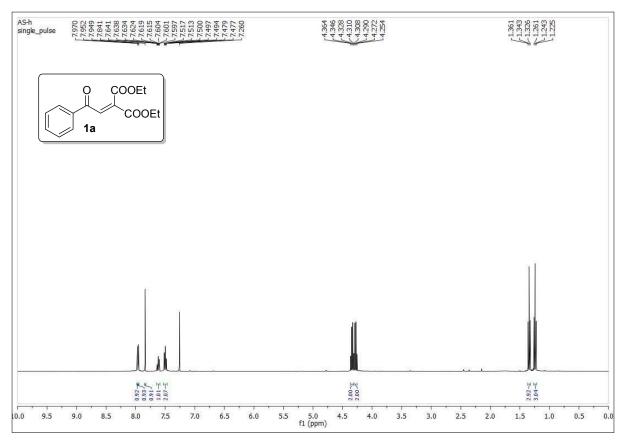
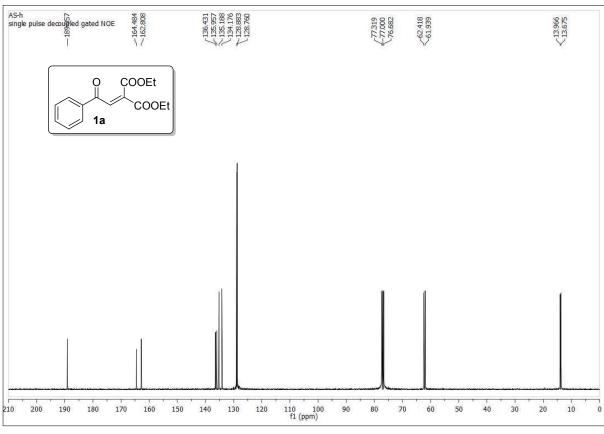
Organocatalytic Enantioselective Conjugate Addition of Pyrazolin-5-ones to Arylomethylidene Malonates

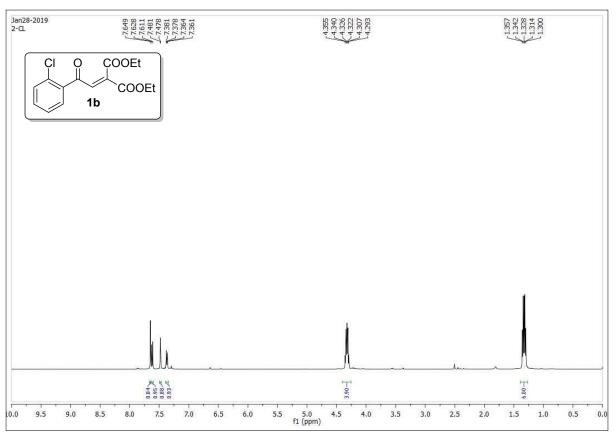
Arun Sharma, Vivek Sharma, Swapandeep Singh Chimni*

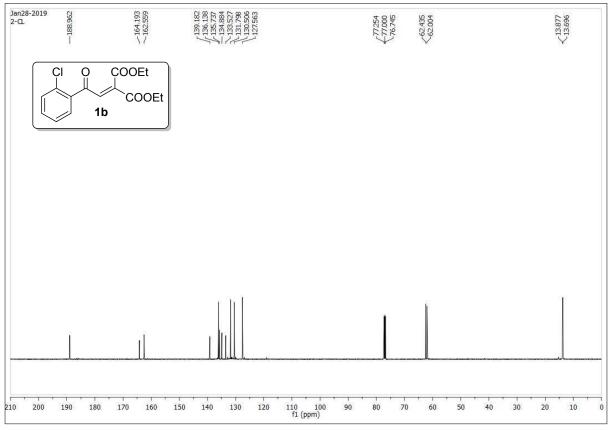
Department of Chemistry Guru Nanak Dev University Amritsar-143005, Punjab, India

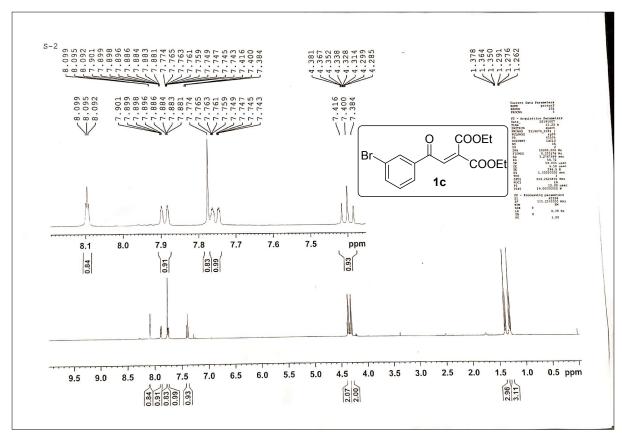
S.No.		Page no.
1.	¹ H and ¹³ C spectra of compound 1a–5a	S2-S44
2.	HPLC chromatograms of compound 3a–5a	S45-S72

