

## APPENDICES

### Appendix A

**Table A.1:** GC Method Development

(i) 1-Octene:

Injector	280 °C			
Split ratio	50:1			
Column Flow	1.2 ml/min (constant flow mode)			
Detector	300 °C			
Make up Flow	25 ml/min			
H <sub>2</sub> Flow	30 ml/min			
Air Flow	300 ml/min			
Column Oven	Rate (°C/min)	Temperature (°C)	Hold (min)	Total Time (min)
		40	2	2
	30	220	-	6
		220	5	5
	Total time			13

(ii) Methyl Oleate:

Split ratio	50:1			
Column Flow	1.2 ml/min (constant flow mode)			
Detector	360 °C			
Make up Flow	25 ml/min			
H <sub>2</sub> Flow	30 ml/min			
Air Flow	300 ml/min			
Column Oven	Rate (°C/min)	Temperature (°C)	Hold (min)	Total Time (min)
		40	3	3
	10	300	-	26
		300	5	5
	Total time			34

## Appendix B

### Calibration Report

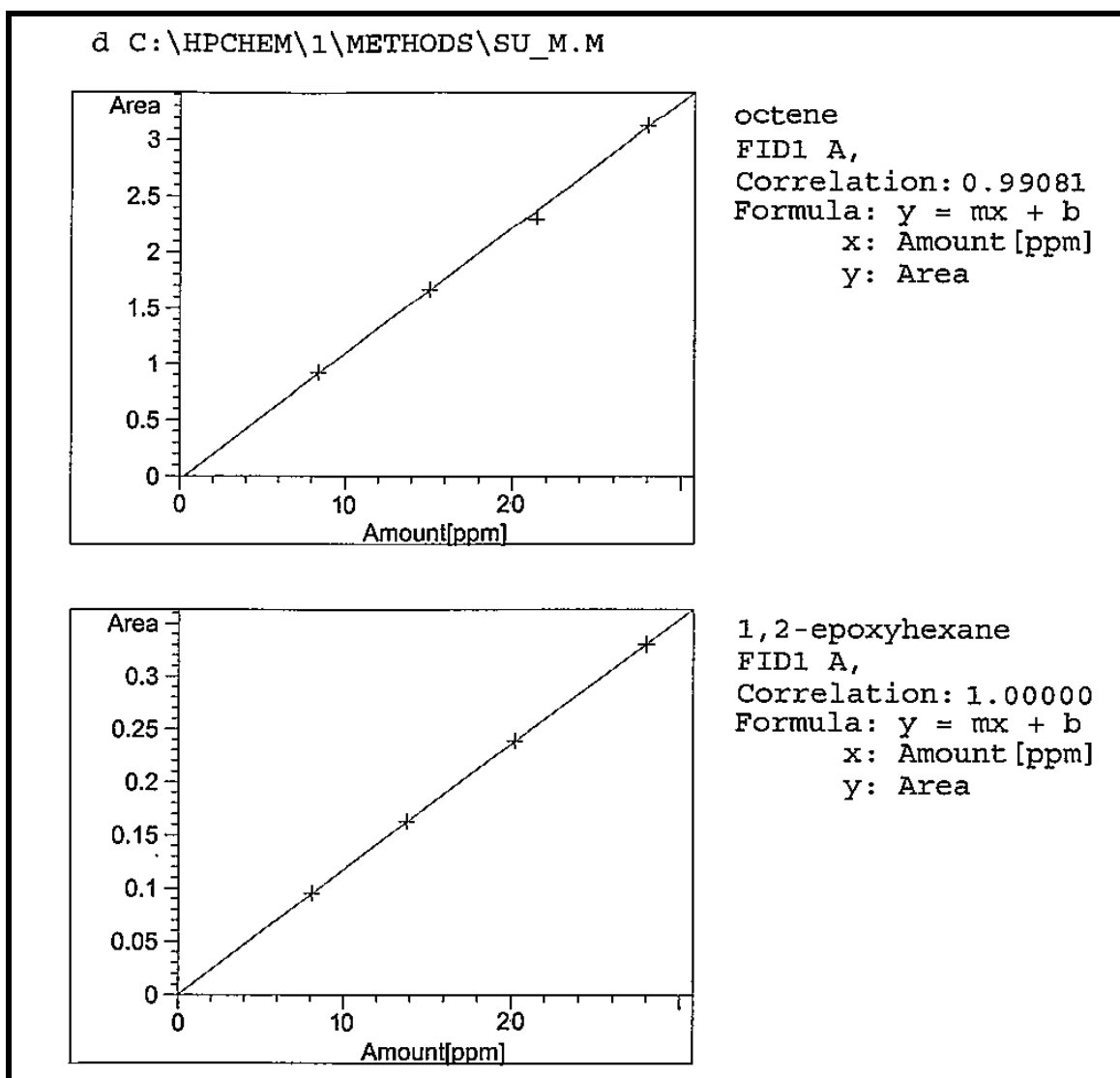
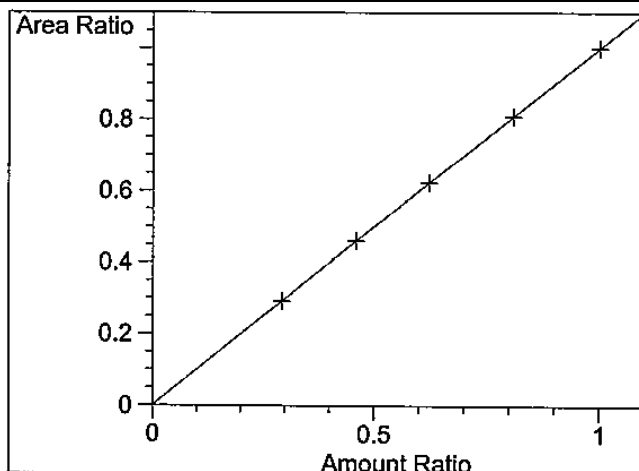
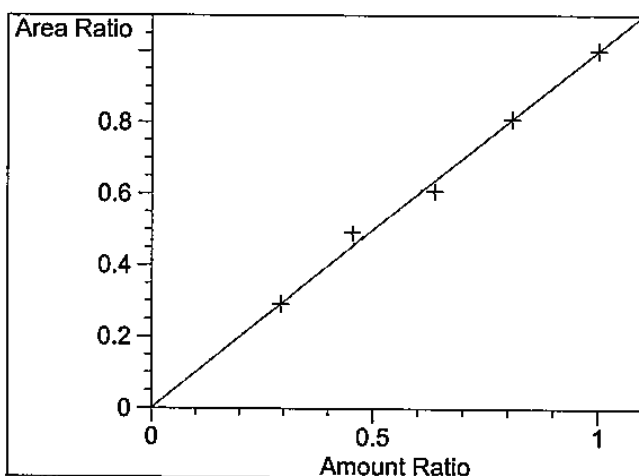


