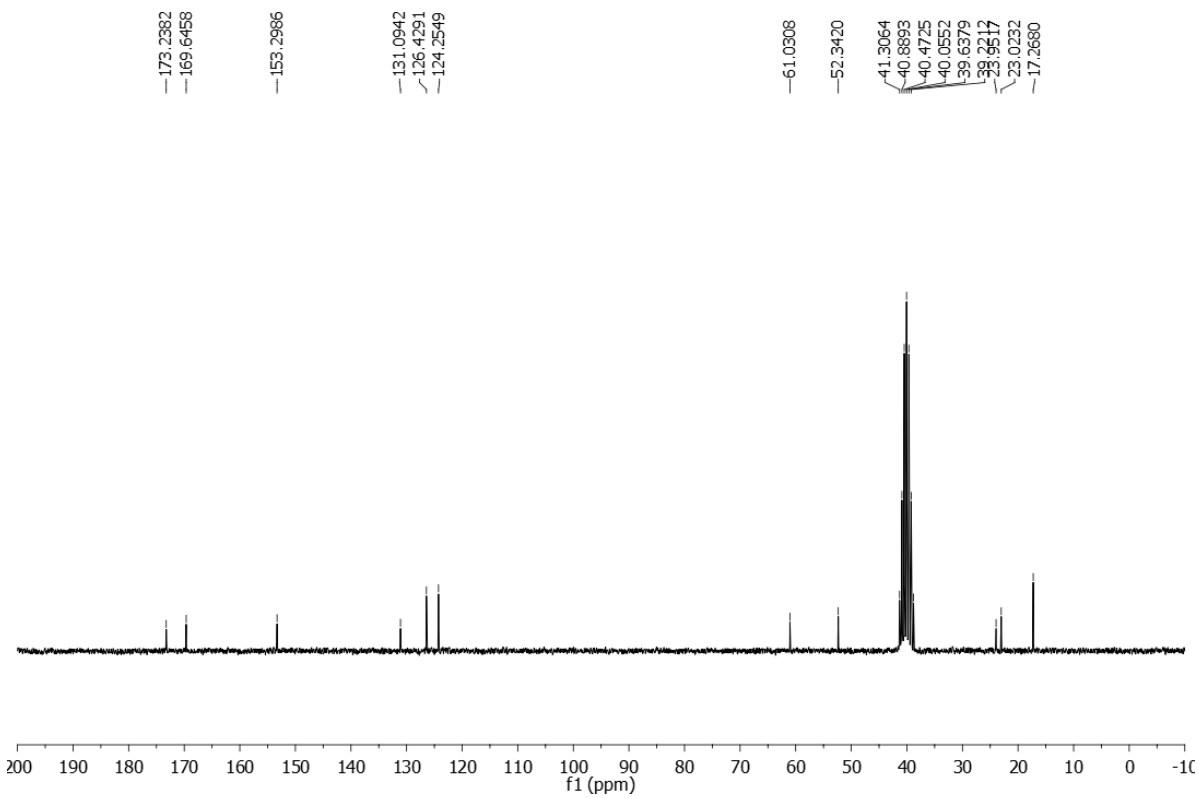
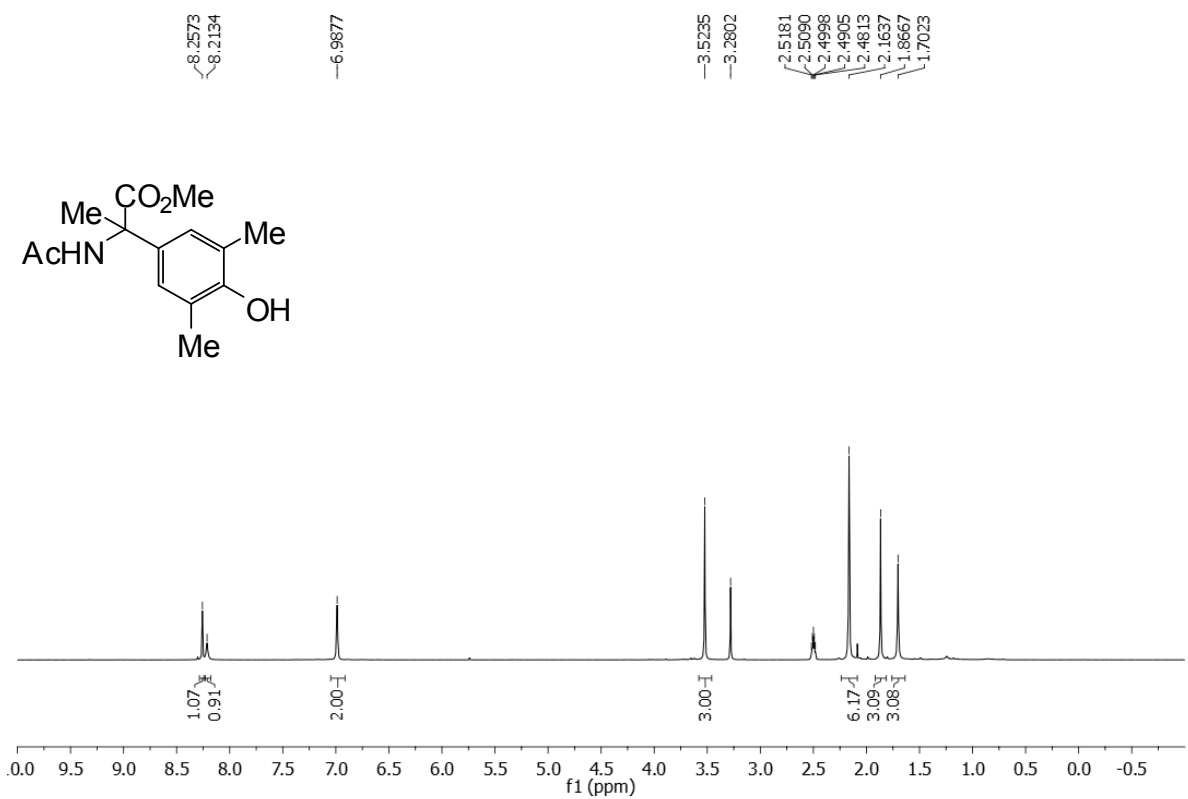
***N*-(4,6-Dimethoxy-3-methyl-2-oxo-2,3-dihydrobenzofuran-3-yl)acetamide (3l)**