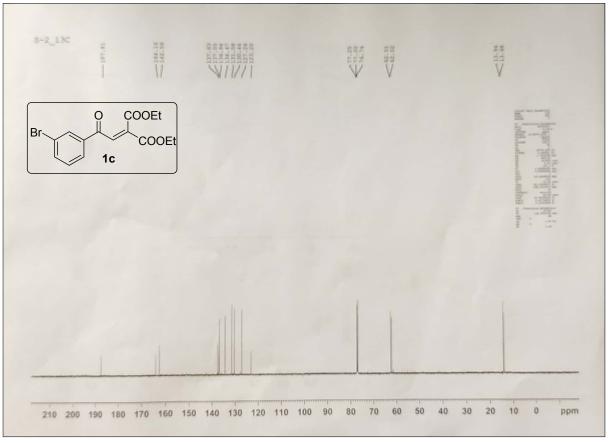


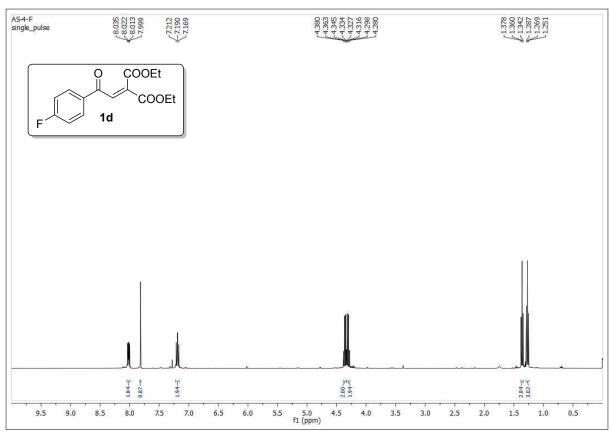


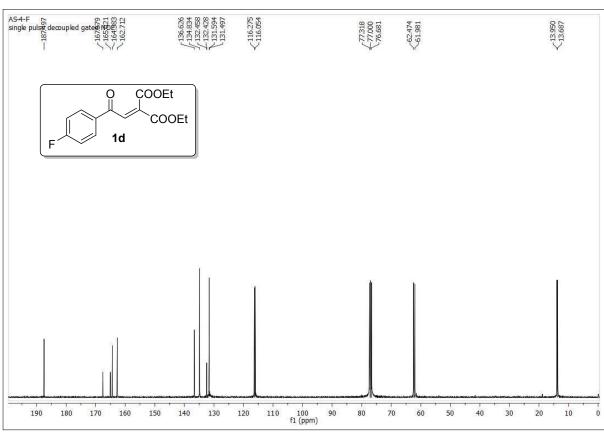


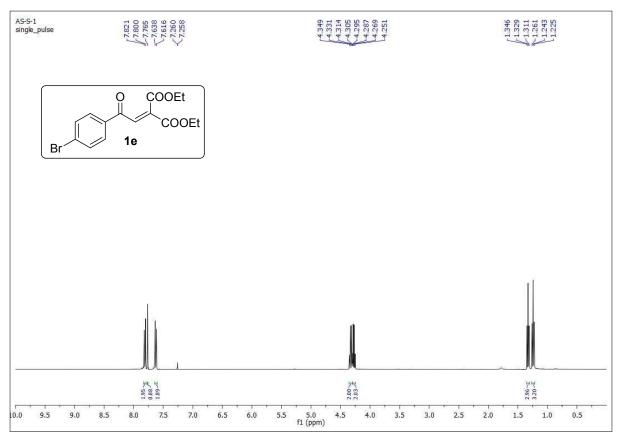


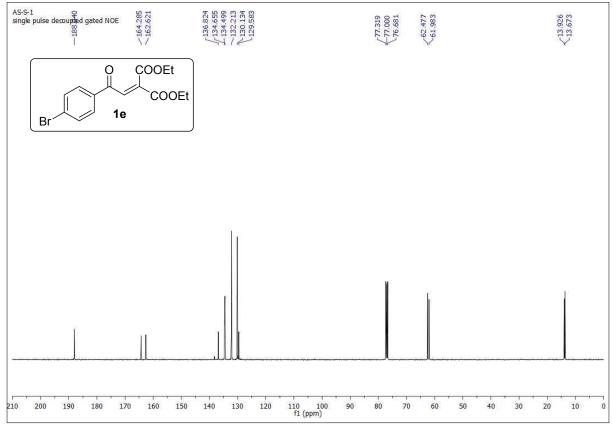


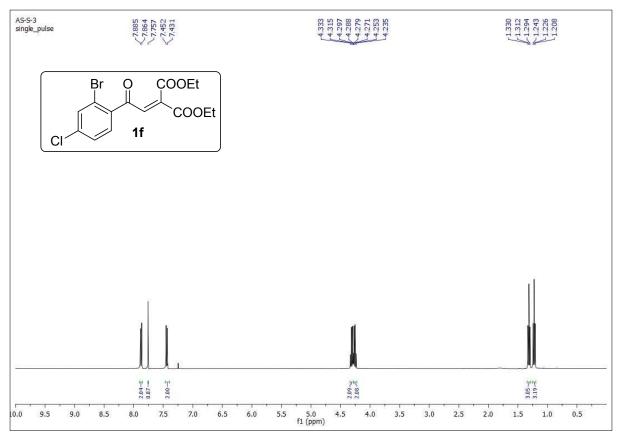


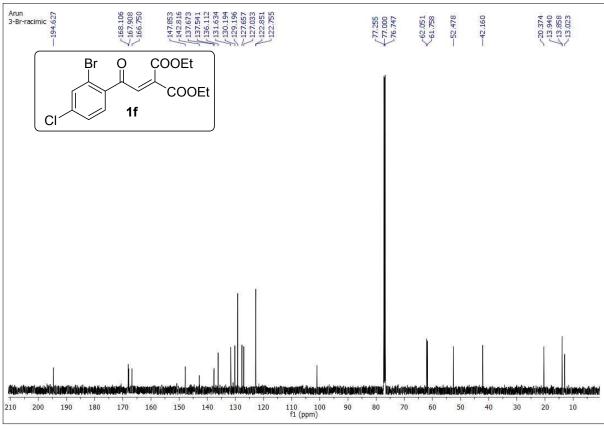


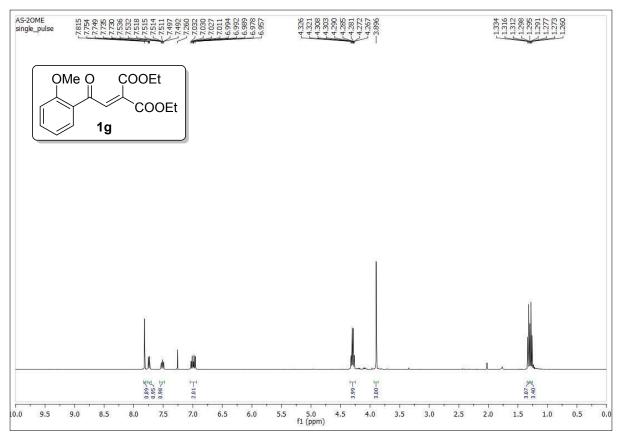


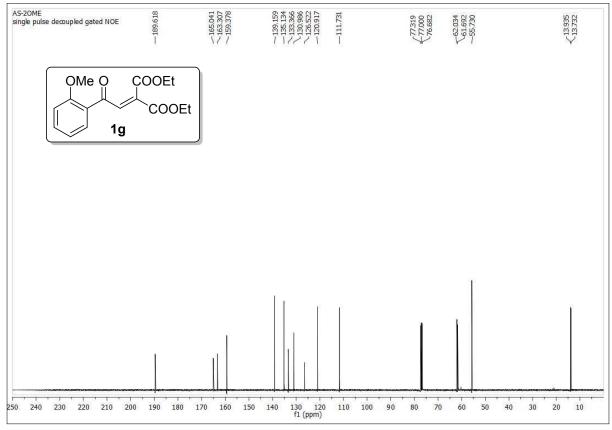


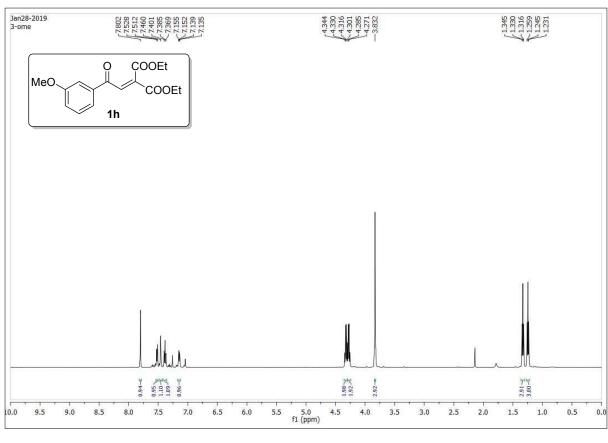


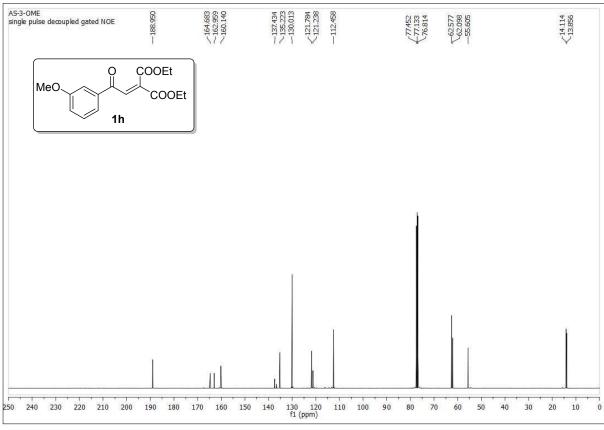


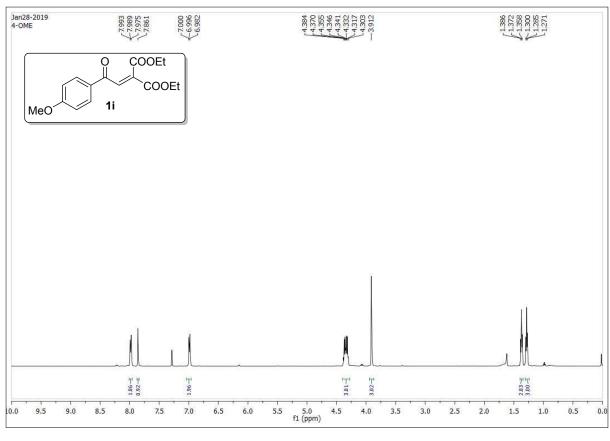


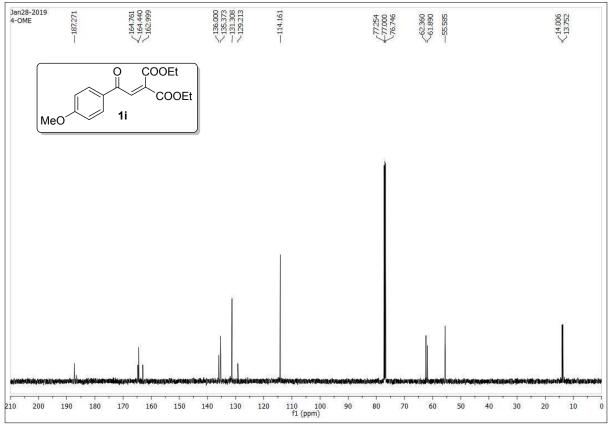


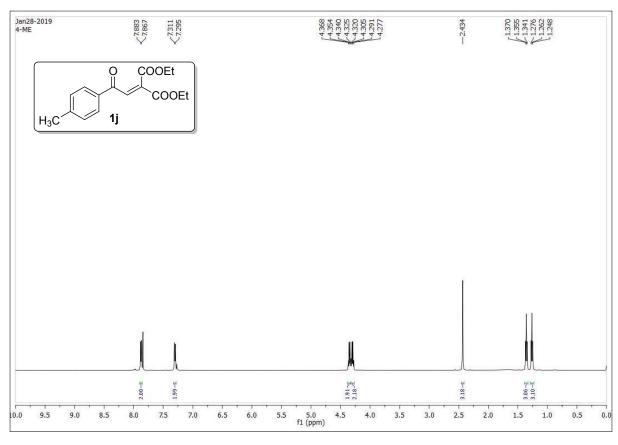


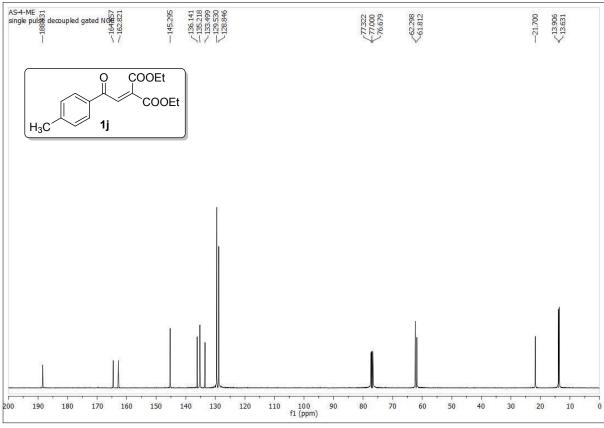


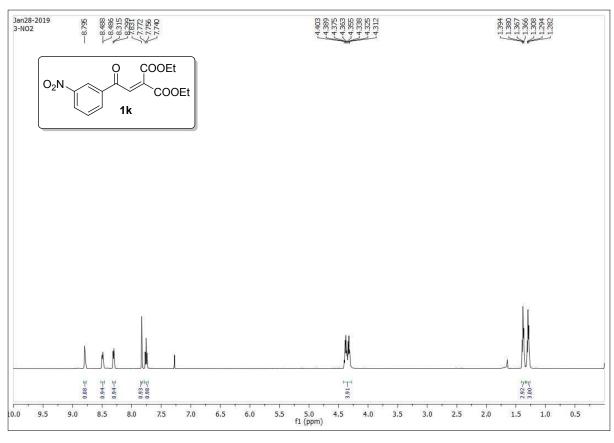


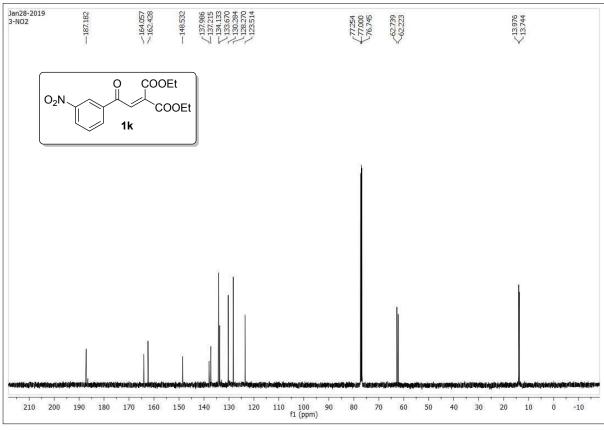


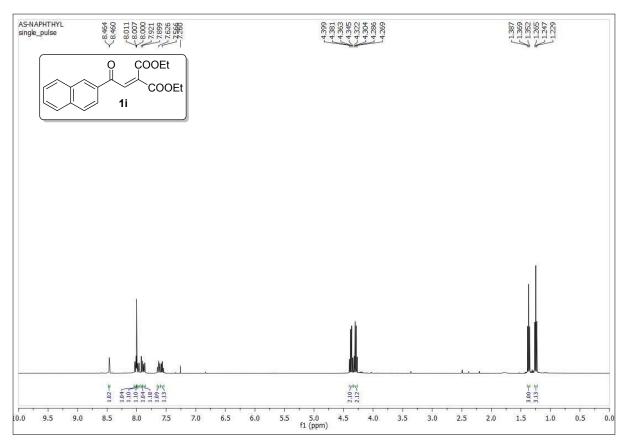


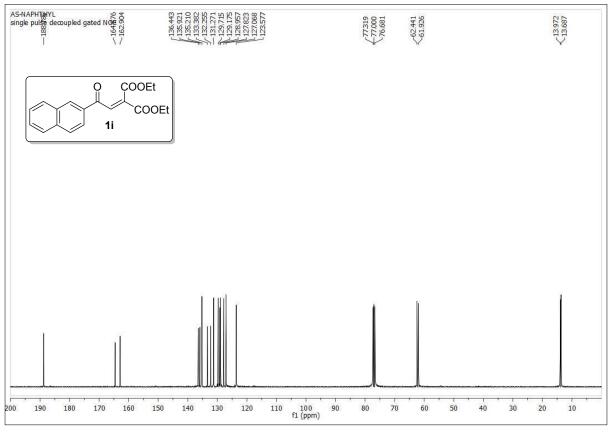


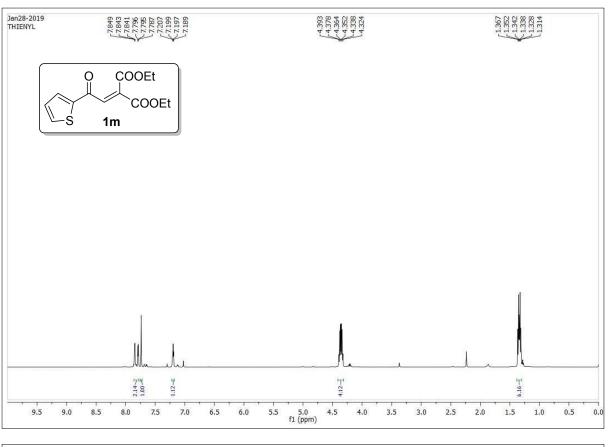


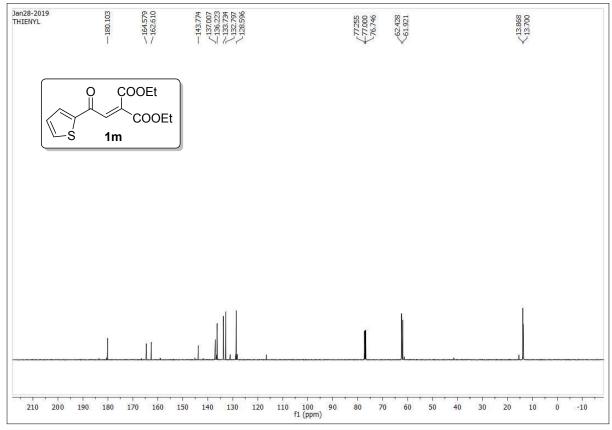


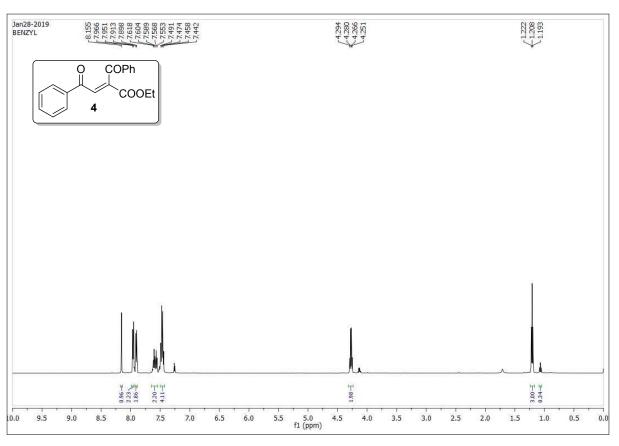


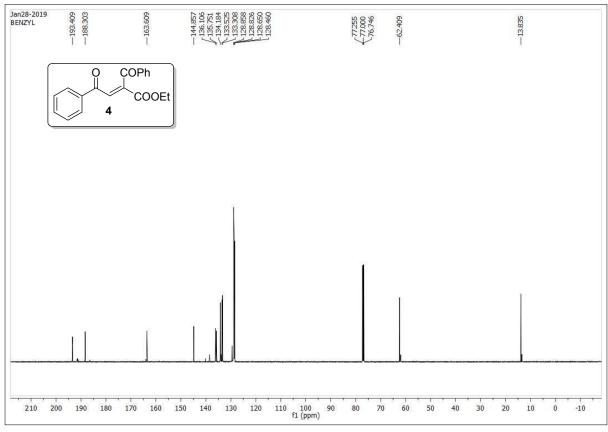


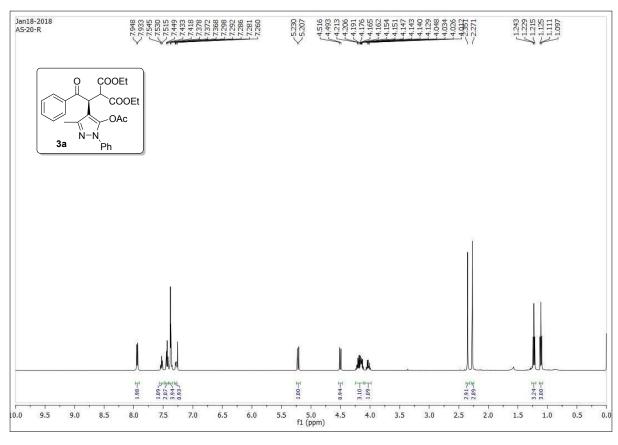


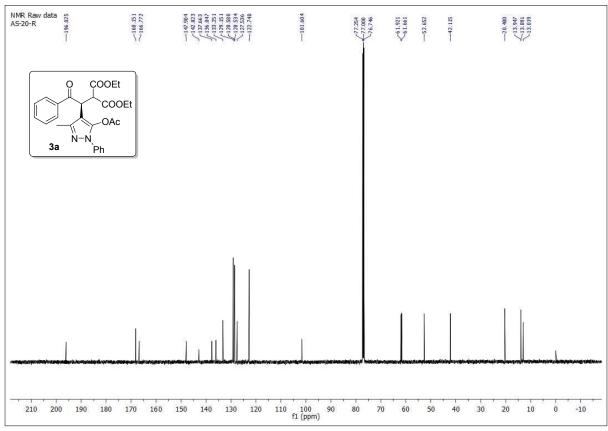


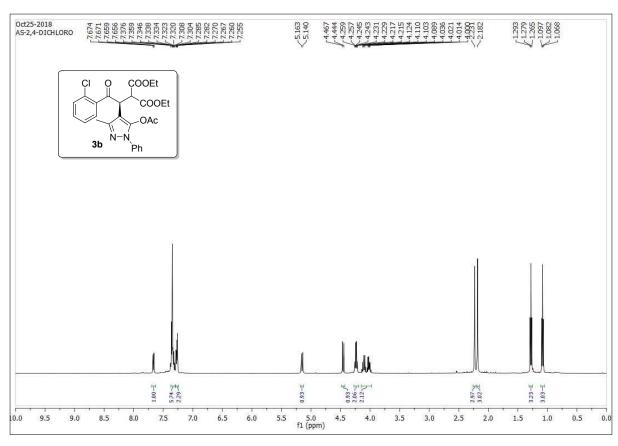


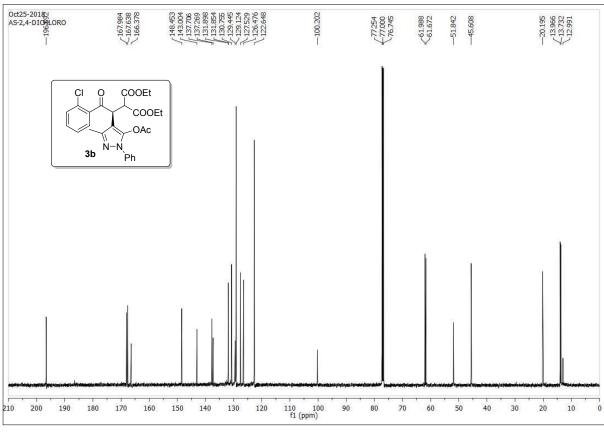


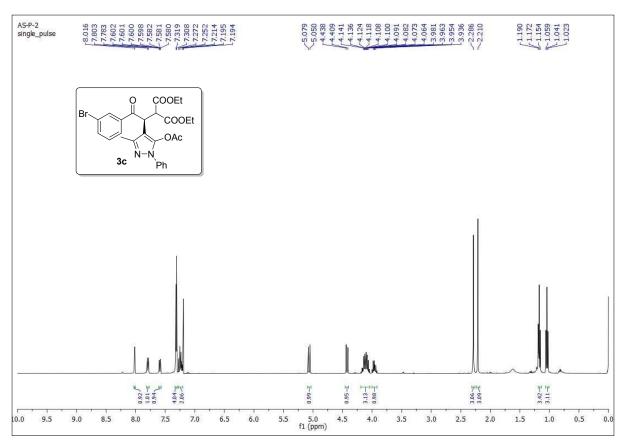


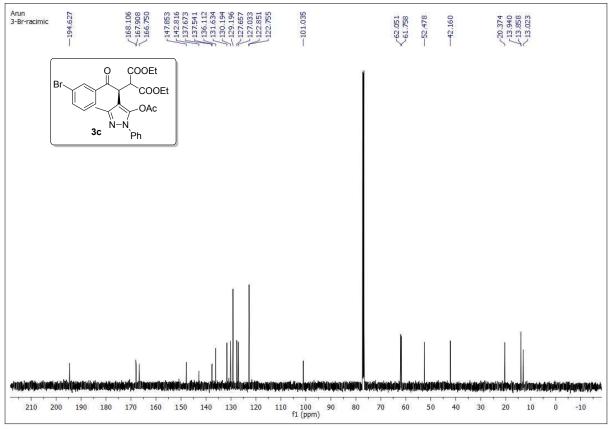


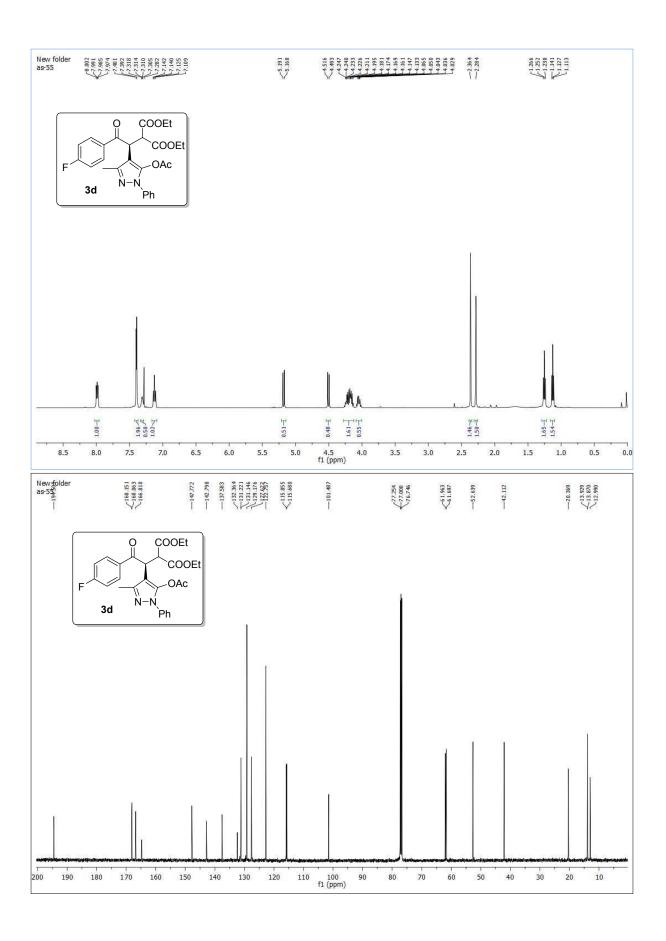


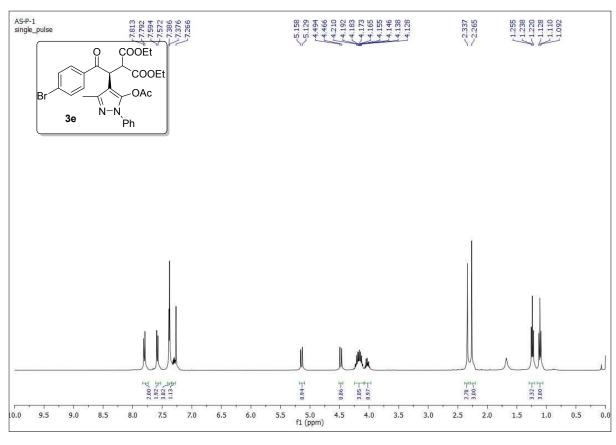


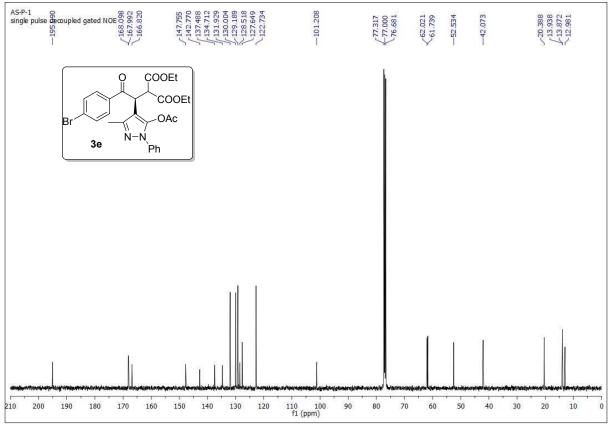


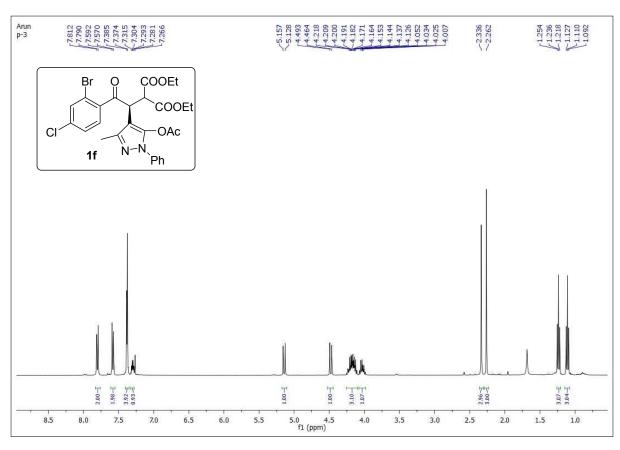


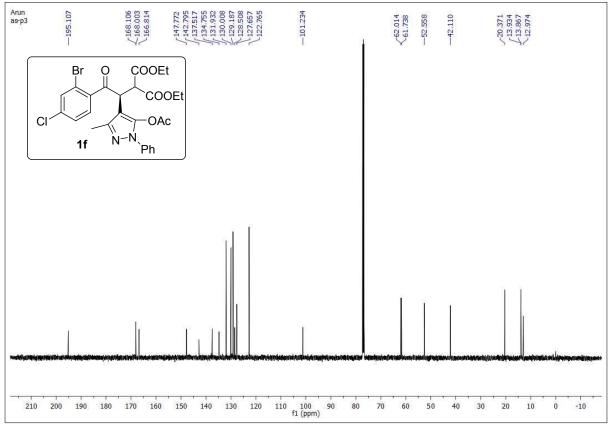


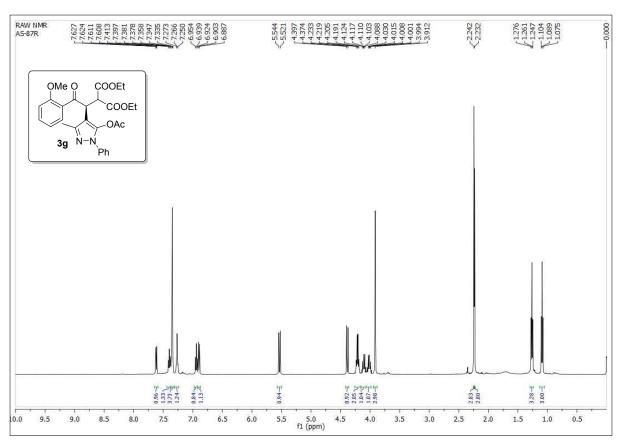


