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APPENDIX

APPENDIX A**Fungal Culture Media**

Potato Dextrose Agar

Potato 200 g

Dextrose 20 g

Agar 15 g

Distilled water add to 1000 ml

APPENDIX B

Table 1 Antifungal activity of benzoic acid derivatives on the mycelial growth of *A. porri* and *F. oxysporum*

Compound no.	Colony diameter (mm) \pm SD			
	<i>Alternaria porri</i>		<i>Fusarium oxysporum</i>	
	0 mM	5 mM	0 mM	5 mM
1	90.00 \pm 0.00	44.63 \pm 3.400	90.00 \pm 0.00	0 \pm 0.00
2	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	30.00 \pm 0.00
3	90.00 \pm 0.00	47.59 \pm 1.306	90.00 \pm 0.00	51.66 \pm 1.025
4	90.00 \pm 0.00	90 \pm 0.00	90.00 \pm 0.00	59.16 \pm 0.023
5	85.56 \pm 0.289	47.55 \pm 0.898	90.00 \pm 0.00	60.00 \pm 0.198
6	85.56 \pm 0.289	80.60 \pm 2.839	90.00 \pm 0.00	73.50 \pm 3.025
7	85.56 \pm 0.289	70.55 \pm 0.896	90.00 \pm 0.00	65.99 \pm 1.025
8	85.56 \pm 0.289	73.33 \pm 0.768	90.00 \pm 0.00	68.24 \pm 0.568
9	90.00 \pm 0.00	16.57 \pm 1.35	90.00 \pm 0.00	14.49 \pm 0.598
10	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	21.33 \pm 0.112
11	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	20.99 \pm 0.669
12	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	14.00 \pm 3.126
13	90.00 \pm 0.00	11.18 \pm 0.637	90.00 \pm 0.00	0 \pm 0.00
14	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	20.16 \pm 0.321
15	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	31.50 \pm 0.546
16	88.36 \pm 0.158	63.53 \pm 1.906	90.00 \pm 0.00	52.33 \pm 0.254
17	88.36 \pm 0.158	46.22 \pm 3.890	90.00 \pm 0.00	63.50 \pm 1.985
18	88.36 \pm 0.158	65.17 \pm 3.700	90.00 \pm 0.00	39.18 \pm 0.584
19	90.00 \pm 0.00	39.45 \pm 0.742	90.00 \pm 0.00	56.75 \pm 0.022
20	90.00 \pm 0.00	38.04 \pm 0.027	90.00 \pm 0.00	43.00 \pm 0.254
21	90.00 \pm 0.00	28.16 \pm 1.203	90.00 \pm 0.00	57.99 \pm 3.051
22	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	20.99 \pm 2.014
23	90.00 \pm 0.00	14.5 \pm 0.866	90.00 \pm 0.00	15.66 \pm 1.065
24	88.36 \pm 0.158	55.76 \pm 1.119	90.00 \pm 0.00	61.49 \pm 2.065
25	90.00 \pm 0.00	14.93 \pm 1.135	90.00 \pm 0.00	26.12 \pm 2.044
26	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	0 \pm 0.00
27	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	0 \pm 0.00
28	90.00 \pm 0.00	13.04 \pm 0.024	90.00 \pm 0.00	25.00 \pm 0.00
29	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	0 \pm 0.00
30	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	0 \pm 0.00

Table 1 (continued)