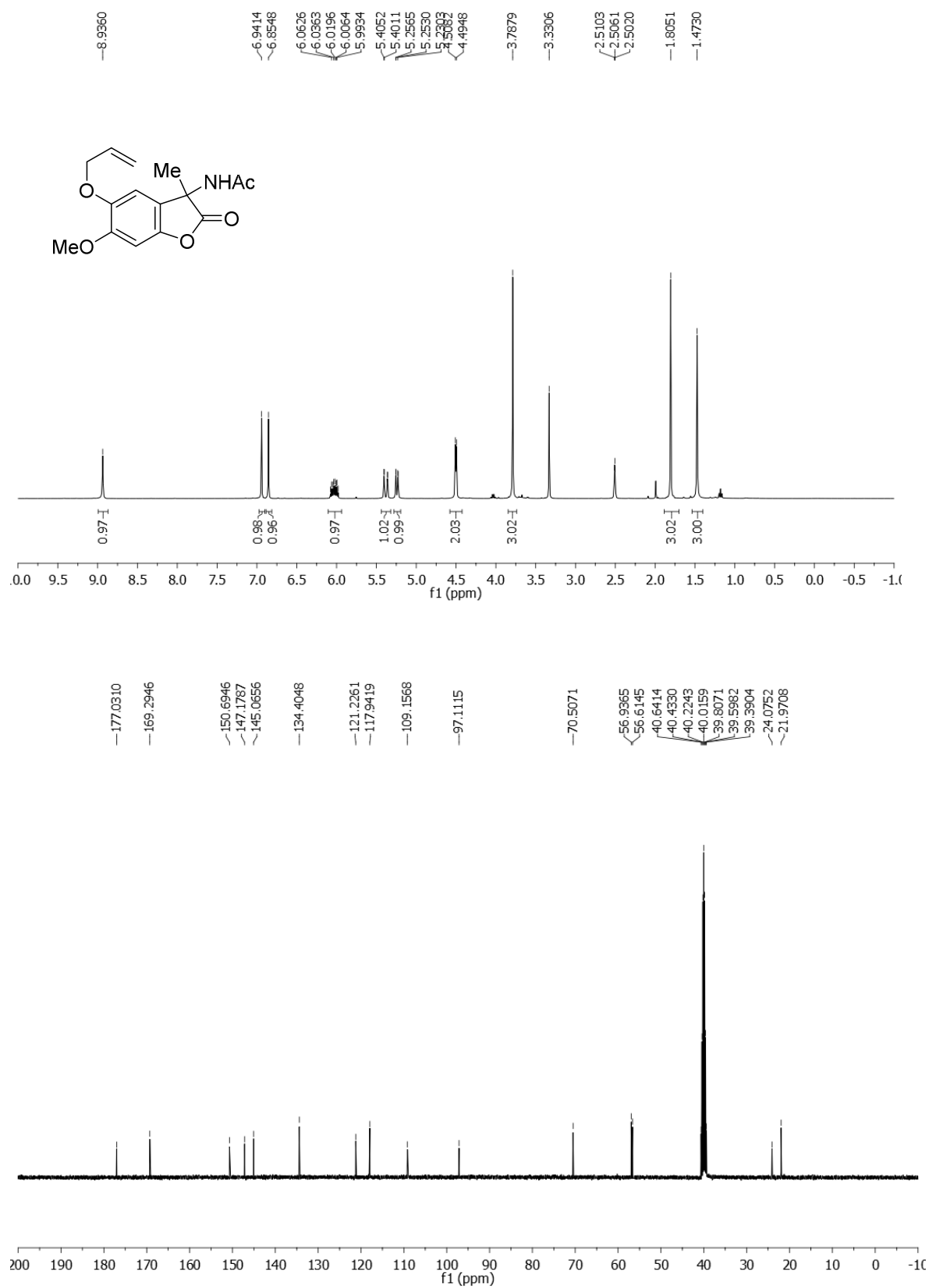
***N*-(3,5-dimethyl-2-oxo-2,3-dihydrobenzofuran-3-yl)acetamide (3m)**