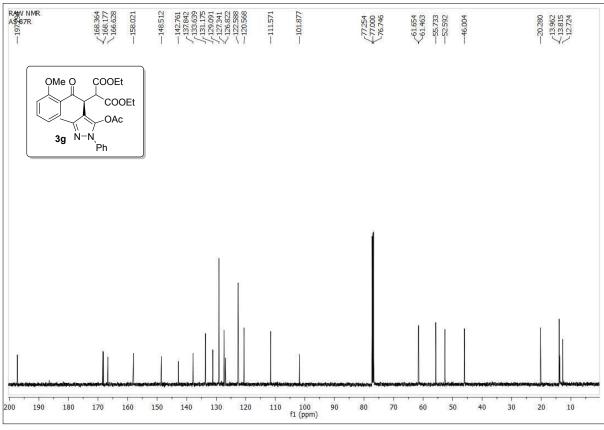


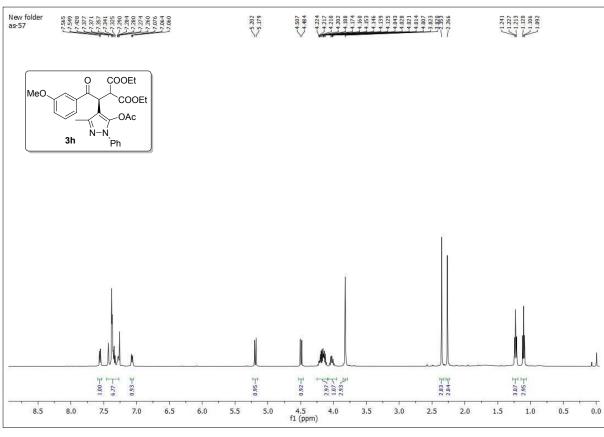


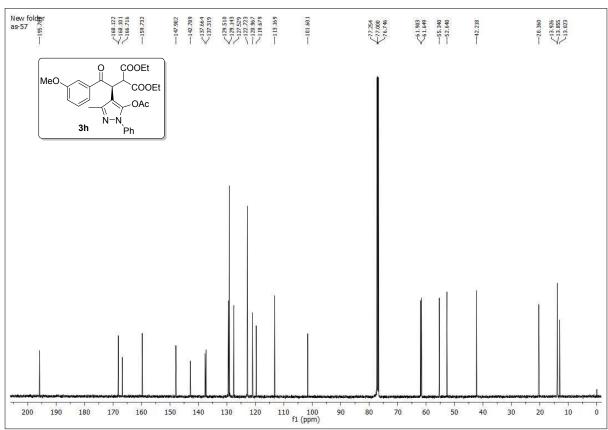


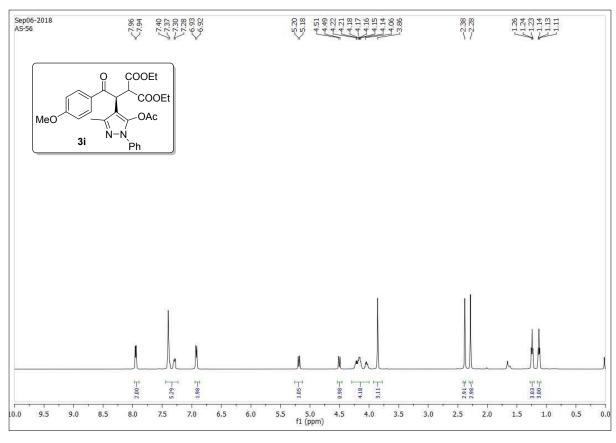


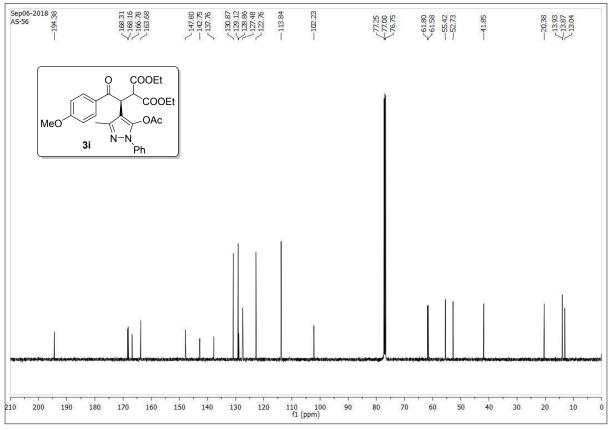


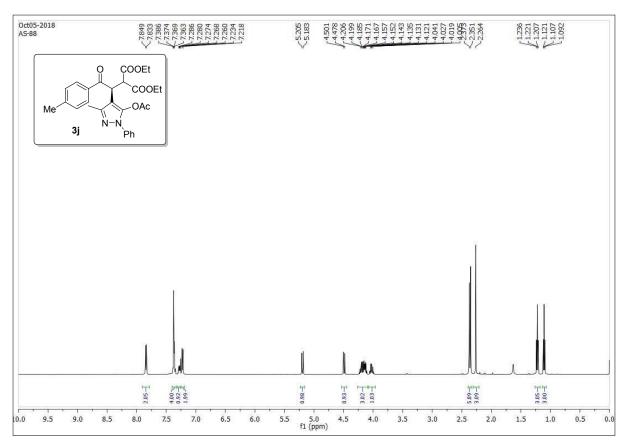


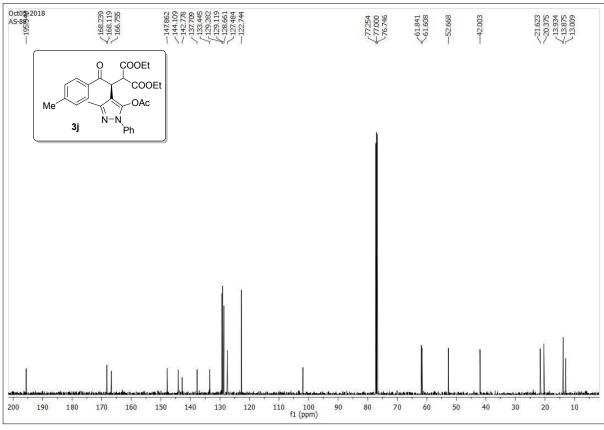


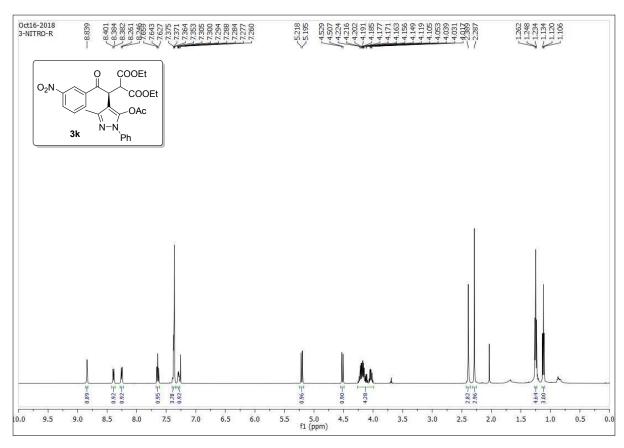


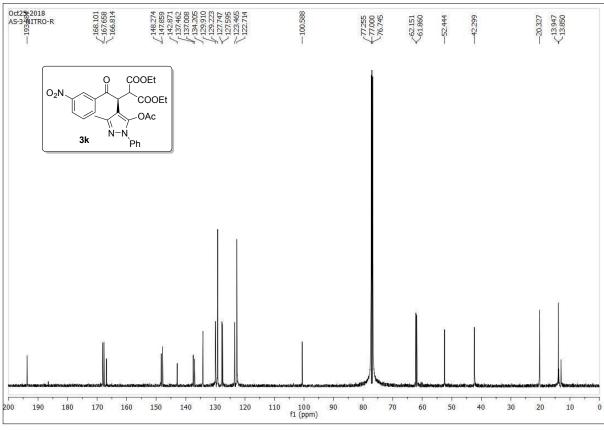


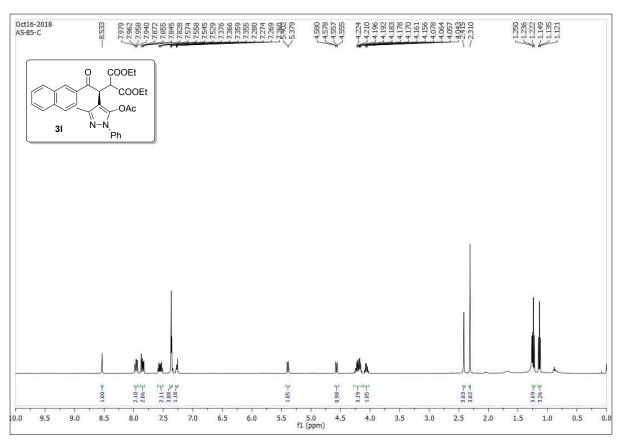


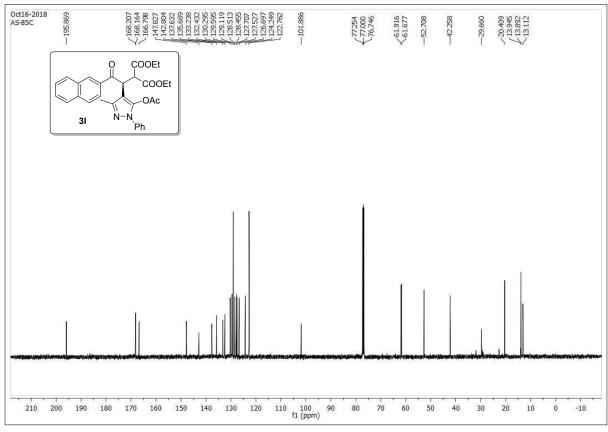


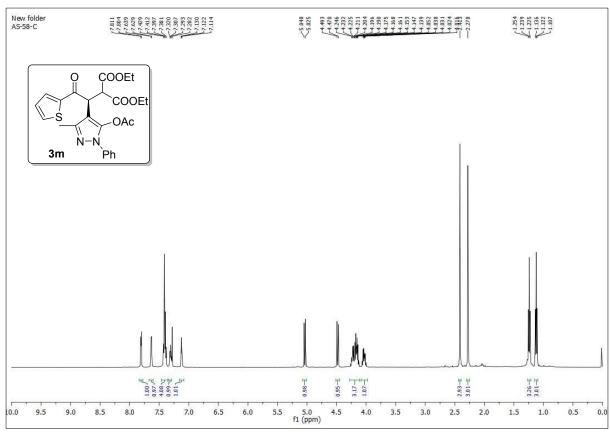


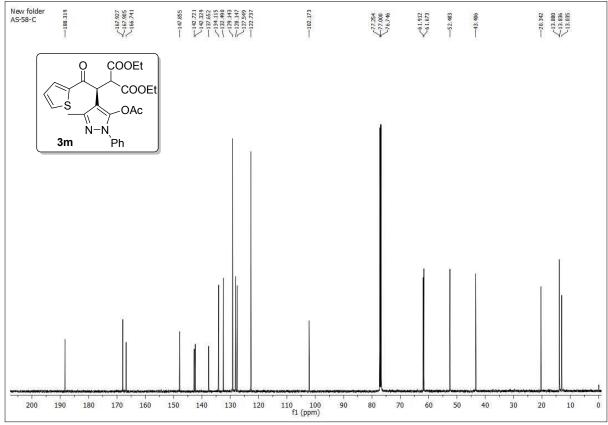


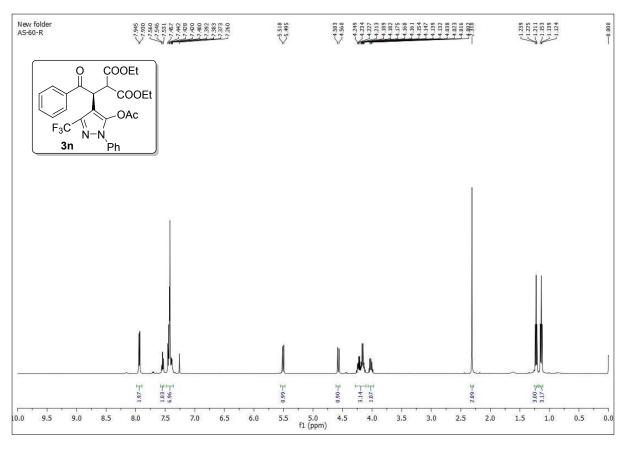


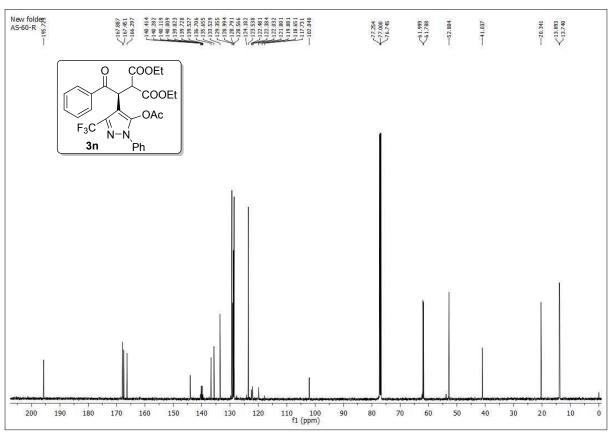


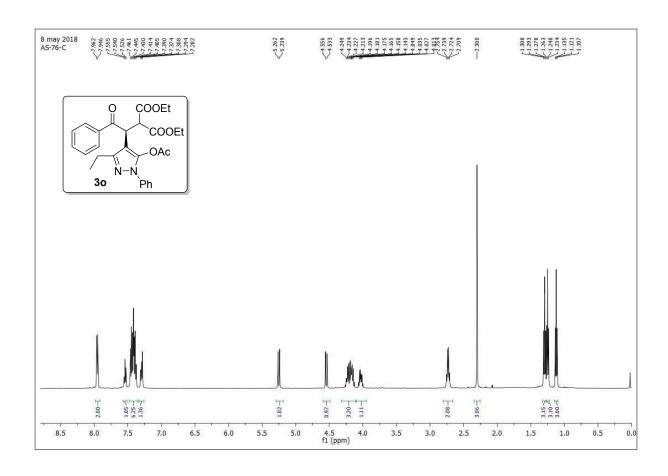


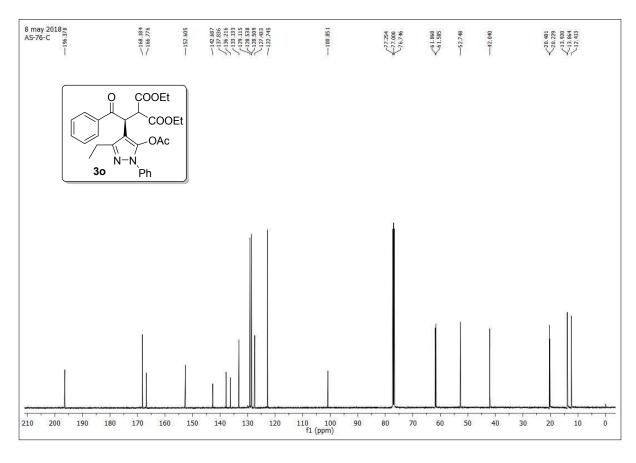


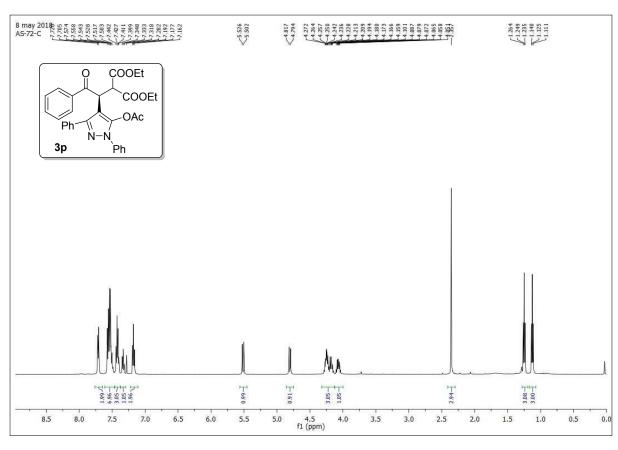


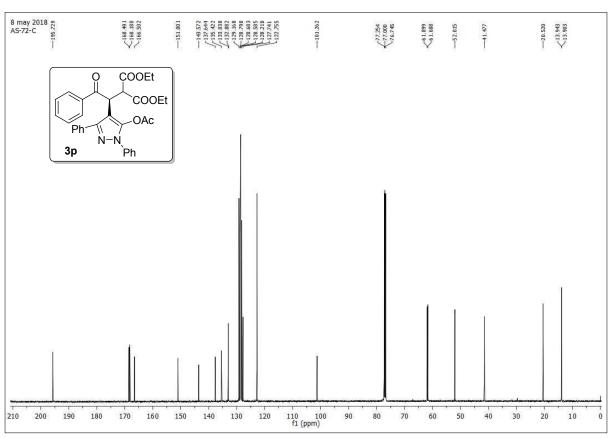


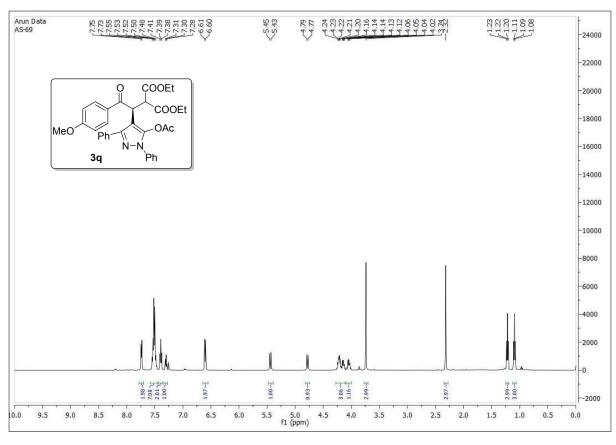


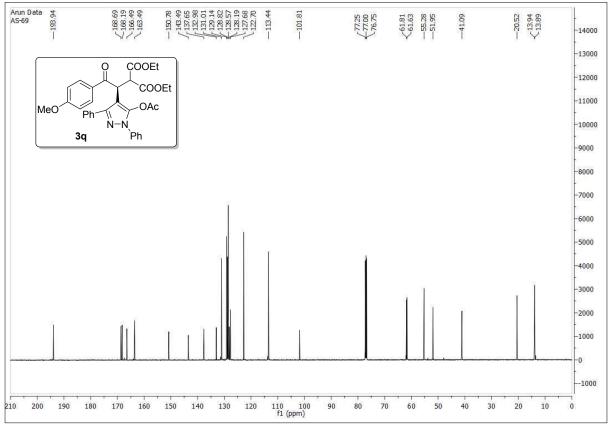


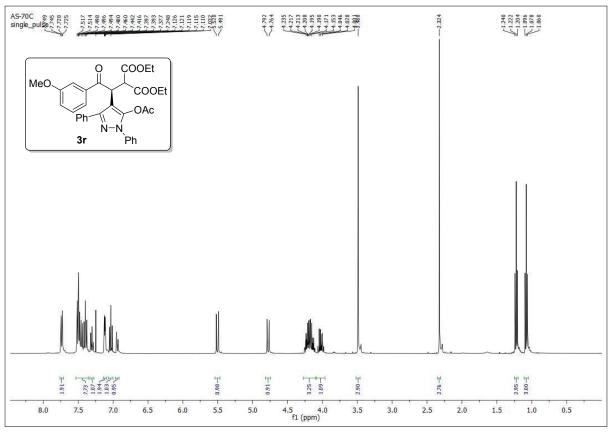


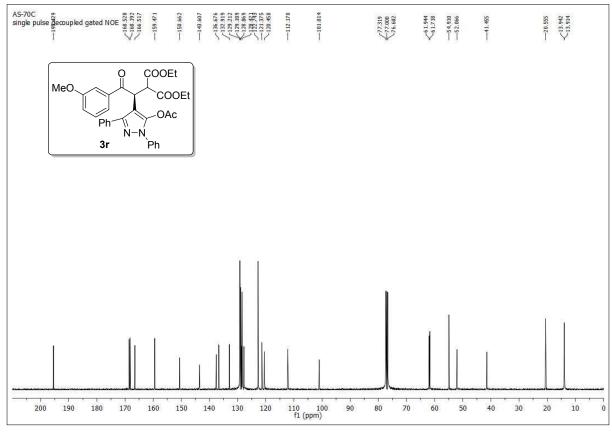


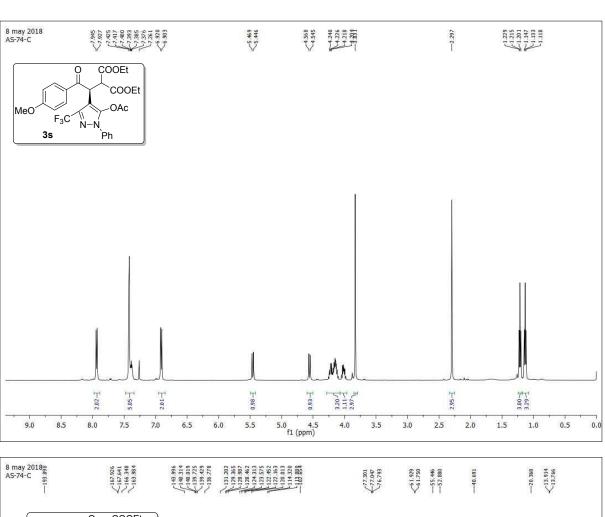


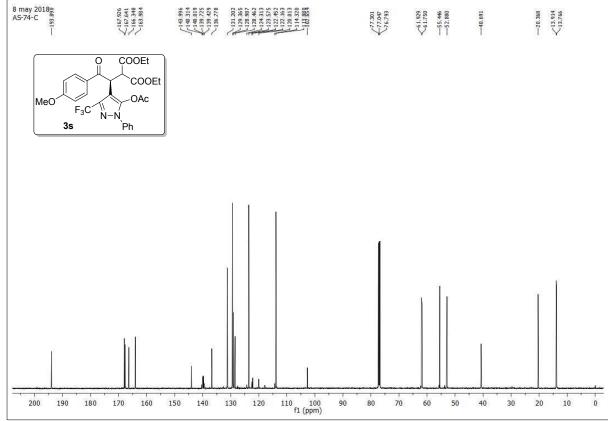


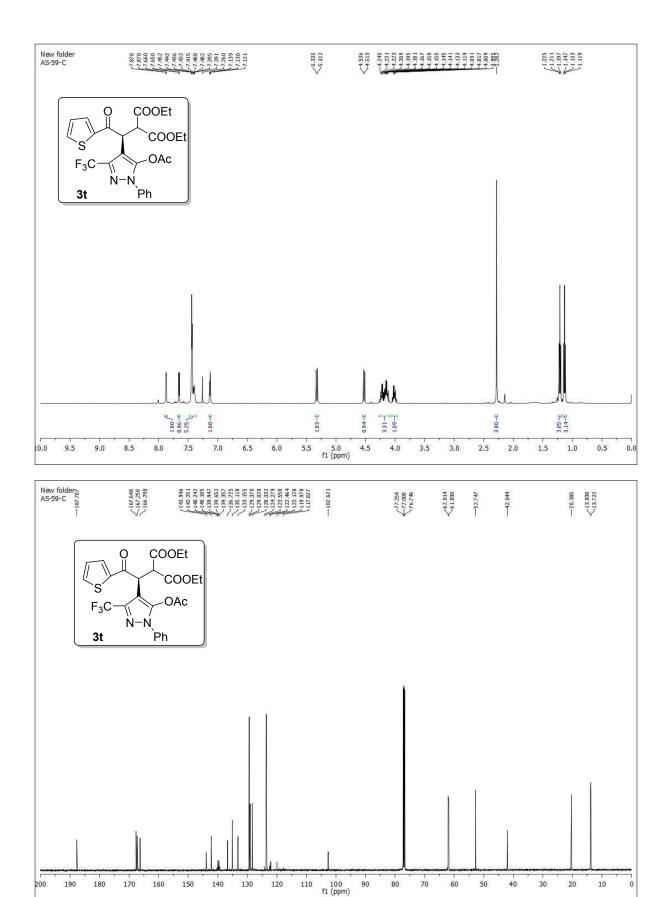


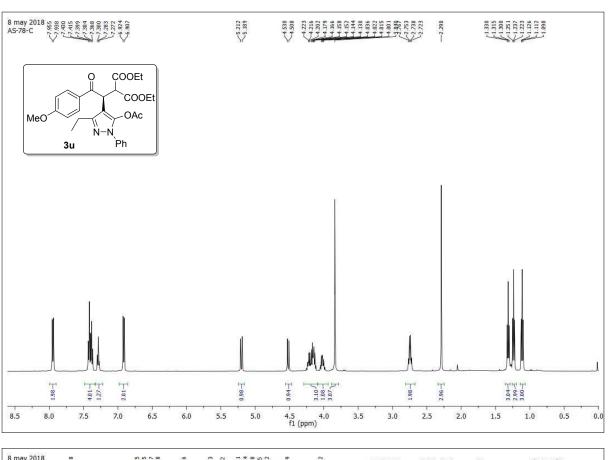


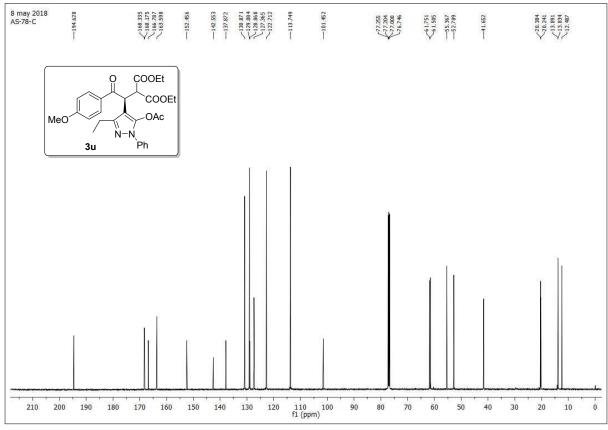


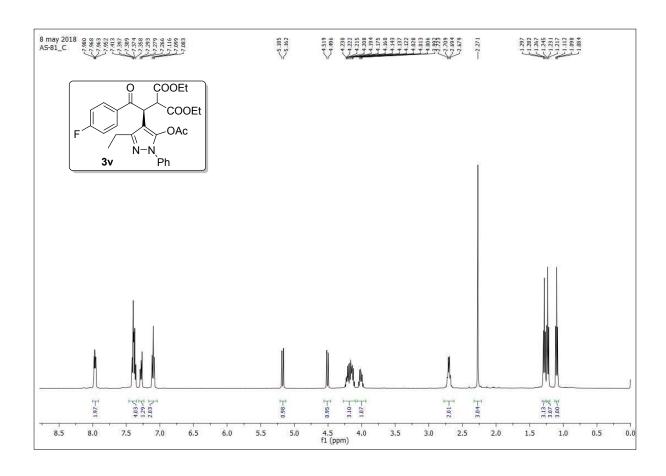


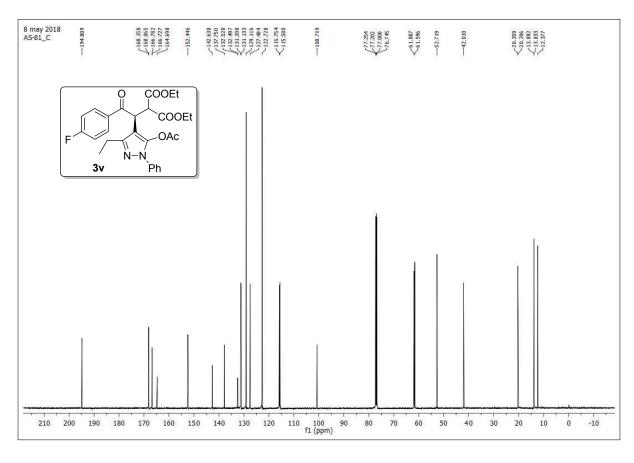


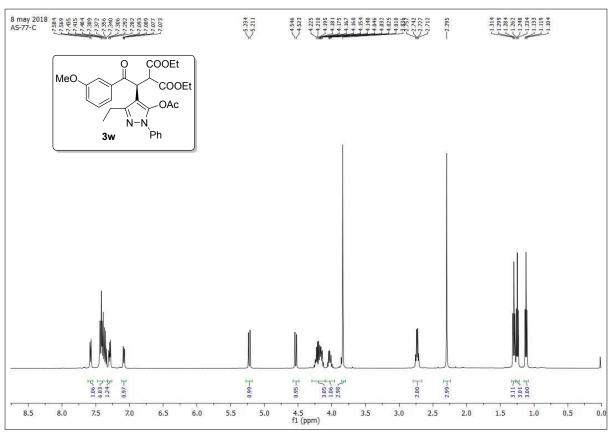


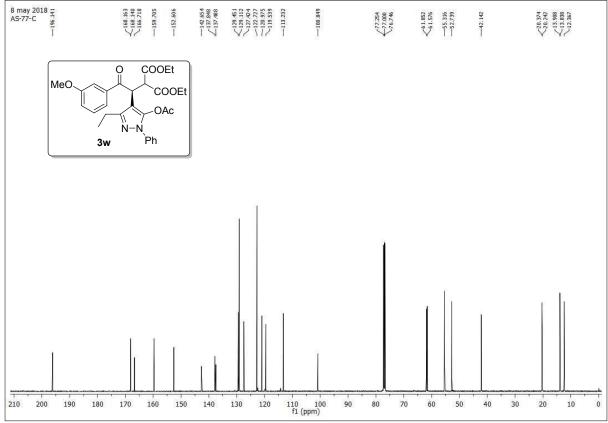


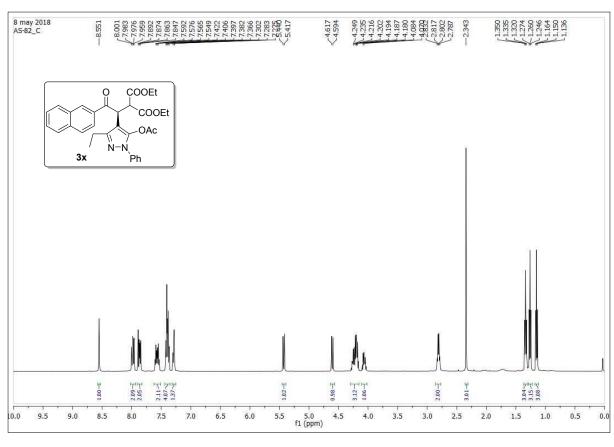


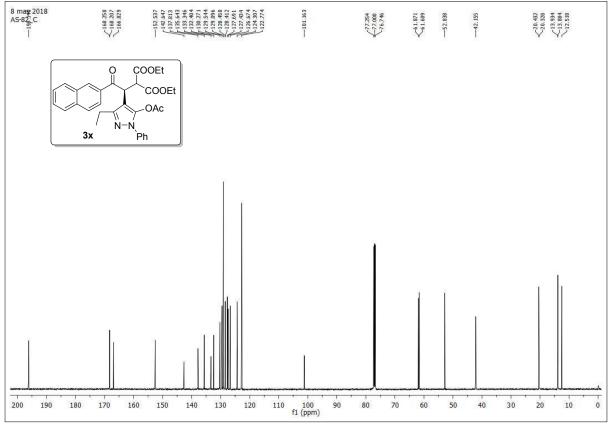


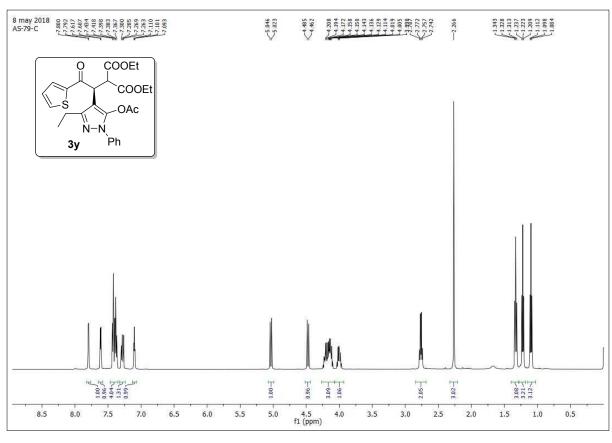