Compound no.	Colony diameter (mm)±SD			
	<i>Alternaria porri</i>		<i>Fusarium oxysporum</i>	
	0 mM	5 mM	0 mM	5 mM
31	90.00± 0.00	0± 0.00	90.00± 0.00	0± 0.00
32	90.00± 0.00	0± 0.00	90.00± 0.00	0± 0.00
33	90.00± 0.00	52.52± 0.772	90.00± 0.00	37.99± 0.215
34	90.00± 0.00	0± 0.00	90.00± 0.00	78.00± 0.011
35	90.00± 0.00	23.06± 1.000	90.00± 0.00	36.65± 1.025
36	90.00± 0.00	0± 0.00	90.00± 0.00	89.17± 4.254
37	90.00± 0.00	74.50± 0.767	90.00± 0.00	69.03± 0.224
38	90.00± 0.00	17.48± 0.296	90.00± 0.00	32.49± 0.447
39	90.00± 0.00	85.77± 2.520	90.00± 0.00	77.67± 2.481
40	90.00± 0.00	44.68± 1.548	90.00± 0.00	54.99± 1.00

Table 2 Antifungal activity of cinnamic acid derivatives on the mycelial growth of *A. porri* and *F. oxysporum*

Compound no.	Colony diameter (mm)±SD			
	<i>Alternaria porri</i>		<i>Fusarium oxysporum</i>	
	0 mM	1 mM	0 mM	1 mM
41	90.00± 0.00	73.47± 0.824	90.00± 0.00	90.00± 0.00
42	90.00± 0.00	50.37± 0.646	90.00± 0.00	90.00± 0.00
43	90.00± 0.00	39.23± 3.039	90.00± 0.00	90.00± 0.00
44	87.56± 0.00	11.71± 1.592	90.00± 0.00	87.50± 1.255
45	87.56± 0.00	13.01± 1.000	90.00± 0.00	90.00± 0.00
46	90.00± 0.00	19.62± 1.073	90.00± 0.00	90.00± 0.00
47	90.00± 0.00	10.70± 2.139	90.00± 0.00	71.33± 0.365
48	90.00± 0.00	15.28± 1.443	90.00± 0.00	90.00± 0.00
49	87.56± 0.00	22.55± 0.962	90.00± 0.00	90.00± 0.00
50	87.56± 0.00	13.64± 1.495	90.00± 0.00	74.47± 1.125
51	90.00± 0.00	12.61± 1.464	90.00± 0.00	66.30± 3.021
52	90.00± 0.00	9.81± 0.313	90.00± 0.00	73.26± 2.584
53	90.00± 0.00	12.61± 0.661	90.00± 0.00	78.66± 0.581
54	90.00± 0.00	28.47± 3.458	90.00± 0.00	74.50± 0.365
55	90.00± 0.00	32.59± 2.252	90.00± 0.00	87.66± 0.586
56	90.00± 0.00	39.20± 0.716	90.00± 0.00	90.00± 0.00

Table 2 (continued)