Figure B.1 : GC calibration curve



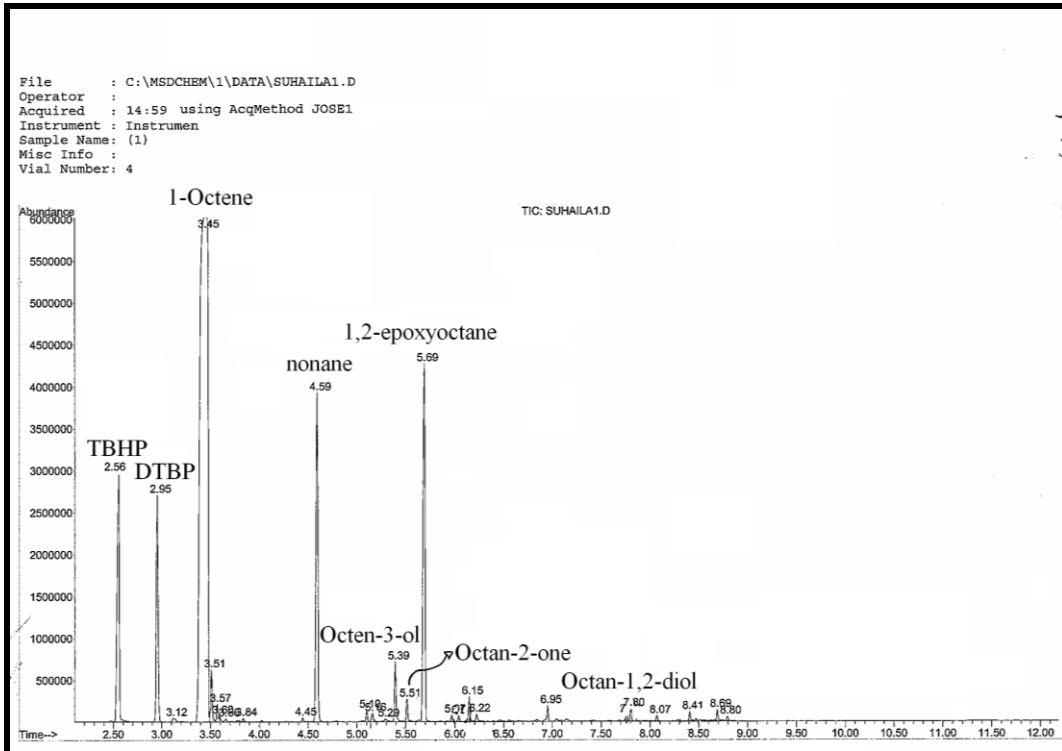
methyl oleate  
FID1 A,  
Correlation: 1.00000  
Formula:  $y = mx + b$   
x: Amount Ratio  
y: Area Ratio