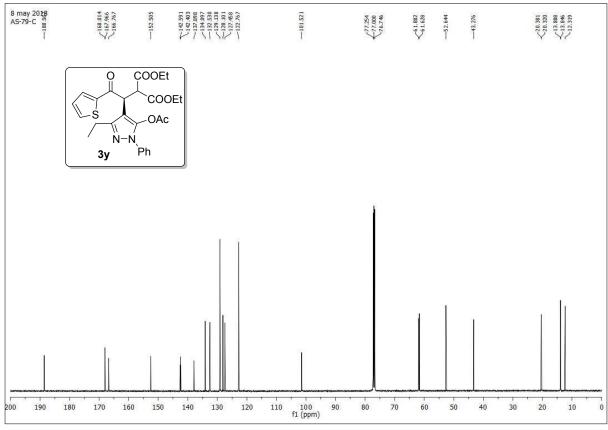


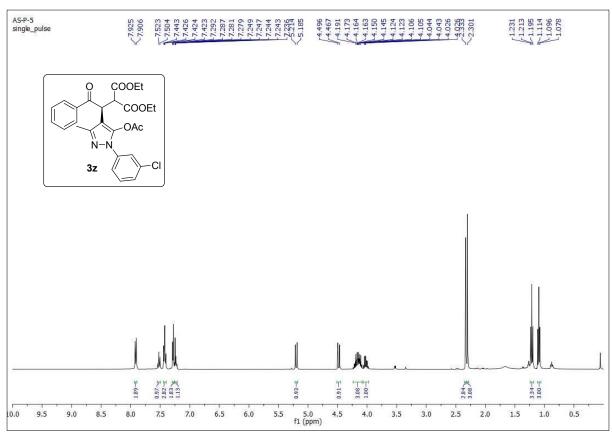


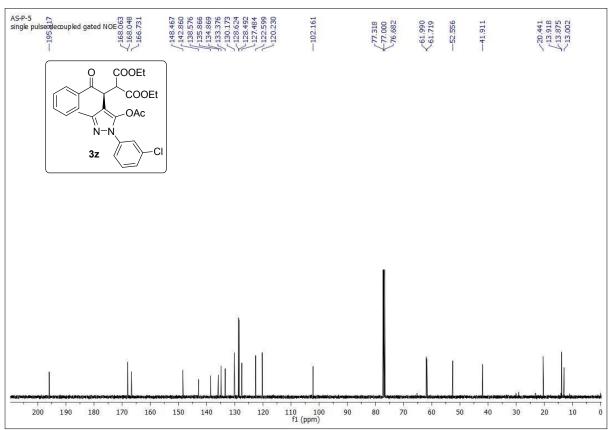


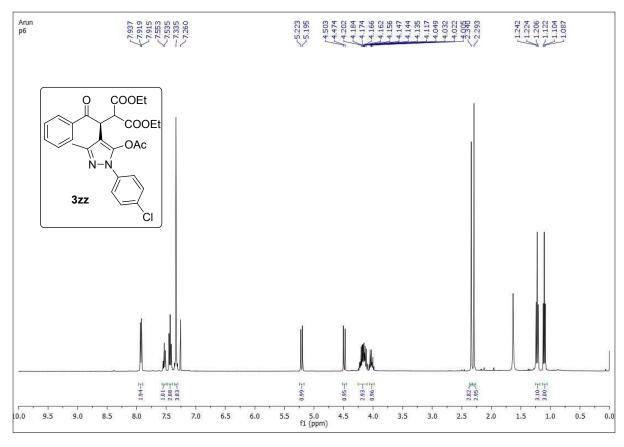


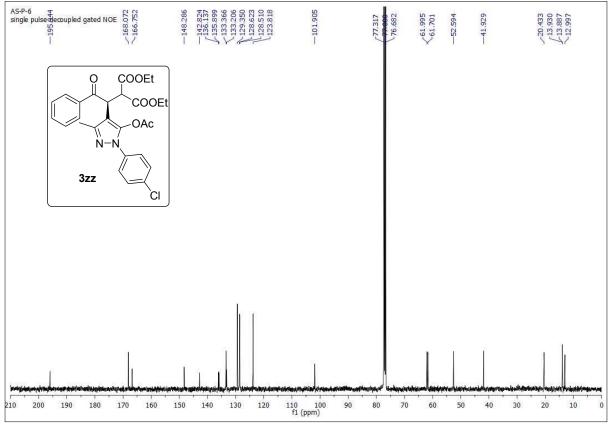


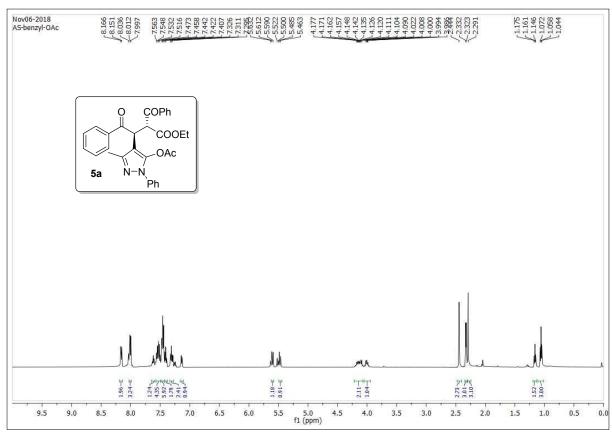


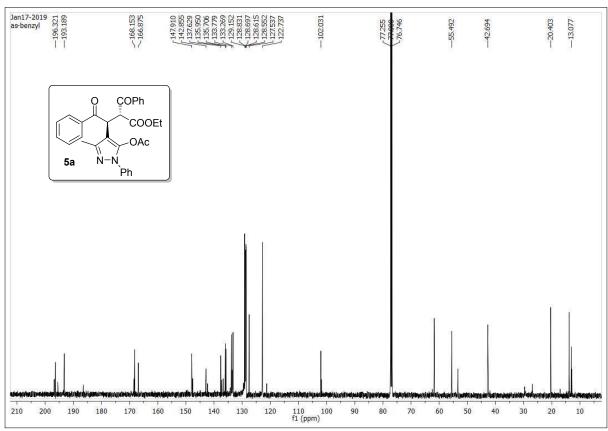


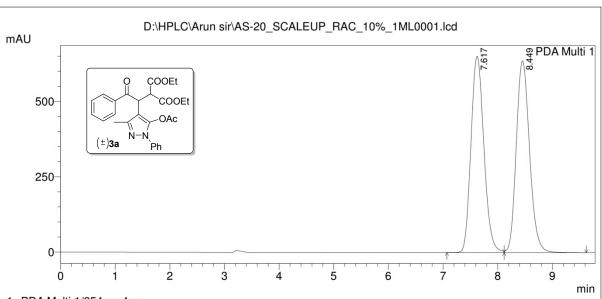










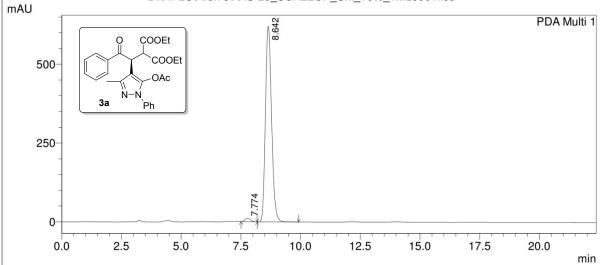


PDA Ch1 254nm 4nm

Pea		

TOTAL DE TIME TIME								
Peak#	Ret. Time	Area	Height	Area %	Height %			
1	7.617	10745502	652042	49.913	50.590			
2	8.449	10782761	636824	50.087	49.410			
Total		21528263	1288866	100.000	100.000			

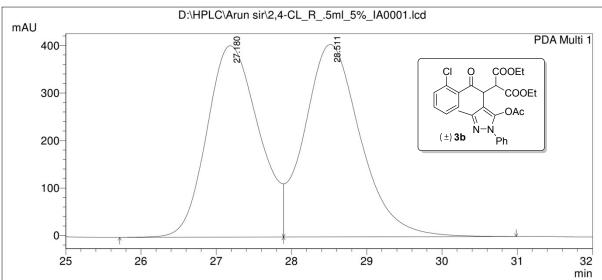




PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	7.774	173838	10747	1.546	1.700
2	8.642	11072685	621350	98.454	98.300
Total		11246522	632097	100.000	100.000

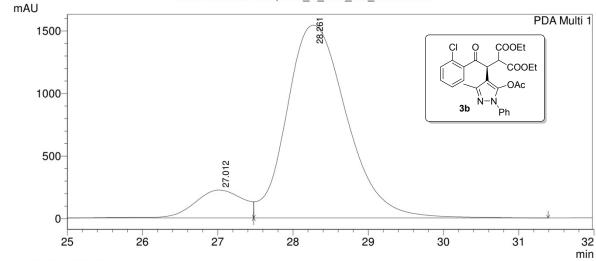


PDA Ch1 254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.180	19298326	402852	48.002	49.868
2	28.511	20904551	404982	51.998	50.132
Total		40202877	807834	100.000	100.000

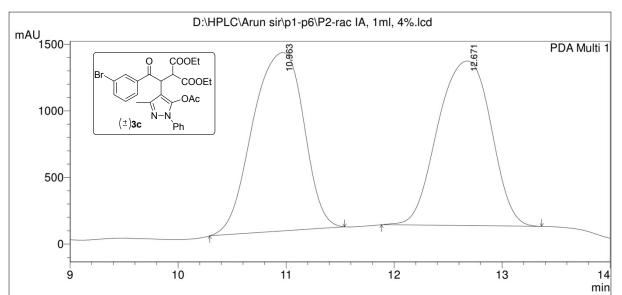
$D: \label{eq:decomposition} D: \label{eq:decomposition}$



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	27.012	10096634	223074	10.596	12.642
2	28.261	85189300	1541493	89.404	87.358
Total		95285935	1764567	100.000	100.000

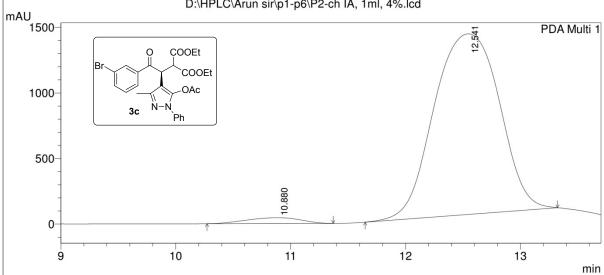


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.963	44124116	1339786	51.021	52.018
2	12.671	42357940	1235825	48.979	47.982