Compound no.	Colony diameter (mm) \pm SD			
	<i>Alternaria porri</i>		<i>Fusarium oxysporum</i>	
	0 mM	1 mM	0 mM	1 mM
57	90.00 \pm 0.00	44.98 \pm 0.973	90.00 \pm 0.00	68.33 \pm 0.654
58	90.00 \pm 0.00	66.02 \pm 0.041	90.00 \pm 0.00	88.83 \pm 1.251
59	90.00 \pm 0.00	82.63 \pm 3.008	90.00 \pm 0.00	90.00 \pm 2.251
60	90.00 \pm 0.00	55.92 \pm 0.891	90.00 \pm 0.00	75.16 \pm 0.636
61	90.00 \pm 0.00	20.376 \pm 0.597	90.00 \pm 0.00	50.00 \pm 0.251
62	90.00 \pm 0.00	41.70 \pm 2.147	90.00 \pm 0.00	85.67 \pm 3.254
63	90.00 \pm 0.00	44.31 \pm 1.139	90.00 \pm 0.00	84.25 \pm 1.025
64	90.00 \pm 0.00	65.16 \pm 0.292	90.00 \pm 0.00	90.00 \pm 0.00
65	90.00 \pm 0.00	82.88 \pm 0.206	90.00 \pm 0.00	90.00 \pm 0.00
66	90.00 \pm 0.00	52.63 \pm 0.549	90.00 \pm 0.00	90.00 \pm 0.00
67	90.00 \pm 0.00	45.27 \pm 2.053	90.00 \pm 0.00	90.00 \pm 0.00
68	90.00 \pm 0.00	33.48 \pm 1.345	90.00 \pm 0.00	90.00 \pm 0.00
69	90.00 \pm 0.00	80.20 \pm 0.711	90.00 \pm 0.00	90.00 \pm 0.00
70	90.00 \pm 0.00	36.24 \pm 0.420	90.00 \pm 0.00	90.00 \pm 0.00
71	90.00 \pm 0.00	68.58 \pm 1.020	90.00 \pm 0.00	90.00 \pm 0.00
72	90.00 \pm 0.00	24.72 \pm 1.252	90.00 \pm 0.00	90.00 \pm 0.00
73	90.00 \pm 0.00	38.10 \pm 1.016	90.00 \pm 0.00	90.00 \pm 0.00
74	79.50 \pm 0.00	25.77 \pm 0.391	90.00 \pm 0.00	90.00 \pm 0.00
75	79.50 \pm 0.00	31.89 \pm 0.181	90.00 \pm 0.00	53.00 \pm 0.125
76	90.00 \pm 0.00	23.41 \pm 1.234	90.00 \pm 0.00	90.00 \pm 0.00
77	90.00 \pm 0.00	19.33 \pm 1.153	90.00 \pm 0.00	71.66 \pm 0.25
78	90.00 \pm 0.00	20.44 \pm 0.956	90.00 \pm 0.00	90.00 \pm 0.00
79	90.00 \pm 0.00	24.34 \pm 0.597	90.00 \pm 0.00	90.00 \pm 0.00
80	90.00 \pm 0.00	87.55 \pm 0.775	90.00 \pm 0.00	44.16 \pm 0.284
81	90.00 \pm 0.00	38.84 \pm 0.270	90.00 \pm 0.00	49.32 \pm 0.915
82	90.00 \pm 0.00	15.80 \pm 0.726	90.00 \pm 0.00	90.00 \pm 0.00
83	90.00 \pm 0.00	37.00 \pm 0.013	90.00 \pm 0.00	90.00 \pm 0.00
84	90.00 \pm 0.00	23.69 \pm 0.605	90.00 \pm 0.00	63.99 \pm 1.026
85	90.00 \pm 0.00	0 \pm 0.00	90.00 \pm 0.00	39.00 \pm 1.154
86	90.00 \pm 0.00	65.02 \pm 0.043	90.00 \pm 0.00	64.00 \pm 0.032
87	78.00 \pm 0.012	17.73 \pm 0.455	90.00 \pm 0.00	60.33 \pm 0.482
88	78.00 \pm 0.012	61.61 \pm 0.536	90.00 \pm 0.00	76.16 \pm 0.328
89	78.00 \pm 0.012	33.61 \pm 0.535	90.00 \pm 0.00	74.00 \pm 0.894
90	78.00 \pm 0.012	21.00 \pm 0.009	90.00 \pm 0.00	58.83 \pm 1.025

Table 3 Antifungal activity of benzoic acid derivatives on the mycelial growth of *Pestalotiopsis* sp. and *P. parasitica*