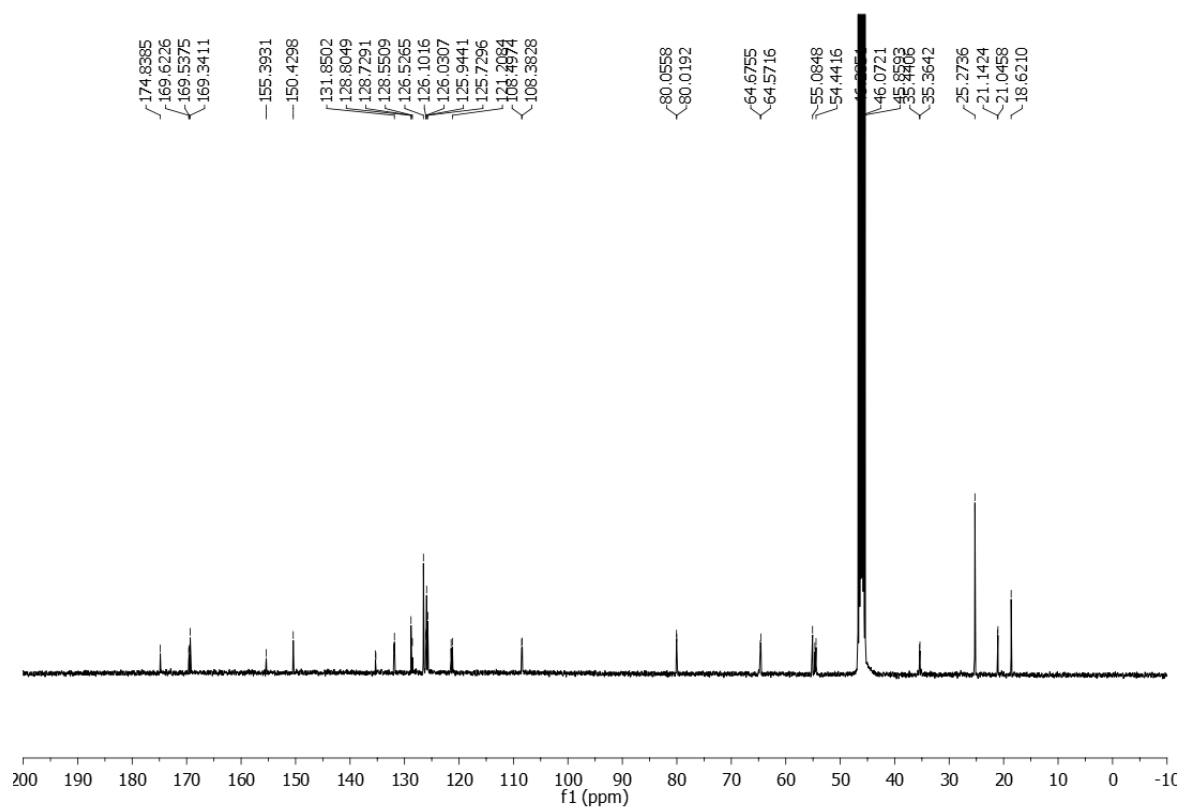
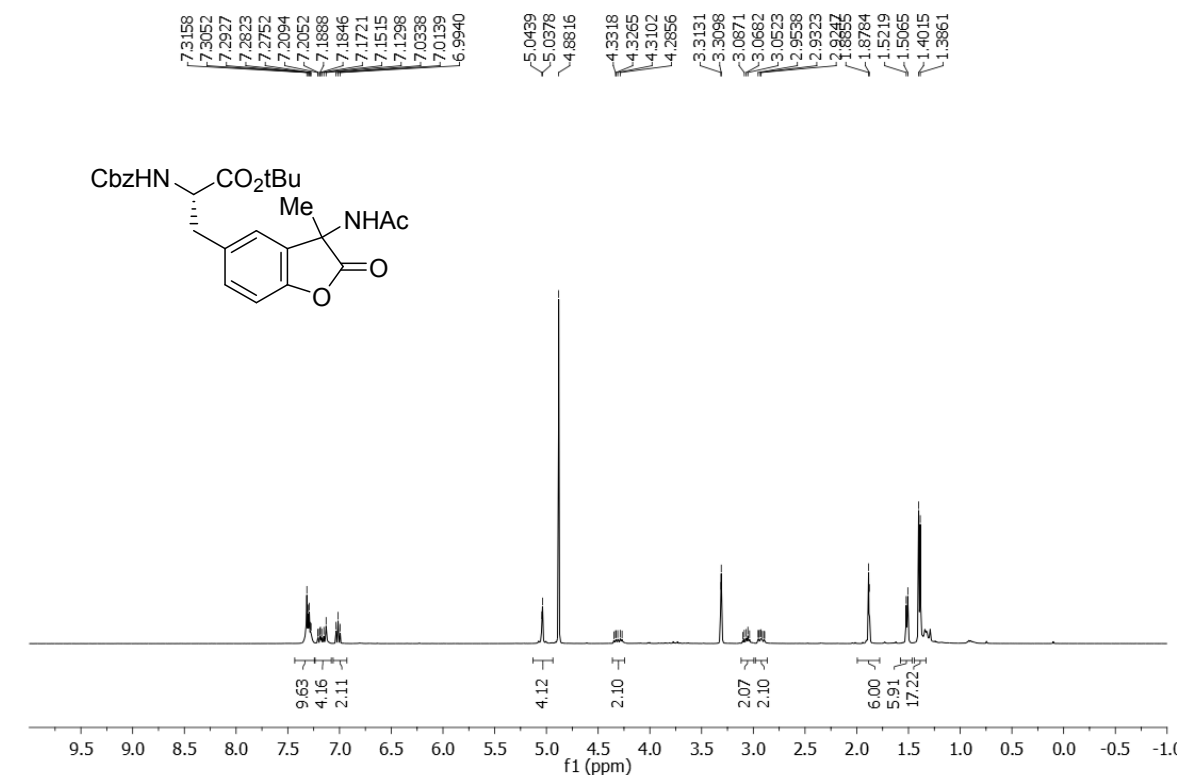
Methyl 2-acetamido-2-(4-hydroxy-3,5-dimethylphenyl)propanoate (3n)