Total		86482057	2575611	100.000	100.000

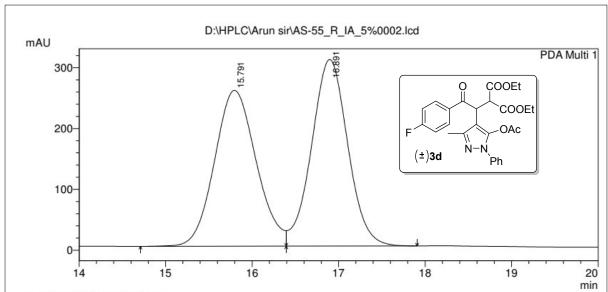
D:\HPLC\Arun sir\p1-p6\P2-ch IA, 1ml, 4%.lcd



1 PDA Multi 1/254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.880	1446924	44444	2.581	3.126
2	12.541	54623572	1377290	97.419	96.874
Total		56070495	1421734	100.000	100.000

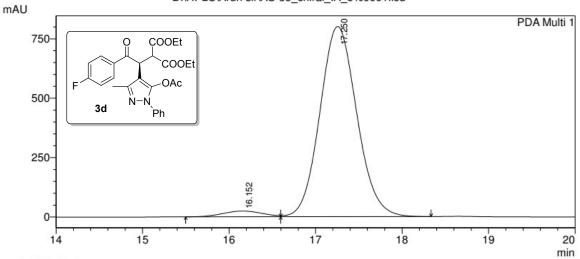


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.791	8589385	256322	49.043	45.511
2	16.891	8924684	306883	50.957	54.489
Total		17514069	563205	100.000	100.000

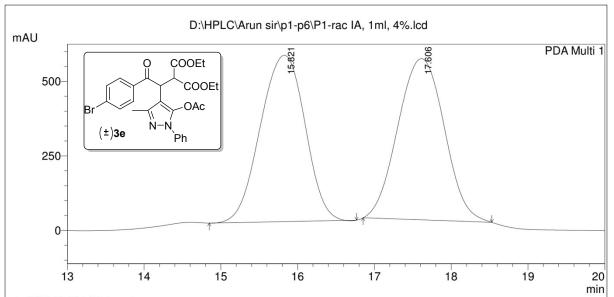




1 PDA Multi 1/254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	16.152	765618	24029	3.126	2.915
2	17.250	23725406	800279	96.874	97.085
Total		24491023	824308	100.000	100.000

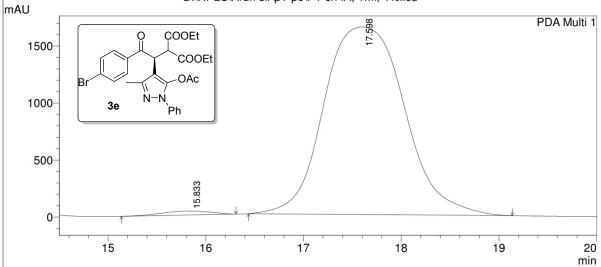


PeakTable

PDA	Ch1	254nm	4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.821	22554372	558173	49.762	50.783
2	17.606	22770048	540970	50.238	49.217
Total		45324420	1099143	100.000	100.000

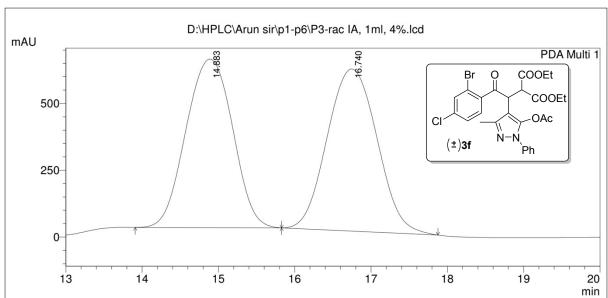
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PeakTable

PDA Ch1 254nm 4nm

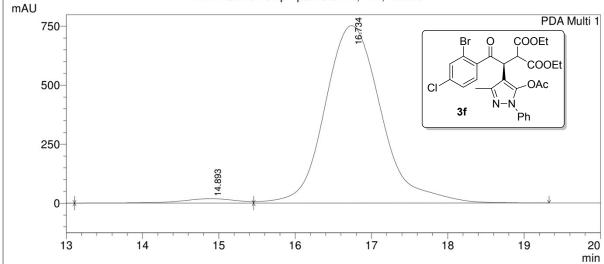
Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.833	1214708	34422	1.272	2.050
2	17.598	94306096	1644906	98.728	97.950
Total		95520804	1679328	100.000	100.000



PeakTable PDA Ch1 254nm 4nm

1 DA CHI 254HH 4HH					
Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.883	26829850	630983	49.311	50.982
2	16.740	27580128	606685	50.689	49.018