Compound no.	Colony diameter (mm)±SD			
	<i>Pestalotiopsis</i> sp.		<i>Phytophthora parasitica</i>	
	0 mM	5 mM	0 mM	5 mM
1	90.00± 0.00	26.00± 0.00	90.00± 0.00	0± 0.00
2	90.00± 0.00	34.00± 0.256	90.00± 0.00	0± 0.00
3	90.00± 0.00	54.45± 0.002	90.00± 0.00	52.61± 0.254
4	90.00± 0.00	90.00± 0.00	90.00± 0.00	65.00± 0.458
5	90.00± 0.00	45.66± 0.007	90.00± 0.00	55.87± 0.694
6	90.00± 0.00	90.00± 0.00	90.00± 0.00	45.60± 1.025
7	90.00± 0.00	90.00± 0.00	90.00± 0.00	80.64± 2.088
8	90.00± 0.00	90.00± 0.00	90.00± 0.00	70.61± 0.250
9	90.00± 0.00	19.71± 0.058	90.00± 0.00	0± 0.00
10	88.36± 0.002	21.17± 0.458	90.00± 0.00	0± 0.00
11	88.36± 0.002	30.56± 0.784	90.00± 0.00	0± 0.00
12	88.36± 0.002	35.56± 1.256	90.00± 0.00	0± 0.00
13	88.36± 0.002	38.78± 3.650	90.00± 0.00	0± 0.00
14	88.36± 0.002	42.89± 0.00	90.00± 0.00	0± 0.00
15	90.00± 0.00	0± 0.00	90.00± 0.00	0± 0.00
16	90.00± 0.00	79.16± 1.256	90.00± 0.00	0± 0.00
17	90.00± 0.00	48.96± 0.256	90.00± 0.00	20.16± 1.056
18	90.00± 0.00	85.50± 0.569	90.00± 0.00	6.66± 0.951
19	90.00± 0.00	77.40± 3.250	90.00± 0.00	0± 0.00
20	90.00± 0.00	87.08± 2.254	90.00± 0.00	0± 0.00
21	90.00± 0.00	73.77± 0.258	90.00± 0.00	0± 0.00
22	90.00± 0.00	31.68± 1.007	90.00± 0.00	0± 0.00
23	90.00± 0.00	90± 0.00	90.00± 0.00	0± 0.00
24	90.00± 0.00	87.60± 0.005	90.00± 0.00	74.50± 1.058
25	90.00± 0.00	0± 0.00	90.00± 0.00	18.66± 1.230
26	90.00± 0.00	42.04± 1.875	90.00± 0.00	0± 0.00
27	90.00± 0.00	0± 0.00	90.00± 0.00	0± 0.00
28	90.00± 0.00	25.03± 2.000	90.00± 0.00	0± 0.00
29	90.00± 0.00	46.26± 0.00	90.00± 0.00	0± 0.00
30	90.00± 0.00	38.50± 0.897	90.00± 0.00	0± 0.00
31	90.00± 0.00	25.12± 0.975	90.00± 0.00	0± 0.00



Table 3 (continued)

Compound no.	Colony diameter (mm)±SD			
	<i>Pestalotiopsis</i> sp.		<i>Phytophthora parasitica</i>	
	0 mM	5 mM	0 mM	5 mM
32	90.00± 0.00	21.01± 0.025	90.00± 0.00	0± 0.00
33	90.00± 0.00	51.56± 0.001	90.00± 0.00	66.92± 1.811
34	90.00± 0.00	90± 0.00	90.00± 0.00	0± 0.00
35	90.00± 0.00	32.72± 0.463	90.00± 0.00	18.33± 1.021
36	90.00± 0.00	89.80± 0.489	90.00± 0.00	90.00± 0.251
37	90.00± 0.00	65.29± 0.598	90.00± 0.00	67.16± 0.654
38	90.00± 0.00	49.60± 0.089	90.00± 0.00	23.75± 0.894
39	90.00± 0.00	69.91± 0.007	90.00± 0.00	25.26± 1.985
40	90.00± 0.00	0± 0.00	90.00± 0.00	0± 0.00

Table 4 Antifungal activity of cinnamic acid derivatives on the mycelial growth of *Pestalotiopsis* sp. and *P. parasitica*

