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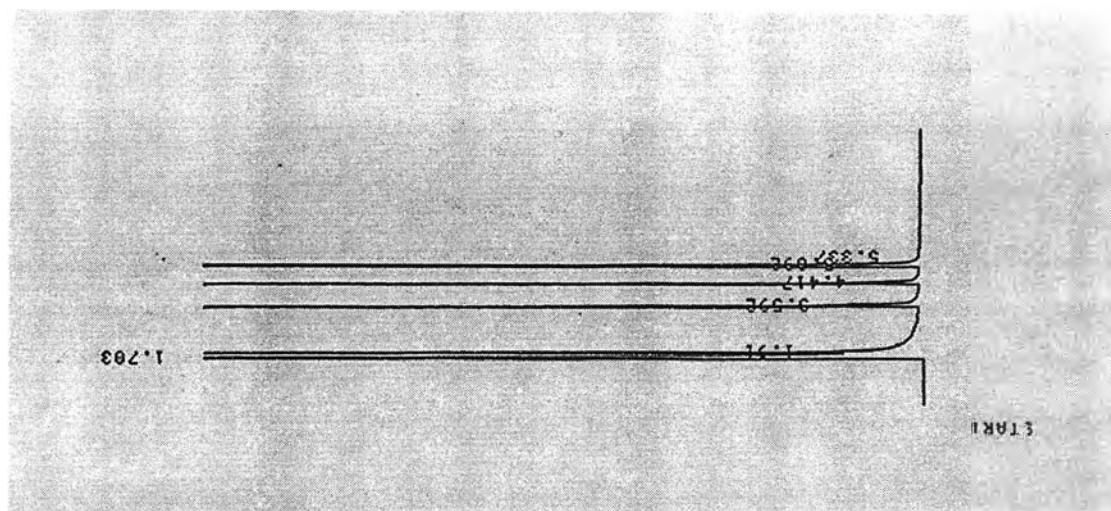


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## **APPENDIX**

## Appendix A



**Figure A.1** GC Chromatogram of cyclohexanol oxidation

Condition gas chromatography

Initial temperature 100°C

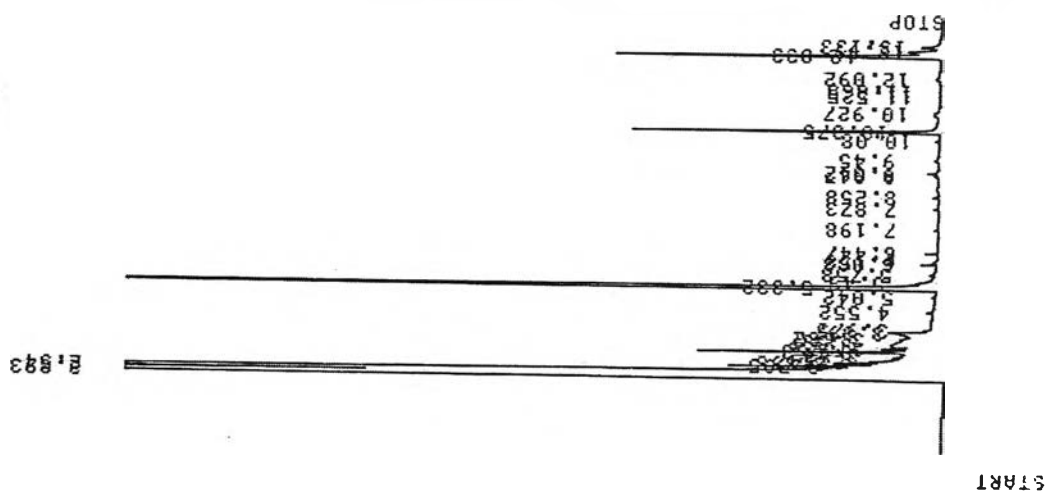
Initial time 1 min

Program rate 10°C/ min

Final temperature 180°C

Final time 5 min

peak number	retention time (min)	compound
1	1.70	solvent
2	1.91	solvent
3	3.59	cyclohexanone
4	4.42	cyclohexanol
5	5.09	cyclododecane (internal standard)