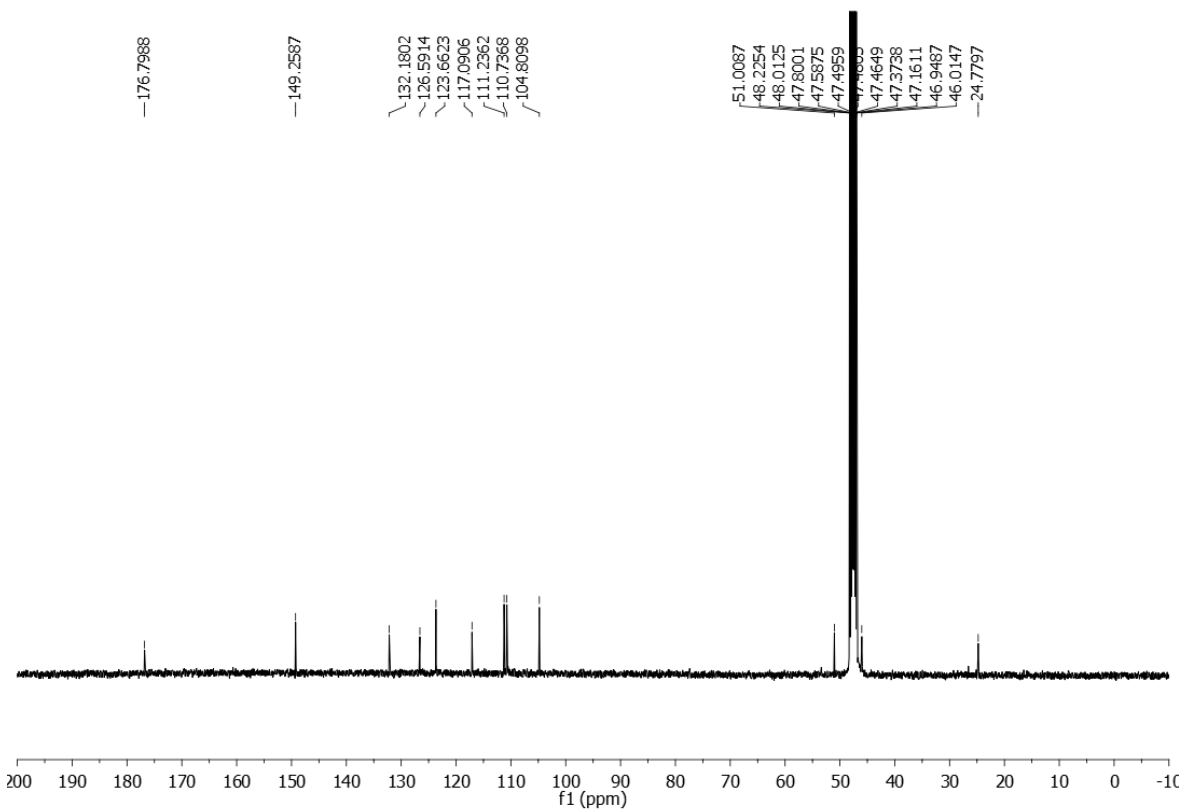
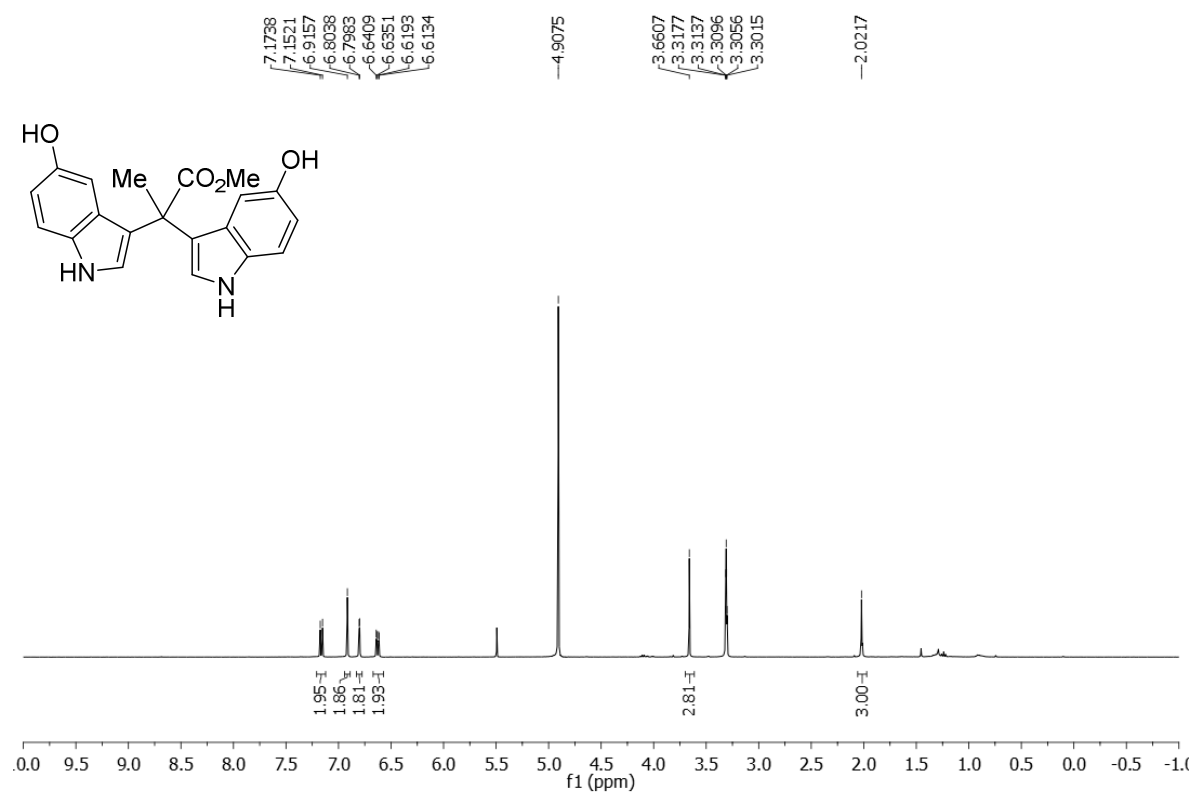
***N*-(5-(allyloxy)-6-methoxy-3-methyl-2-oxo-2,3-dihydrobenzofuran-3-yl)acetamide (3o)**