Total		54409978	1237668	100.000	100.000

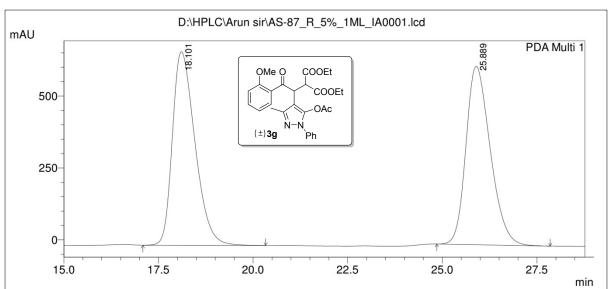
D:\HPLC\Arun sir\p1-p6\P3-ch IA, 1ml, 4%.lcd



PeakTable

PDA Ch1	254nm 4nm

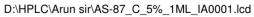
Peak#	Ret. Time	Area	Height	Area %	Height %	
1	14.893	533316	14053	1.396	1.845	
2	16.734	37683520	747716	98.604	98.155	
Total		38216836	761769	100.000	100.000	

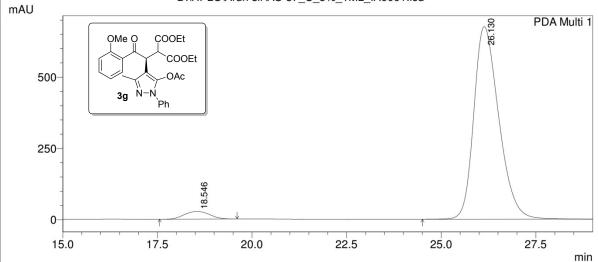


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.101	27961094	672705	50.175	52.022
2	25.889	27765837	620411	49.825	47.978
Total		55726931	1293116	100.000	100.000

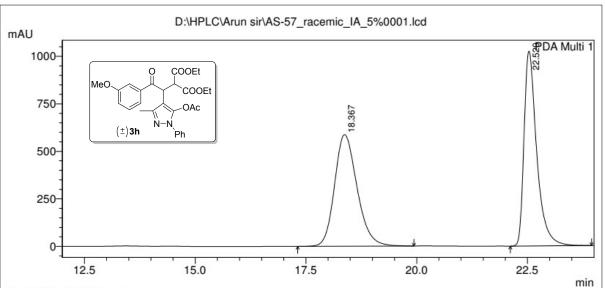




PeakTable

PDA Ch1 254nm 4nm

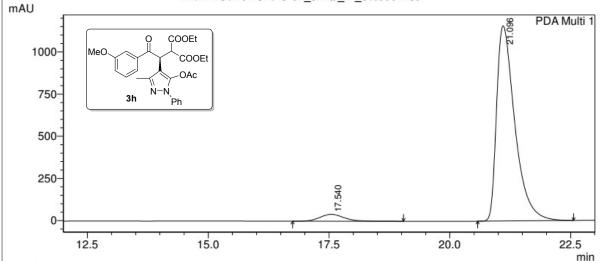
Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.546	1251969	26791	3.879	3.815
2	26.130	31021673	675532	96.121	96.185
Total		32273642	702323	100.000	100.000



PeakTable

PDA Ch1 254nm 4nm

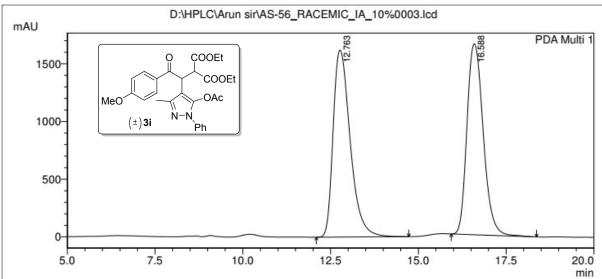
Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.367	20761944	587377	50.455	36.435
2	22.529	20387622	1024768	49.545	63.565
Total		41149566	1612145	100.000	100.000



PeakTable

PDA Ch1 254nm 4nm

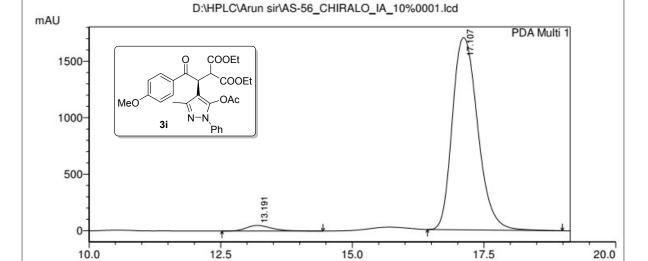
Peak#	Ret. Time	Area	Height	Area %	Height %
1	17.540	1436433	41090	4.513	3.429
2	21.096	30389947	1157315	95.487	96.571
Total		31826380	1198405	100.000	100.000



PDA Ch1 254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.763	54717873	1619988	50.652	49.481
2	16.588	53308147	1653950	49.348	50.519
Total		108026020	3273939	100.000	100.000