**Figure A.2** GC Chromatogram of 1,4-cyclohexadiol oxidation

Condition gas chromatography

Initial temperature 80°C

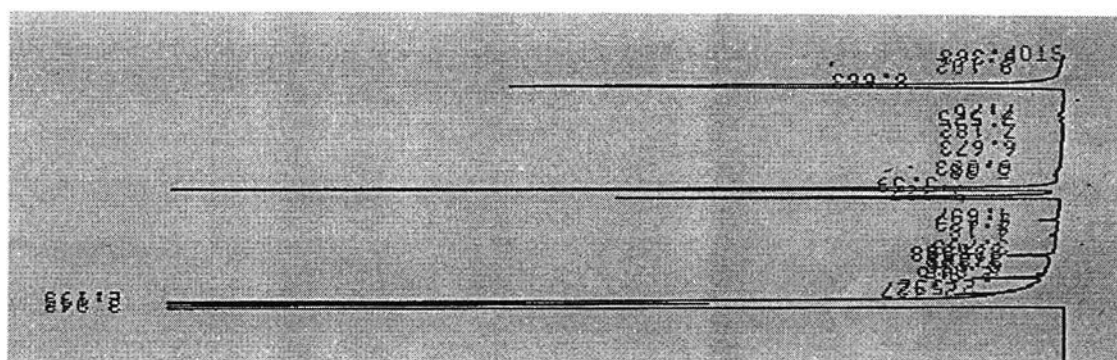
Initial time 1 min

Program rate 5°C/ min

Final temperature 180°C

Final time 5 min

peak number	retention time (min)	compound
1	2.39	solvent
2	2.54	solvent
3	5.33	1,4-cyclohexadione
4	10.37	1,4-cyclohexadiol
5	12.83	cyclododecane (internal standard)



**Figure A.3** GC Chromatogram of menthol oxidation

Condition gas chromatography

Initial temperature 100°C

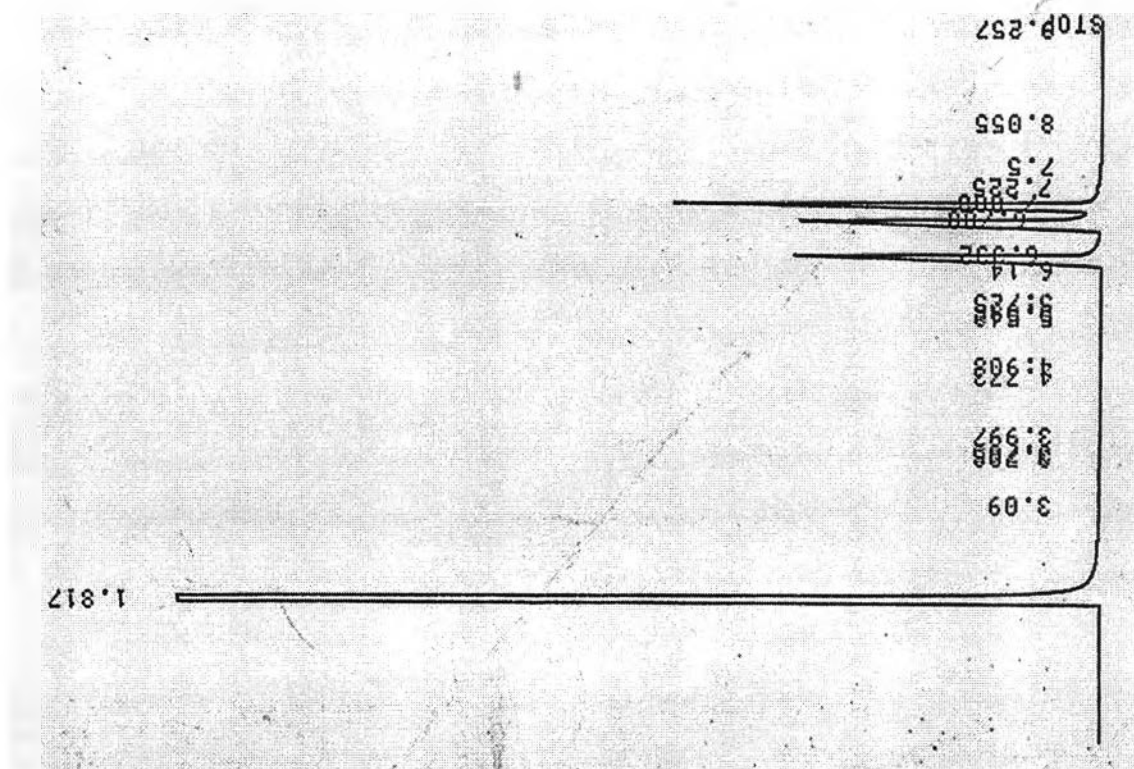
Initial time 1 min

Program rate 5°C/ min

Final temperature 120°C

Final time 5 min

peak number	retention time (min)	compound
1	2.04	solvent
2	2.19	solvent
3	5.34	menthone
4	5.59	menthol
5	8.66	cyclododecane (internal standard)