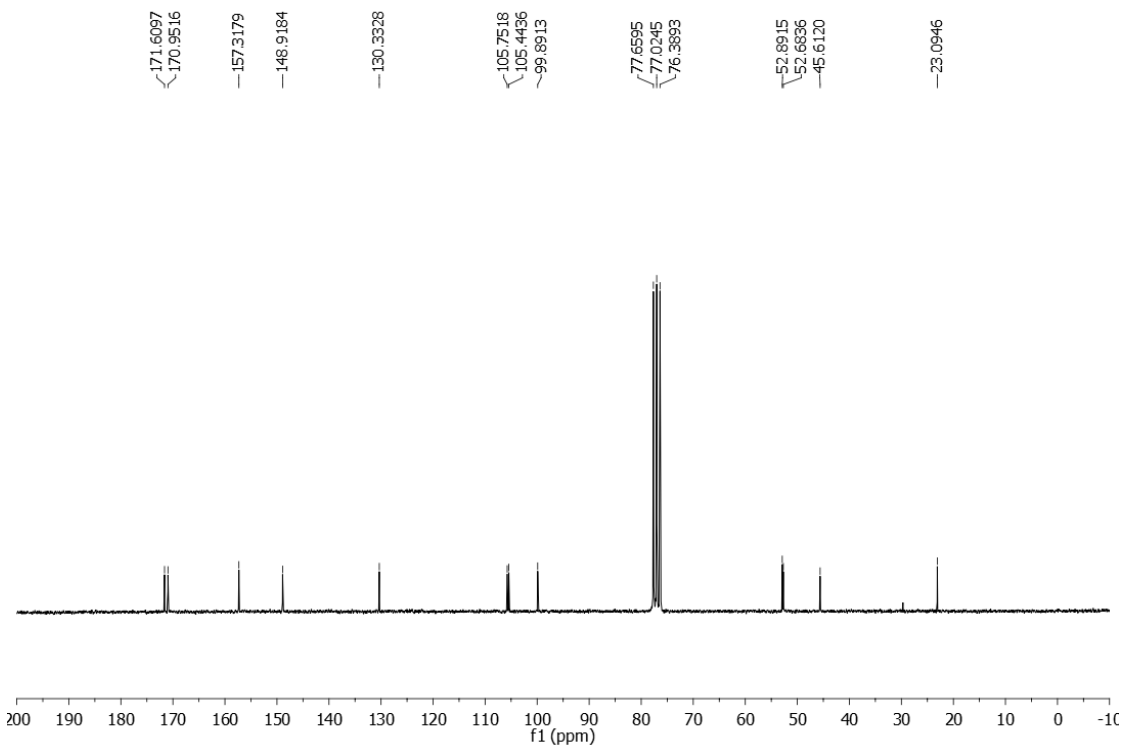
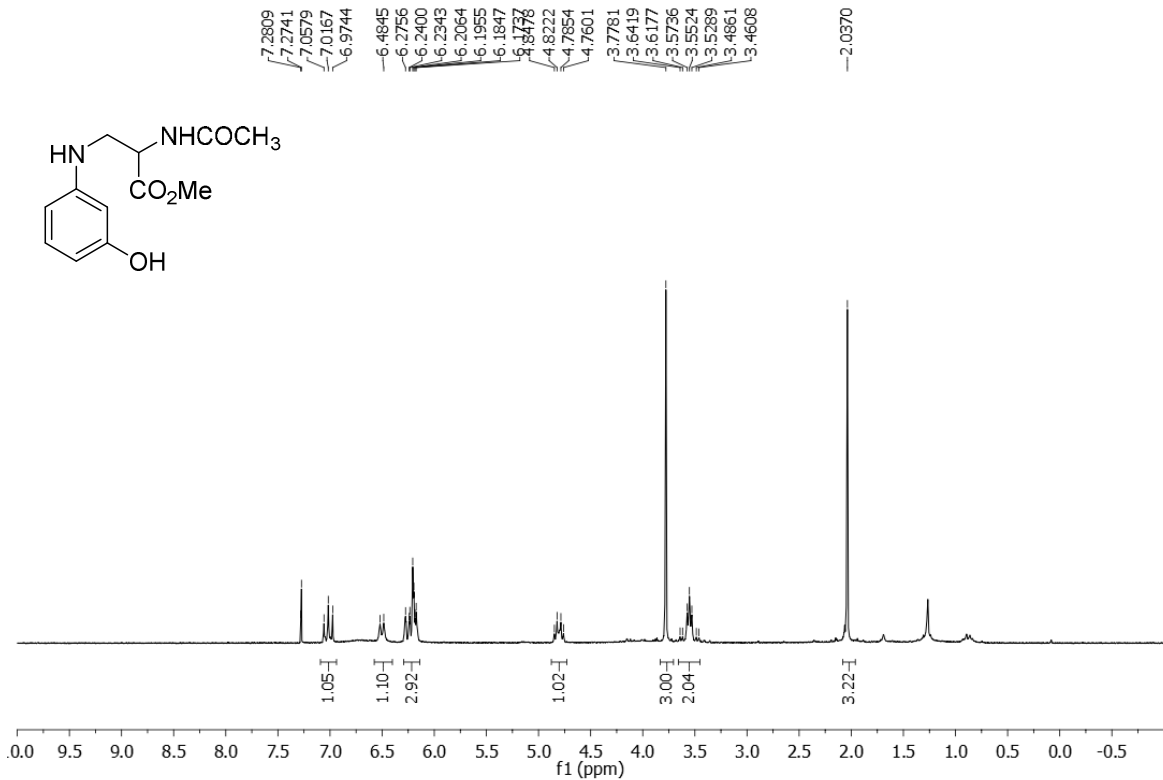
***tert*-butyl (2*S*)-3-(3-acetamido-3-methyl-2-oxo-2,3-dihydrobenzofuran-5-yl)-2-(((benzyloxy)carbonyl)amino)propanoate (3p)**