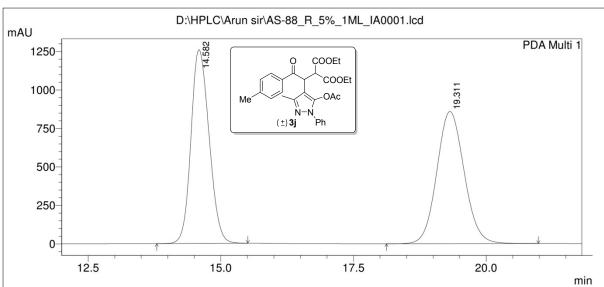
1 PDA Multi 1/254nm 4nm

PeakTable

min

PDA Ch1 254nm 4nm

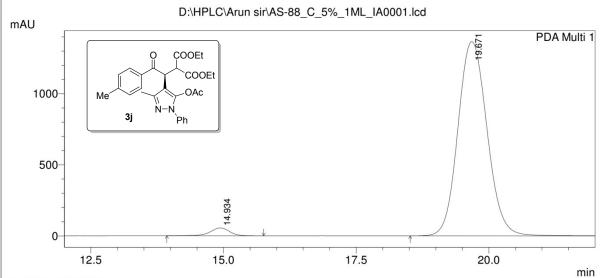
Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.191	1688292	49998	2.862	2.854
2	17.107	57303046	1701768	97.138	97.146
Total		58991338	1751766	100.000	100.000



PDA Ch1 254nm 4nm

PeakTable

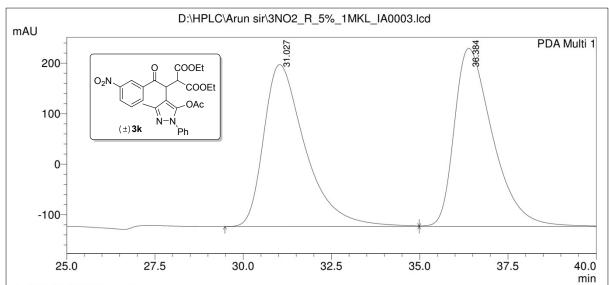
Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.582	29955948	1258861	49.283	59.440
2	19.311	30827972	858997	50.717	40.560
Total		60783920	2117857	100.000	100.000



1 PDA Multi 1/254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.934	1394943	54911	2.602	3.864
2	19.671	52208655	1366051	97.398	96.136
Total		53603598	1420962	100.000	100.000

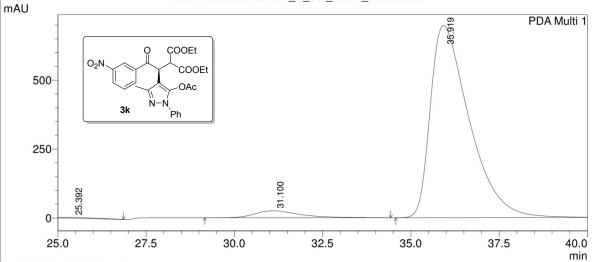


PDA Ch1 254nm 4nm

PeakTable

D 1//	D . T.	A	TT 1 1	A 01	TT ' 1 . Cf
Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.027	26261130	320704	49.724	47.622
2	36.384	26552644	352739	50.276	52.378
Total		52813774	673443	100.000	100.000

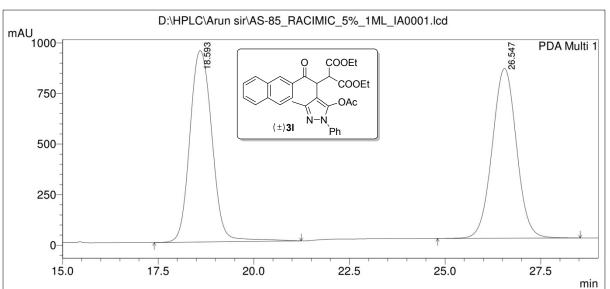




1 PDA Multi 1/254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	31.100	2234379	25361	4.013	3.510
2	35.919	53447512	697114	95.987	96.490
Total		55681891	722475	100.000	100.000

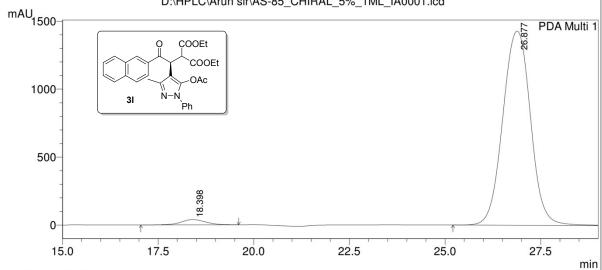


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.593	38149497	945853	50.736	52.984
2	26.547	37042392	839324	49.264	47.016
Total		75191889	1785176	100.000	100.000

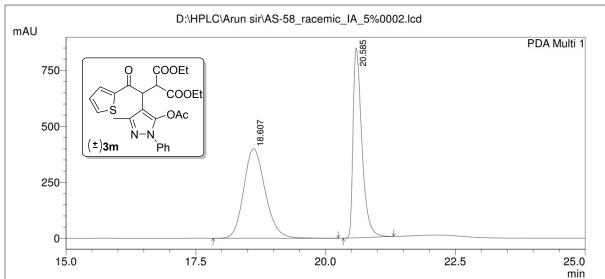




PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.398	1755382	39022	2.370	2.657
2	26.877	72326546	1429399	97.630	97.343
Total		74081928	1468420	100.000	100.000

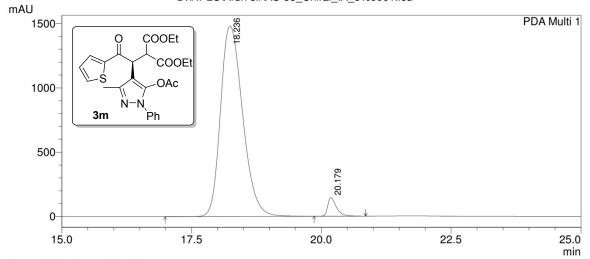


PDA Ch1 254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.607	11533326	400750	53.515	32.098
2	20.585	10018263	847757	46.485	67.902
Total		21551589	1248507	100.000	100.000

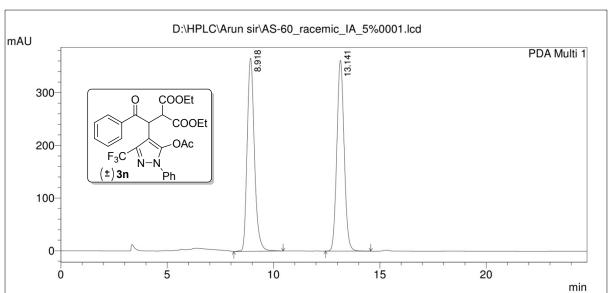




PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.236	43876138	1481099	96.279	91.089
2	20.179	1695744	144894	3.721	8.911
Total		45571882	1625993	100.000	100.000

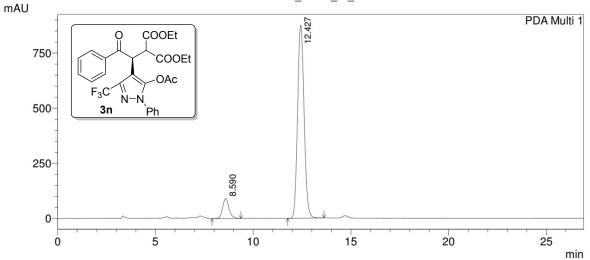


PeakTable

PDA Ch1 254nm 4nm

l	Peak#	Ret. Time	Area	Height	Area %	Height %
l	1	8.918	8675873	366535	50.151	50.313
l	2	13.141	8623572	361981	49.849	49.687
	Total		17299445	728516	100.000	100.000

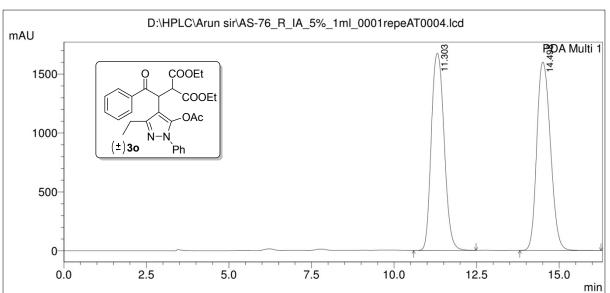
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PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	8.590	2060829	90352	9.241	9.359
2	12.427	20240564	875008	90.759	90.641
Total		22301393	965359	100.000	100.000

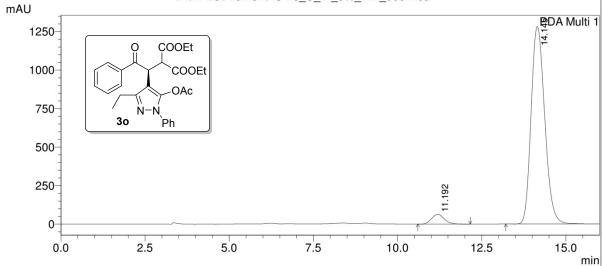


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.303	45266761	1674681	49.580	51.155
2	14.498	46033621	1599068	50.420	48.845
Total		91300383	3273749	100.000	100.000

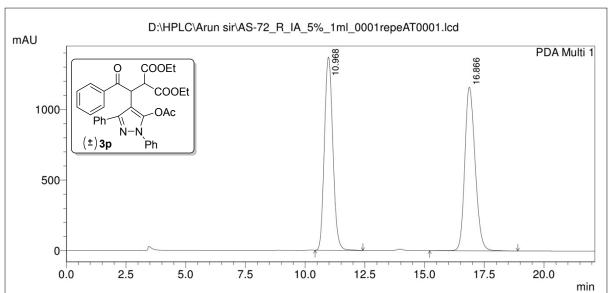
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PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.192	1668952	64252	4.428	4.770
2	14.145	36019041	1282618	95.572	95.230
Total		37687994	1346870	100.000	100.000

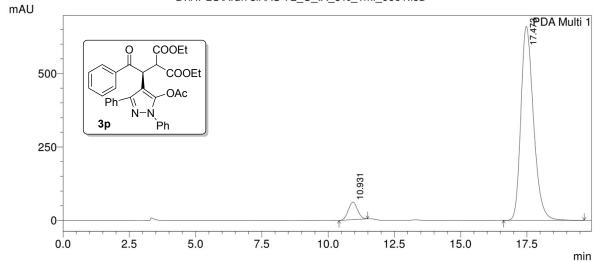


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.968	33703911	1369666	49.065	54.150
2	16.866	34988986	1159732	50.935	45.850
Total		68692896	2529398	100.000	100.000

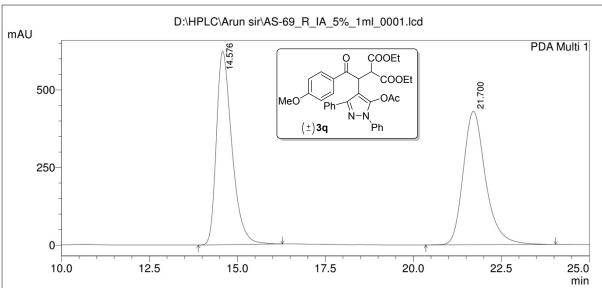
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PeakTable

PDA Ch1 254nm 4nm

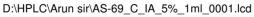
Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.931	1444969	59841	6.192	8.318
2	17.473	21890063	659609	93.808	91.682
Total		23335032	719450	100.000	100.000

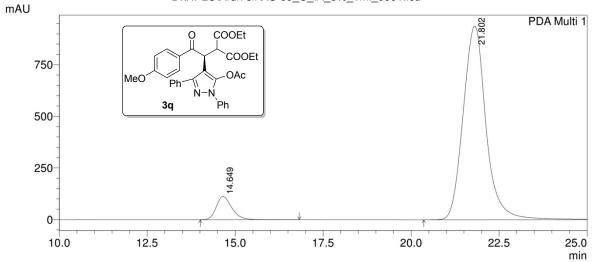


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.576	19153561	622617	50.219	59.154
2	21.700	18986471	429919	49.781	40.846
Total		38140032	1052536	100.000	100.000

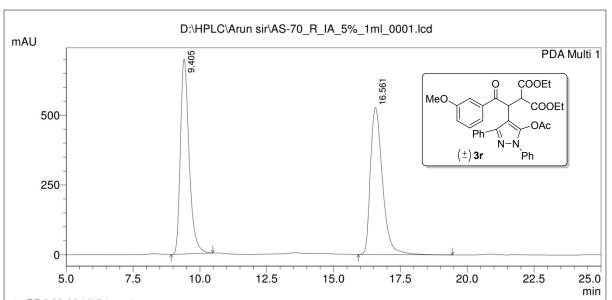




PeakTable

PDA Ch1 254nm 4nm

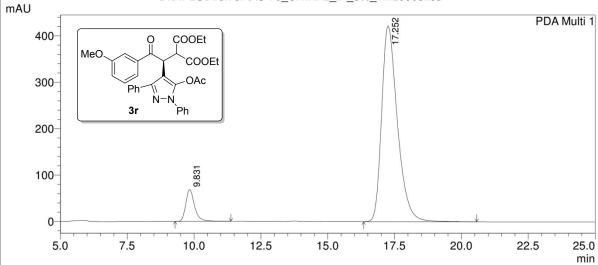
Peak#	Ret. Time	Area	Height	Area %	Height %
1	14.649	3469732	113260	7.538	10.758
2	21.802	42561829	939556	92.462	89.242
Total		46031560	1052816	100.000	100.000



PDA Ch1 254nm 4nm

DA CHI 2	DA CHI 254IIII 4IIIII							
Peak#	Ret. Time	Area	Height	Area %	Height %			
1	9.405	15890377	699742	49.035	57.064			
2	16.561	16515813	526508	50.965	42.936			
Total		32406190	1226249	100.000	100.000			

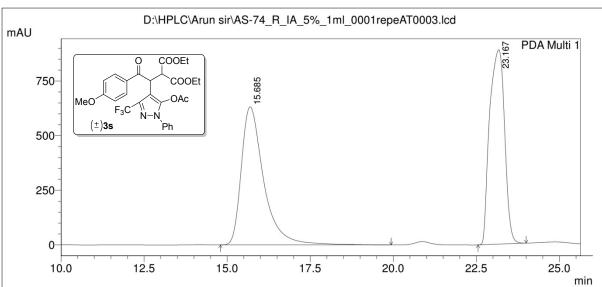
PeakTable



PeakTable

PDA	Chl	254nm	4nm

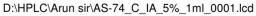
Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.831	1567316	68575	8.297	13.992
2	17.252	17321744	421534	91.703	86.008
Total		18889060	490109	100.000	100.000