**Figure A.4** GC Chromatogram of cinnamyl alcohol oxidation

Condition gas chromatography

Initial temperature 100°C

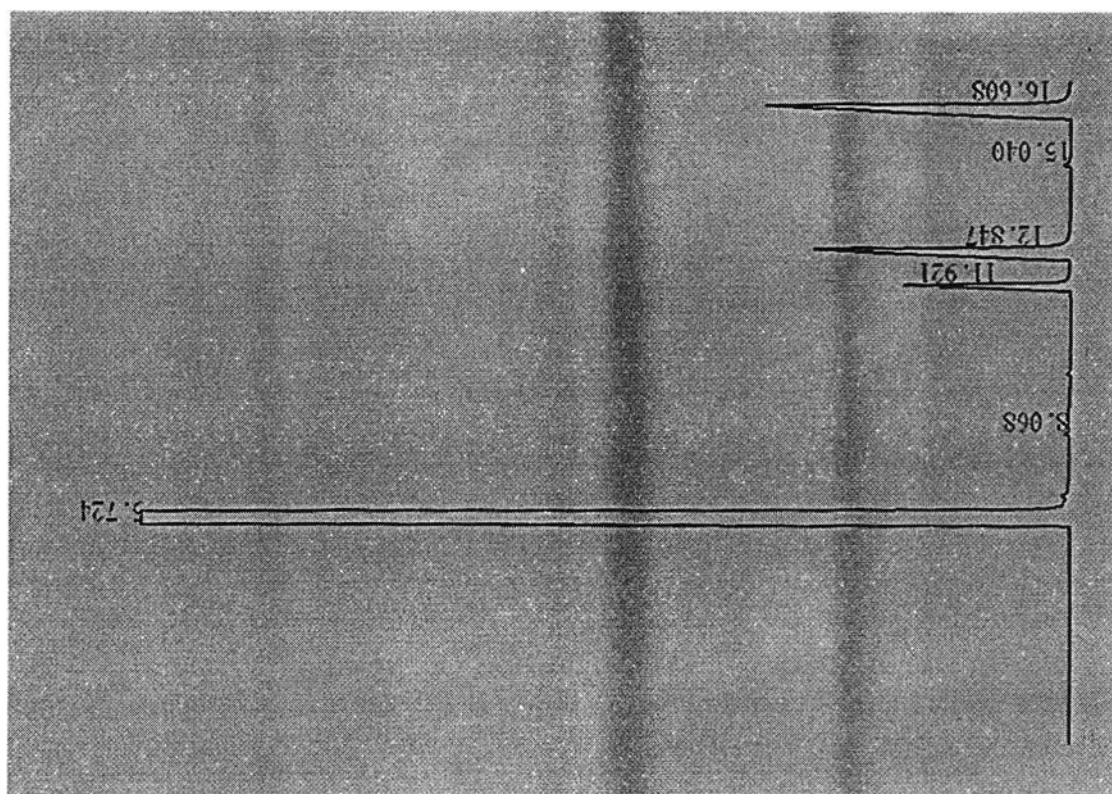
Initial time 1 min

Program rate 10°C/ min

Final temperature 220°C

Final time 5 min

peak number	retention time (min)	compound
1	1.82	solvent
2	6.33	cinnamyldehyde
3	6.79	cinnamyl alcohol
4	7.00	cyclododecane (internal standard)