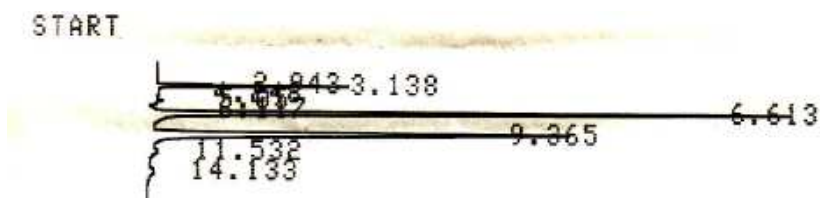
Methyl 2,2-bis(5-hydroxy-1*H*-indol-3-yl)propanoate



Methyl 2-acetamido-3-((3-hydroxyphenyl)amino)propanoate



HPLC chromatogram (3g): racemic mixture



CHROMATOGRAM 1 MEMORIZED

CHROMATOPAC C-R6A

FILE 0

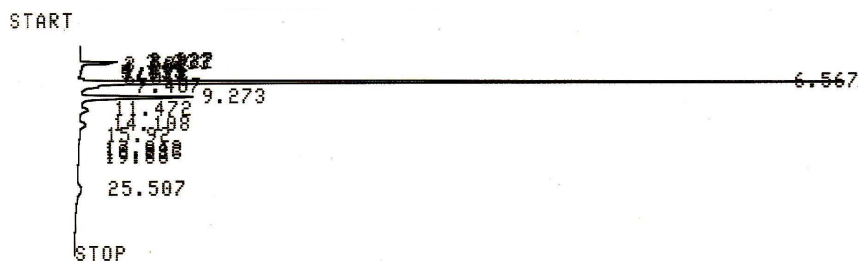
SAMPLE NO 0

METHOD 41

REPORT NO 687

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.943	51786			1.3756	
2	3.138	196194	V		5.2114	
3	6.117	13703			0.364	
4	6.613	1719215	V		45.6665	
5	9.365	1672571	V		44.4275	
6	11.532	60545	V		1.6082	
7	14.133	50708			1.3469	
TOTAL		3764721			100	

HPLC chromatogram (3g): reaction employing phosphoric acid 4b as catalyst.



CHROMATOPAC C-R6A

FILE 0

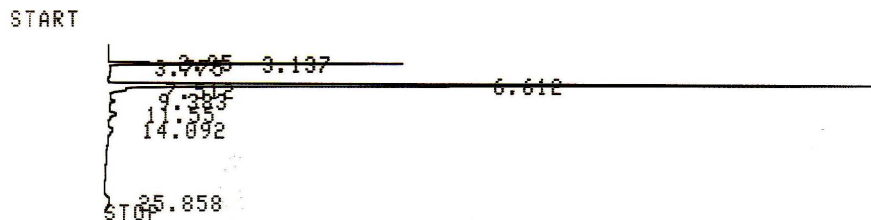
SAMPLE NO 0

METHOD 41

REPORT NO 686

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.937	53440			1.208	
2	3.122	41442	V		0.9368	
3	3.233	48806	V		1.1032	
4	3.582	11989	V		0.271	
5	6.015	19217			0.4344	
6	6.567	3143815	SV		71.0634	
7	7.407	10497	T		0.2373	
8	9.273	684397	V		15.4702	
9	11.472	138402	V		3.1285	
10	14.108	124313	V		2.81	
11	15.92	21673	V		0.4899	
12	25.507	125966			2.8474	
TOTAL		4423954			100	

HPLC chromatogram (3g): reaction employing phosphoric acid **4b** as catalyst. After recrystallisation with *i*Pr₂O/acetone 7:1 (mother liquor).

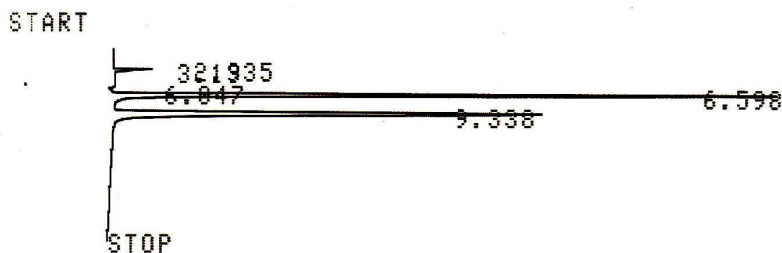


CHROMATOPAC C-R6A
SAMPLE NO 0
REPORT NO 689

FILE 0
METHOD 41

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.95	47690			1.4215	
2	3.137	392540	V		11.7004	
3	6.612	2613993	S		77.9152	
4	7.512	17969	T		0.5356	
5	9.383	37213	T		1.1092	
6	11.55	72471			2.1601	
7	14.092	70858			2.1121	
8	25.858	102187			3.0459	
TOTAL		3354920			100	

HPLC chromatogram (3g): reaction employing phosphoric acid **4b** as catalyst. After recrystallisation with *i*Pr₂O/acetone 7:1 (Crystals).



CHROMATOPAC C-R6A
SAMPLE NO 0
REPORT NO 690

FILE 0
METHOD 41

PKNO	TIME	AREA	MK	IDNO	CONC	NAME
1	2.935	44042			1.1273	
2	3.13	20608	V		0.5275	
3	6.598	1945541	V		49.7982	
4	9.338	1896655	V		48.547	
TOTAL		3906847			100	