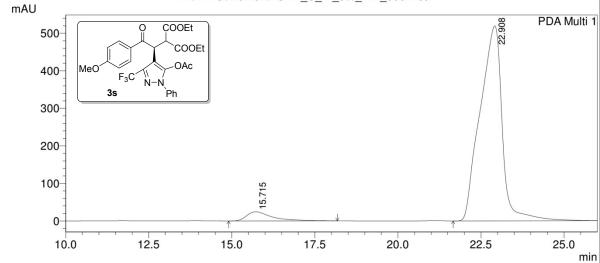


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.685	29657805	632018	51.570	41.531
2	23.167	27852432	889779	48.430	58.469
Total		57510237	1521797	100.000	100.000

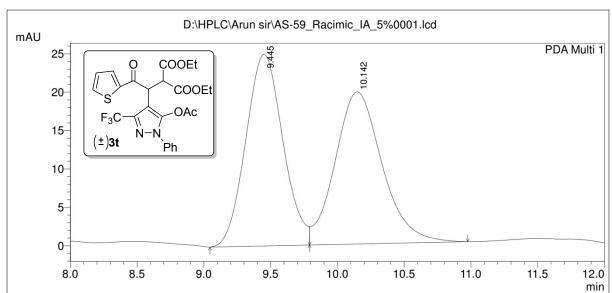




PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.715	1303694	24450	5.113	4.493
2	22.908	24195121	519740	94.887	95.507
Total		25498815	544190	100.000	100.000

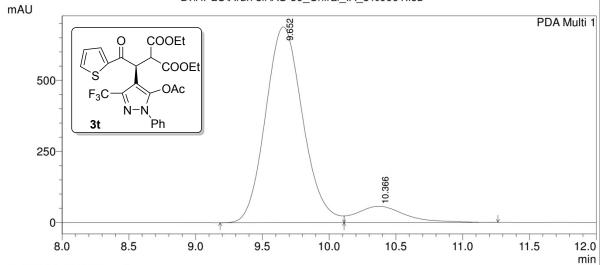


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.445	483597	24964	49.930	55.728
2	10.142	484948	19832	50.070	44.272
Total		968544	44796	100.000	100.000

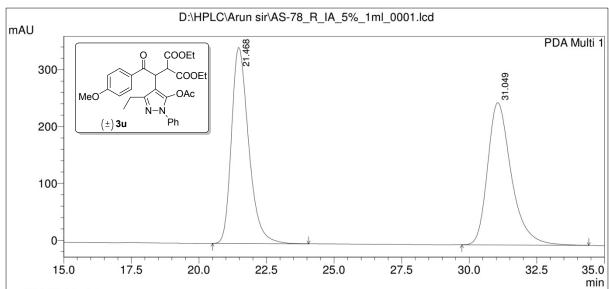




1 PDA Multi 1/254nm 4nm

PeakTable

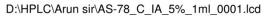
Peak#	Ret. Time	Area	Height	Area %	Height %
1	9.652	13364514	688996	90.356	92.318
2	10.366	1426390	57331	9.644	7.682
Total	5	14790904	746327	100.000	100.000

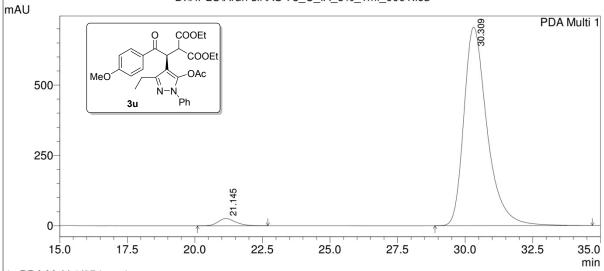


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.468	15286118	344821	49.987	57.946
2	31.049	15293778	250254	50.013	42.054
Total		30579895	595075	100.000	100.000

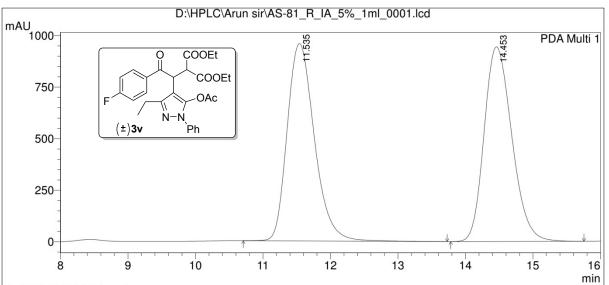




1 PDA Multi 1/254nm 4nm

PeakTable

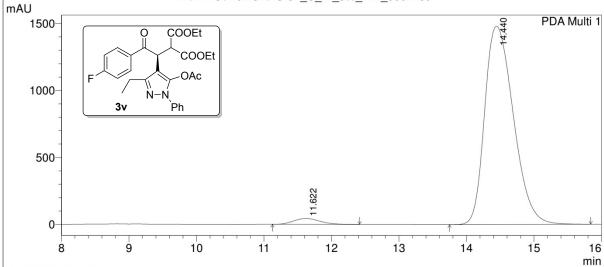
Peak#	Ret. Time	Area	Height	Area %	Height %
1	21.145	1157759	25742	2.664	3.518
2	30.309	42298486	705997	97.336	96.482
Total		43456245	731739	100.000	100.000



PDA Ch1 254nm 4nm

PeakTable

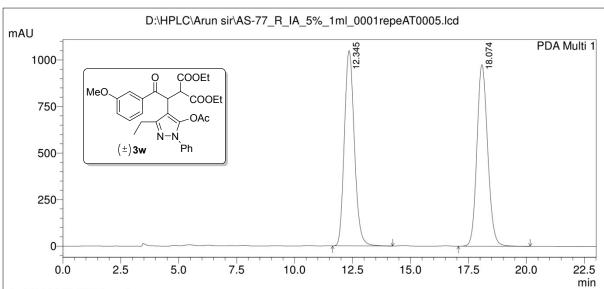
Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.535	26844433	957701	49.895	50.361
2	14.453	26957015	943981	50.105	49.639
Total		53801448	1901681	100.000	100.000



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.622	1175185	43908	2.615	2.880
2	14.440	43760158	1480482	97.385	97.120
Total		44935343	1524390	100.000	100.000

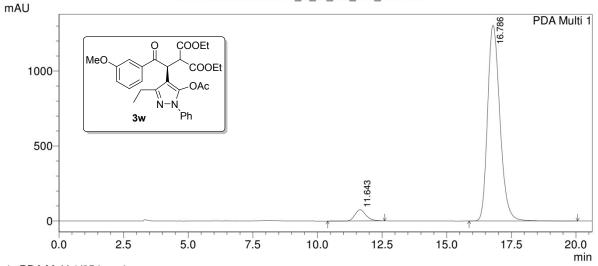


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.345	31530032	1049784	50.003	51.824
2	18.074	31526028	975892	49.997	48.176
Total		63056060	2025676	100.000	100.000

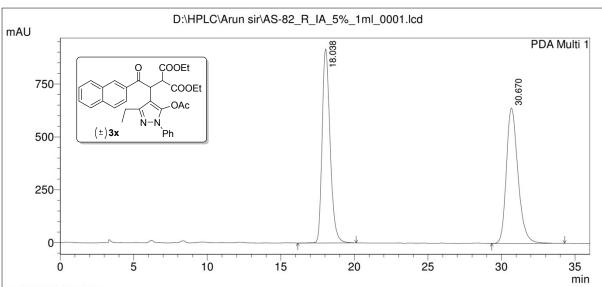




PeakTable

PDA Ch1 254nm 4nm

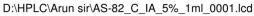
Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.643	2194026	74429	4.814	5.393
2	16.786	43386091	1305632	95.186	94.607
Total		45580117	1380061	100.000	100.000

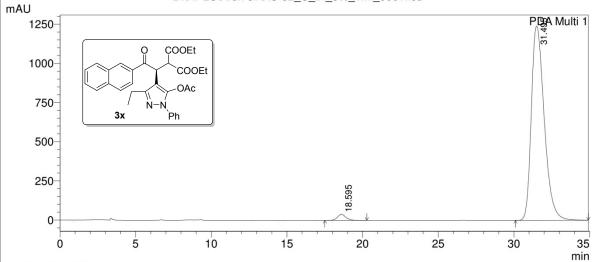


PDA Ch1 254nm 4nm

PeakTable

1 211 0111 2	C IIIII IIIII				
Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.038	34536517	917219	49.651	58.914
2	30.670	35022409	639668	50.349	41.086
Total		69558926	1556887	100.000	100.000

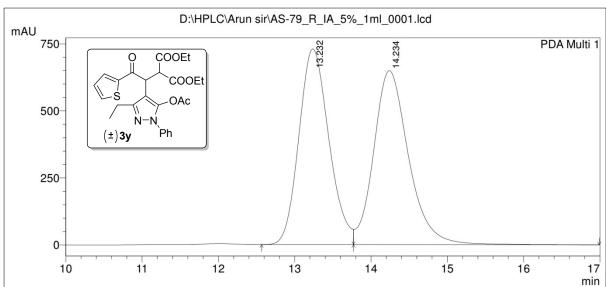




1 PDA Multi 1/254nm 4nm

PeakTable

Peak#	Ret. Time	Area	Height	Area %	Height %
1	18.595	1490160	38199	1.984	2.985
2	31.495	73605388	1241325	98.016	97.015
Total		75095549	1279524	100.000	100.000

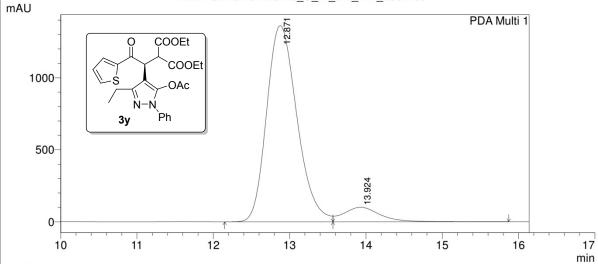


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.232	19928801	729678	49.155	52.927
2	14.234	20614366	648984	50.845	47.073
Total		40543167	1378662	100.000	100.000

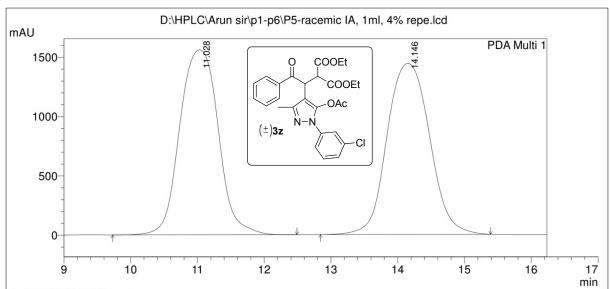




PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	12.871	37589531	1362645	91.824	93.077
2	13.924	3347106	101360	8.176	6.923
Total		40936637	1464005	100.000	100.000

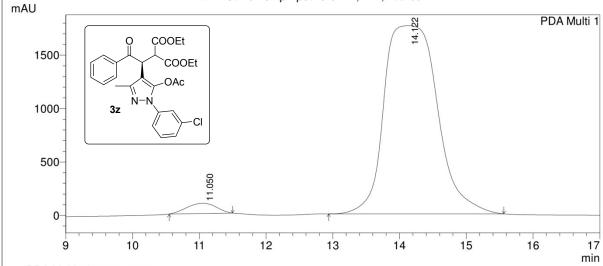


PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.028	62533952	1560458	49.459	51.963
2	14.146	63901026	1442582	50.541	48.037
Total		126434978	3003040	100.000	100.000

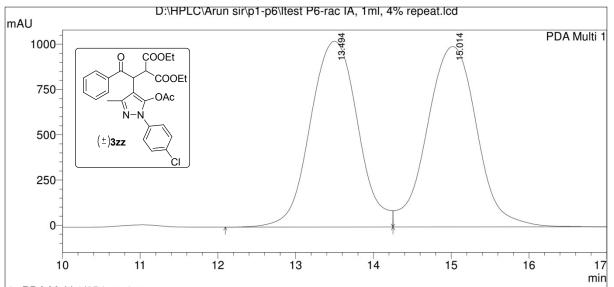
D:\HPLC\Arun sir\p1-p6\P5-ch IA, 1ml, 4%.lcd



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.050	2900517	95825	2.882	5.161
2	14.122	97744045	1760847	97.118	94.839
Total		100644562	1856673	100.000	100.000

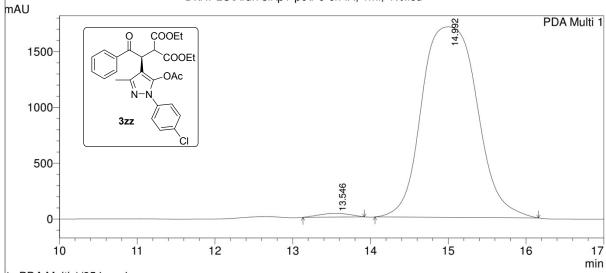


PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.494	43512807	1026335	49.601	50.730
2	15.014	44212163	996790	50.399	49.270
Total		87724971	2023126	100.000	100.000

D:\HPLC\Arun sir\p1-p6\P6-ch IA, 1ml, 4%.lcd

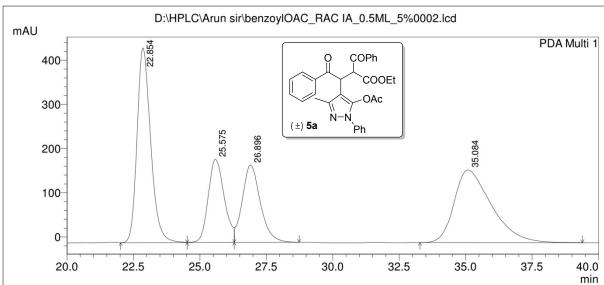
PeakTable



PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.546	919684	32859	1.076	1.889
2	14.992	84575870	1706869	98.924	98.111
Total		85495553	1739727	100.000	100.000

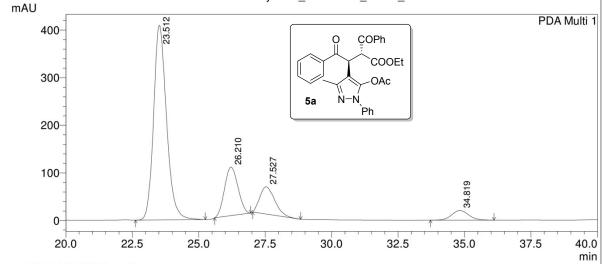


PDA Ch1 254nm 4nm

PeakTable

PDA CIII 2	.3411111 411111				
Peak#	Ret. Time	Area	Height	Area %	Height %
1	22.854	15709351	440380	32.759	45.500
2	25.575	7911807	188207	16.499	19.446
3	26.896	8268677	174852	17.243	18.066
4	35.084	16064857	164425	33.500	16.988
Total		47954692	967864	100.000	100.000





PeakTable

PDA Ch1 254nm 4nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	23.512	13861082	409002	67.330	69.515
2	26.210	3589528	101961	17.436	17.330
3	27.527	2223640	57066	10.801	9.699
4	34.819	912447	20332	4.432	3.456
Total		20586696	588361	100.000	100.000