**Figure A.5** GC Chromatogram of *trans*-2-hexenol oxidation

Condition gas chromatography

Initial temperature 60°C

Initial time 1 min

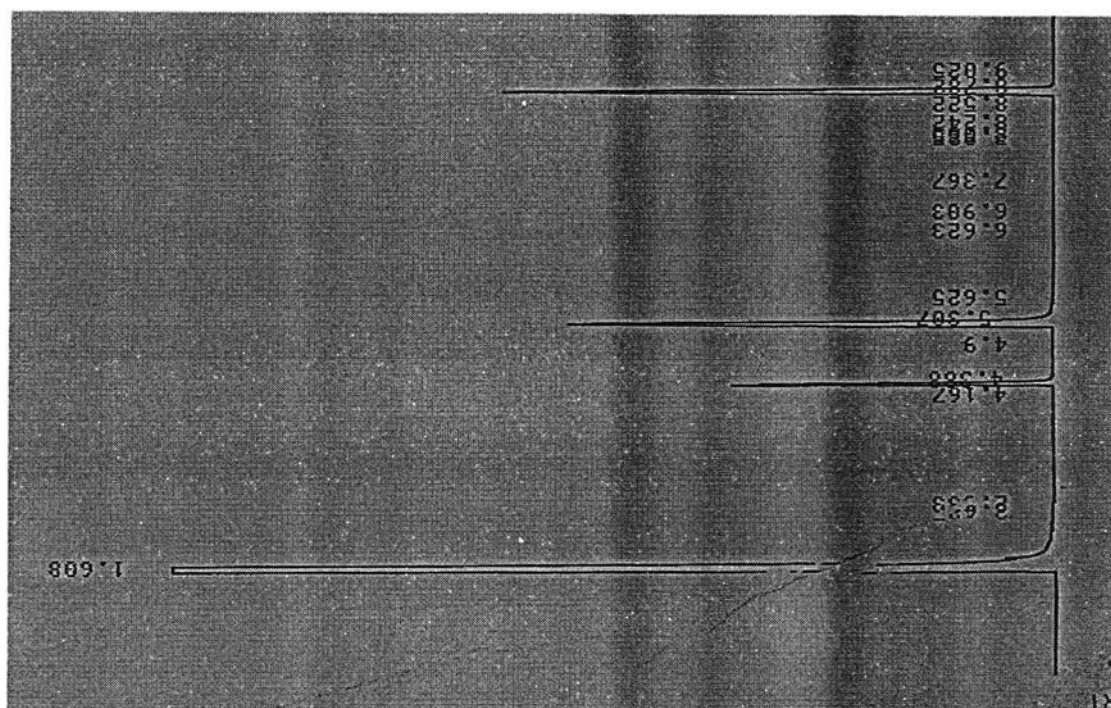
Program rate 3°C/ min

Final temperature 150°C

Final time 1 min

peak number	retention time (min)	compound
1	5.72	solvent
2	11.92	<i>trans</i> -2-hexenal
3	12.85	<i>trans</i> -2-hexenol
4	16.61	cyclododecane (internal standard)





**Figure A.6** GC Chromatogram of 1-octanol oxidation

Condition gas chromatography

Initial temperature 100°C

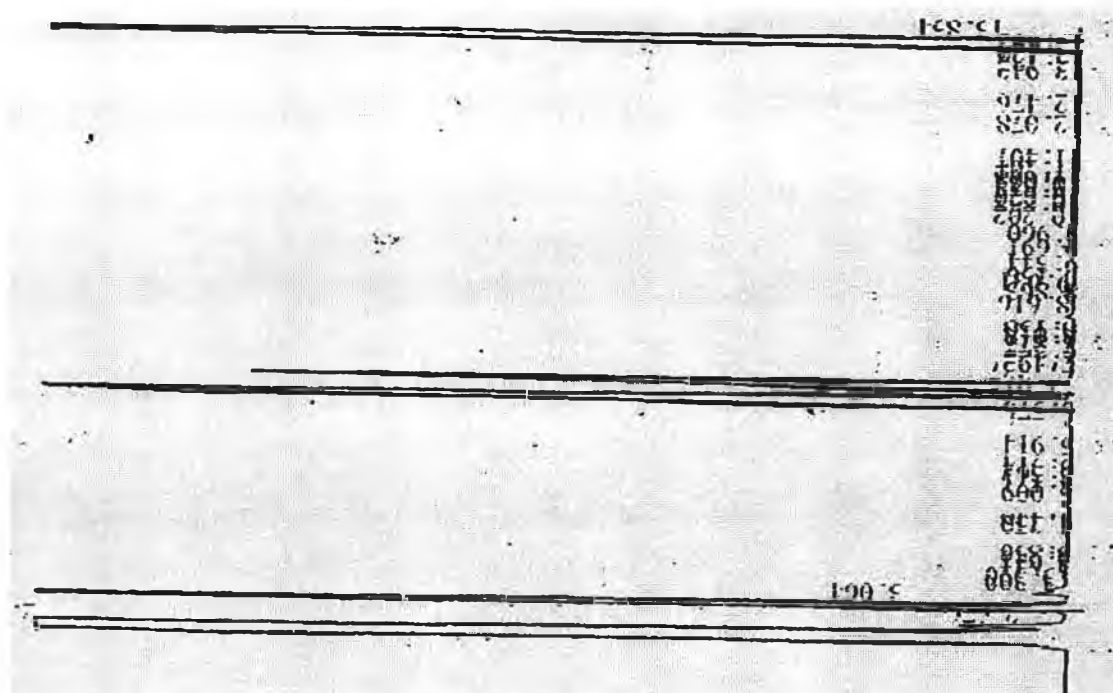
Initial time 1 min

Program rate 10°C/ min

Final temperature 200°C

Final time 5 min

peak number	retention time (min)	compound
1	1.61	solvent
2	4.39	1-octanal
3	5.31	1-octanol
4	8.78	cyclododecane (internal standard)



**Figure A.7** GC Chromatogram of 1-octanol oxidation

Condition gas chromatography

Initial temperature 100°C

Initial time 1 min

Program rate 10°C/ min

Final temperature 200°C

Final time 5 min

peak number	retention time (min)	compound
1	2.38	solvent
2	3.06	solvent
3	7.01	2-octanone
4	7.33	2-octanol
5	13.85	cyclododecane (internal standard)

## VITA

Miss Uthumporn Thong-in was born on December 3, 1977 in Lampang Province, Thailand. She received a Bachelor and Master Degree of Science in Chemistry from Chiang Mai University in 1999 and 2002. Since then, she has been a graduate student studying Petrochemistry as her major course at Chulalongkorn University.

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