Compound no.	Colony diameter (mm)±SD			
	<i>Pestalotiopsis</i> sp.		<i>Phytophthora parasitica</i>	
	0 mM	1 mM	0 mM	1 mM
41	90.00± 0.00	88.88± 0.0	90.00± 0.00	0± 0.00
42	90.00± 0.00	53.47± 0.654	90.00± 0.00	0± 0.00
43	90.00± 0.00	46.99± 1.265	90.00± 0.00	0± 0.00
44	90.00± 0.00	56.54± 3.256	90.00± 0.00	0± 0.00
45	90.00± 0.00	46.45± 0.002	90.00± 0.00	0± 0.00
46	90.00± 0.00	47.53± 0.00	90.00± 0.00	0± 0.00
47	90.00± 0.00	51.13± 1.021	90.00± 0.00	0± 0.00
48	90.00± 0.00	54.08± 1.056	90.00± 0.00	0± 0.00
49	90.00± 0.00	40.51± 1.789	90.00± 0.00	0± 0.00
50	90.00± 0.00	34.96± 0.258	90.00± 0.00	13.83± 3.025
51	90.00± 0.00	0± 0.058	90.00± 0.00	0± 0.00
52	90.00± 0.00	28.54± 0.795	90.00± 0.00	0± 0.00
53	90.00± 0.00	29.37± 0.084	90.00± 0.00	0± 0.00
54	90.00± 0.00	63.25± 0.00	90.00± 0.00	9.83± 1.587
55	90.00± 0.00	78.20± 0.259	90.00± 0.00	17.00± 0.00
56	90.00± 0.00	79.27± 0.879	90.00± 0.00	0± 0.00

Table 4 (continued)

Compound no.	Colony diameter (mm)±SD			
	<i>Pestalotiopsis</i> sp.		<i>Phytophthora parasitica</i>	
	0 mM	1 mM	0 mM	1 mM
57	90.00± 0.00	48.07± 0.896	90.00± 0.00	45.17± 0.254
58	90.00± 0.00	82.05± 1.890	90.00± 0.00	79.74± 0.812
59	90.00± 0.00	82.69± 3.026	90.00± 0.00	74.25± 3.025
60	90.00± 0.00	52.42± 1.256	90.00± 0.00	61.00± 0.00
61	90.00± 0.00	14.10± 0.277	90.00± 0.00	5.83± 5.106
63	90.00± 0.00	44.19± 2.036	90.00± 0.00	72.17± 0.879
64	90.00± 0.00	61.12± 1.025	90.00± 0.00	64.99± 0.526
65	90.00± 0.00	70.52± 1.502	90.00± 0.00	88.30± 1.960
66	90.00± 0.00	73.88± 3.012	90.00± 0.00	21.00± 0.00
67	90.00± 0.00	54.18± 0.225	90.00± 0.00	13.00± 0.00
68	90.00± 0.00	66.49± 2.517	90.00± 0.00	10.00± 0.00
69	90.00± 0.00	86.19± 0.500	90.00± 0.00	22.30± 1.025
70	90.00± 0.00	37.04± 0.577	90.00± 0.00	12.66± 0.698
71	90.00± 0.00	57.84± 3.424	90.00± 0.00	19.83± 0.584
72	90.00± 0.00	53.64± 2.015	90.00± 0.00	0± 0.00
73	90.00± 0.00	40.87± 1.498	90.00± 0.00	12.83± 1.021
74	90.00± 0.00	50.36± 0.025	90.00± 0.00	7.00± 0.00
75	90.00± 0.00	40.42± 0.159	90.00± 0.00	9.00± 0.178
76	90.00± 0.00	27.73± 2.915	90.00± 0.00	8.00± 0.144
77	90.00± 0.00	15.32± 1.065	90.00± 0.00	10.66± 0.025
78	90.00± 0.00	29.92± 0.894	90.00± 0.00	7.00± 0.00
79	90.00± 0.00	63.68± 3.594	90.00± 0.00	0± 0.00
80	90.00± 0.00	25.55± 0.589	90.00± 0.00	9.17± 2.211
81	90.00± 0.00	18.43± 0.697	90.00± 0.00	16.16± 0.151
82	90.00± 0.00	32.51± 0.823	90.00± 0.00	0± 0.00
83	90.00± 0.00	73.92± 1.965	90.00± 0.00	9.00± 0.00
84	90.00± 0.00	56.99± 2.365	90.00± 0.00	25.61± 0.458
85	90.00± 0.00	19.99± 0.063	90.00± 0.00	52.28± 0.487
86	90.00± 0.00	65.83± 0.248	90.00± 0.00	75.36± 1.654
87	90.00± 0.00	52.49± 0.889	90.00± 0.00	28.69± 1.264
88	90.00± 0.00	76.32± 0.215	90.00± 0.00	90.00± 0.00
89	90.00± 0.00	63.99± 3.020	90.00± 0.00	50.20± 1.250
90	90.00± 0.00	50.67± 1.254	90.00± 0.00	90.00± 0.00

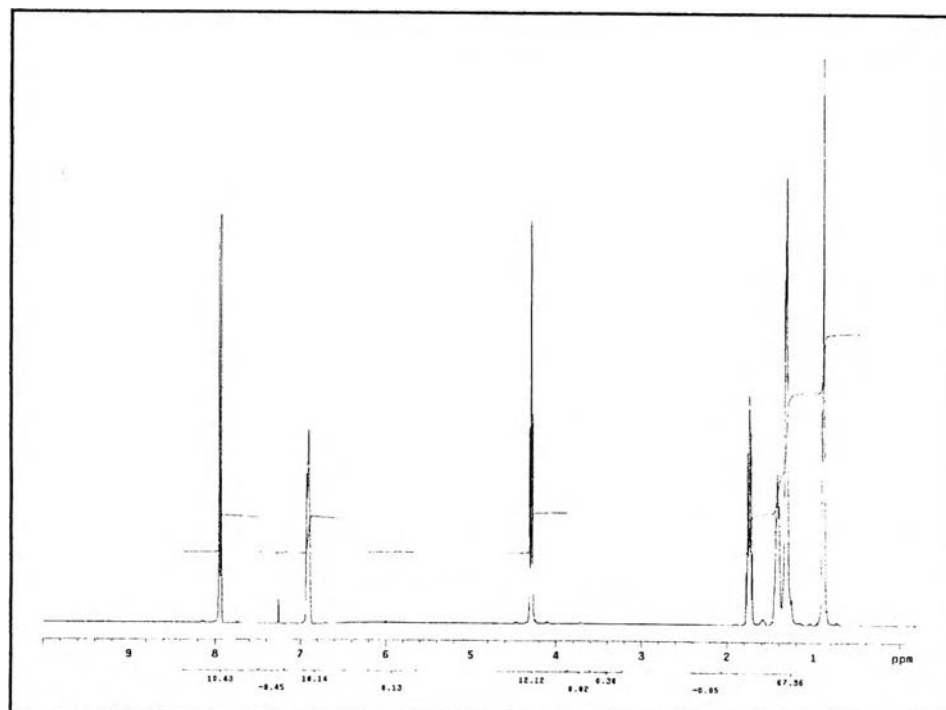


Fig. 1 ¹H-NMR spectrum of hexyl 4-hydroxy benzoate

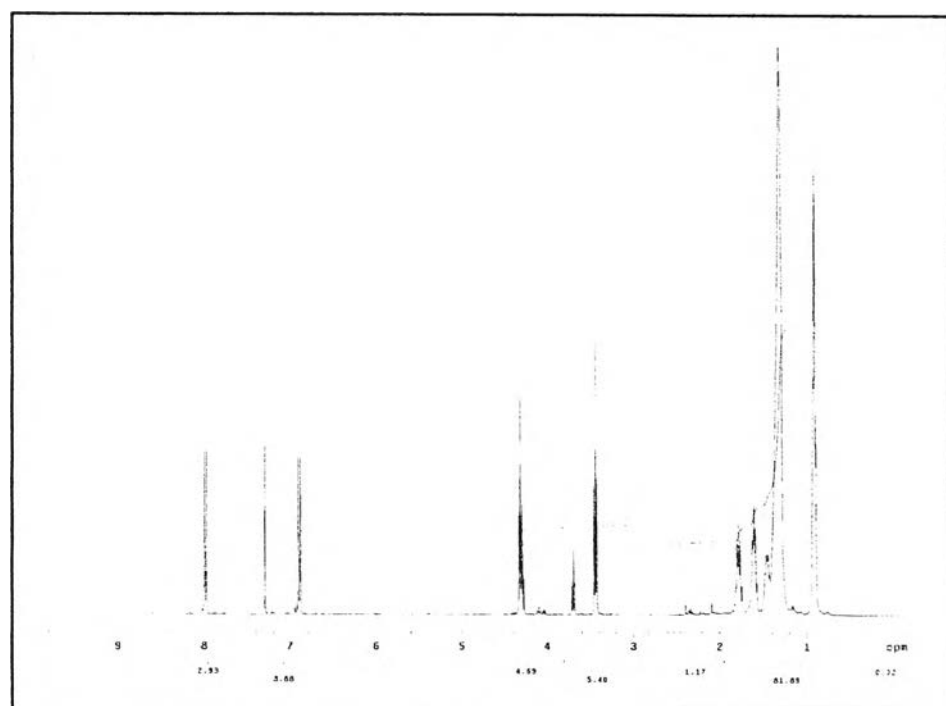


Fig. 2 ¹H-NMR spectrum of octyl 4-hydroxy benzoate

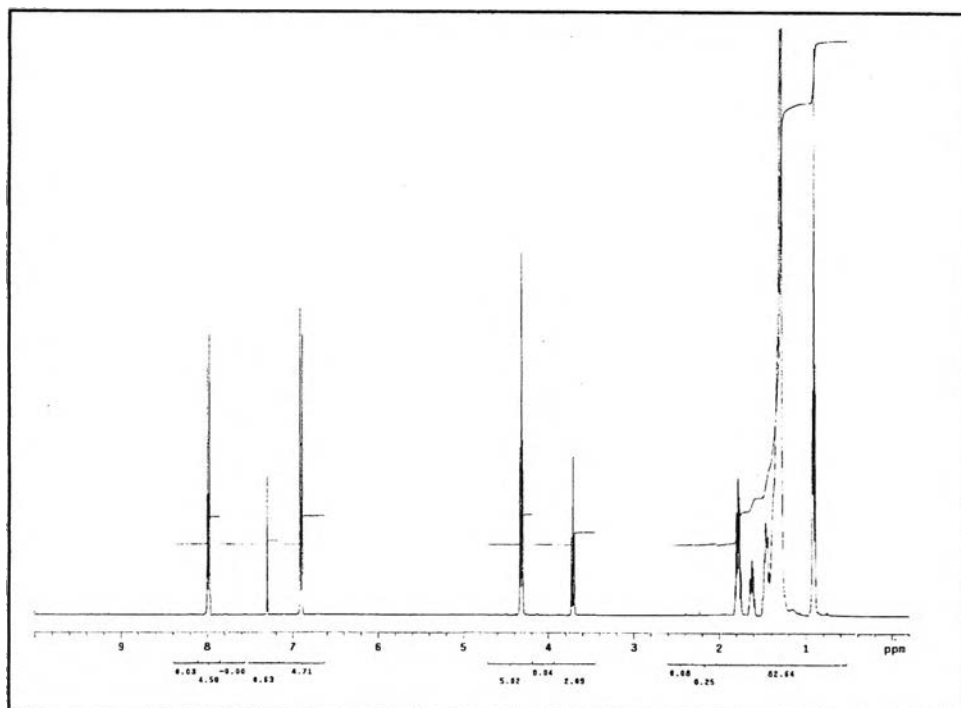


Fig. 3 $^1\text{H-NMR}$ spectrum of dodecyl 4-hydroxy benzoate

VITA

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