epoxy oleate  
FID1 A,  
Correlation: 0.98512  
Formula:  $y = mx + b$   
x: Amount Ratio  
y: Area Ratio

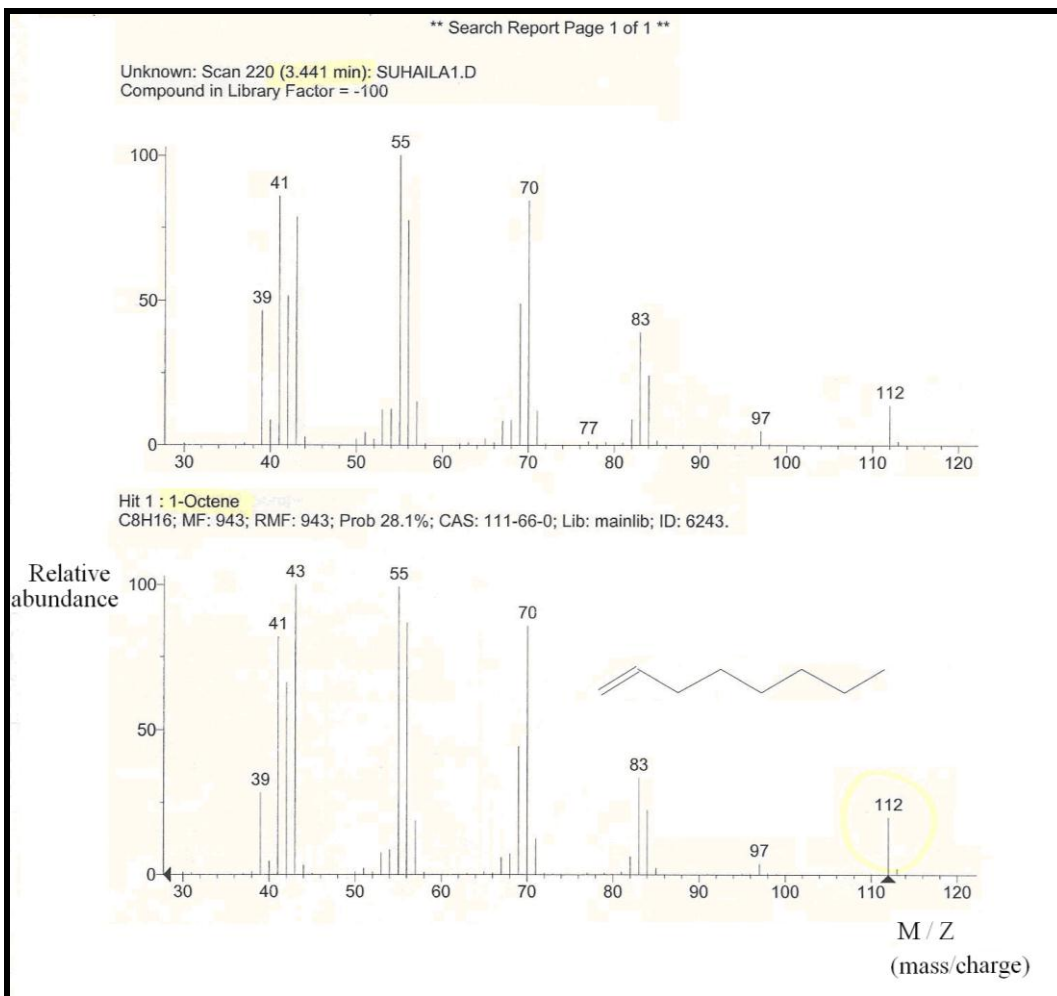
Figure B.1, continued

## Appendix C

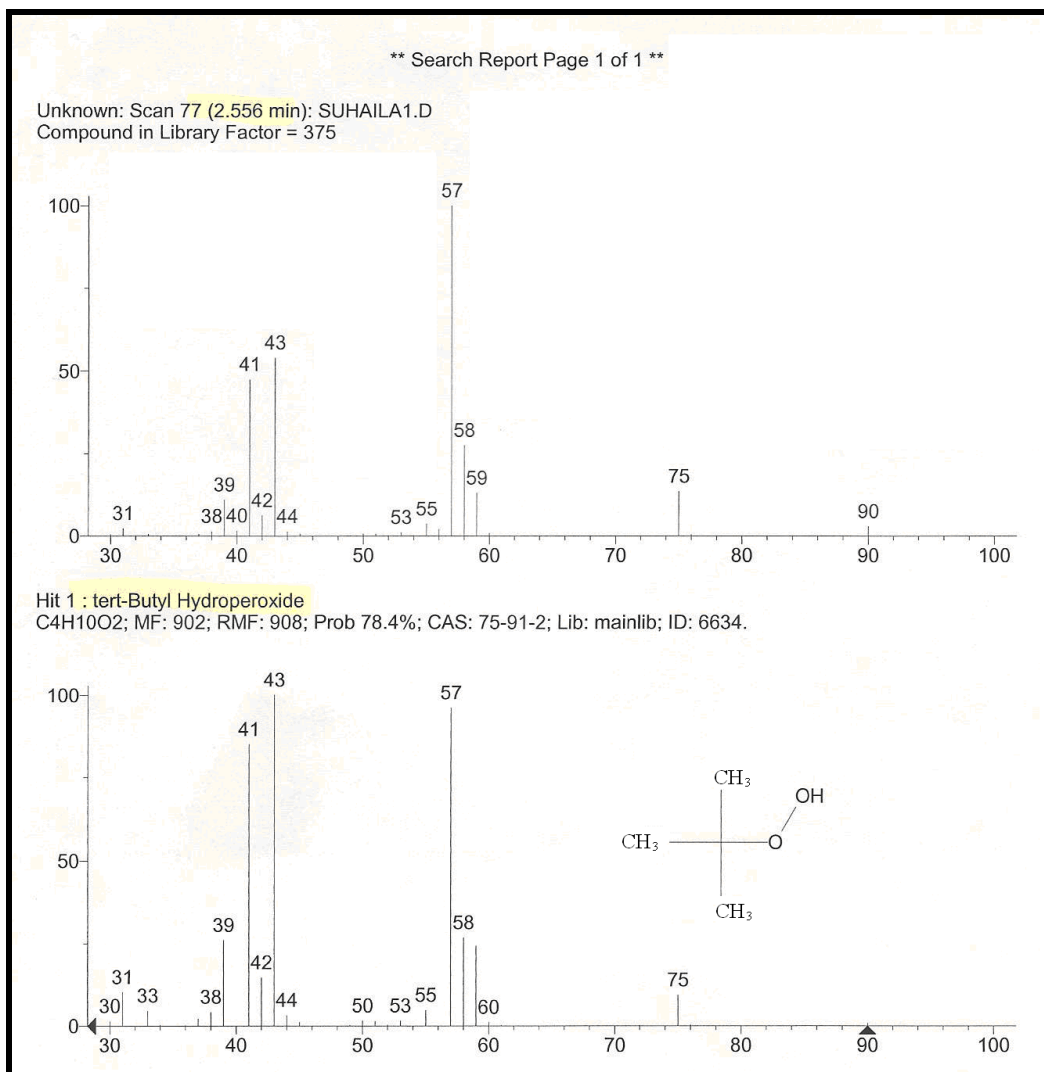


**Figure C.1:** Chromatogram of epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.

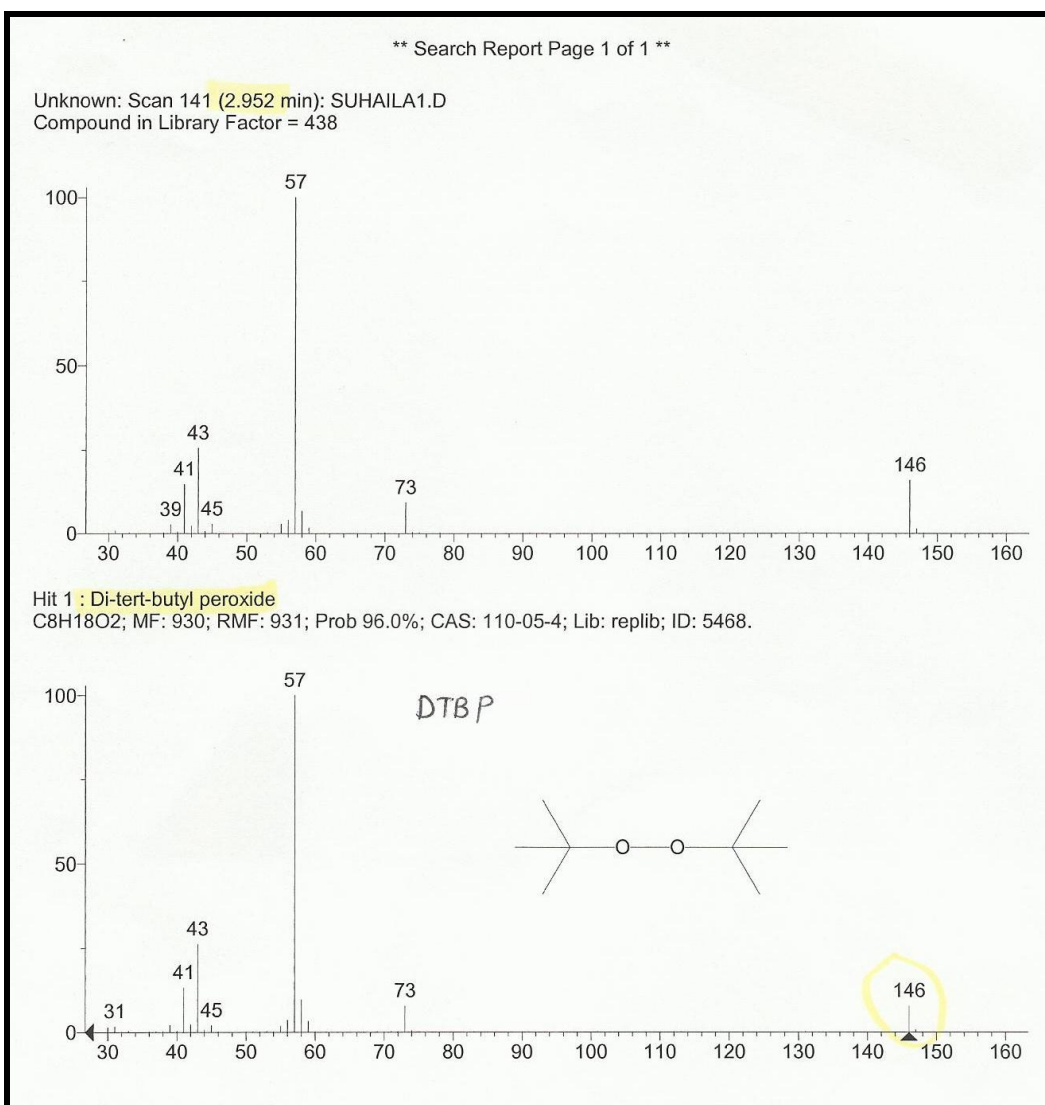
## Appendix D



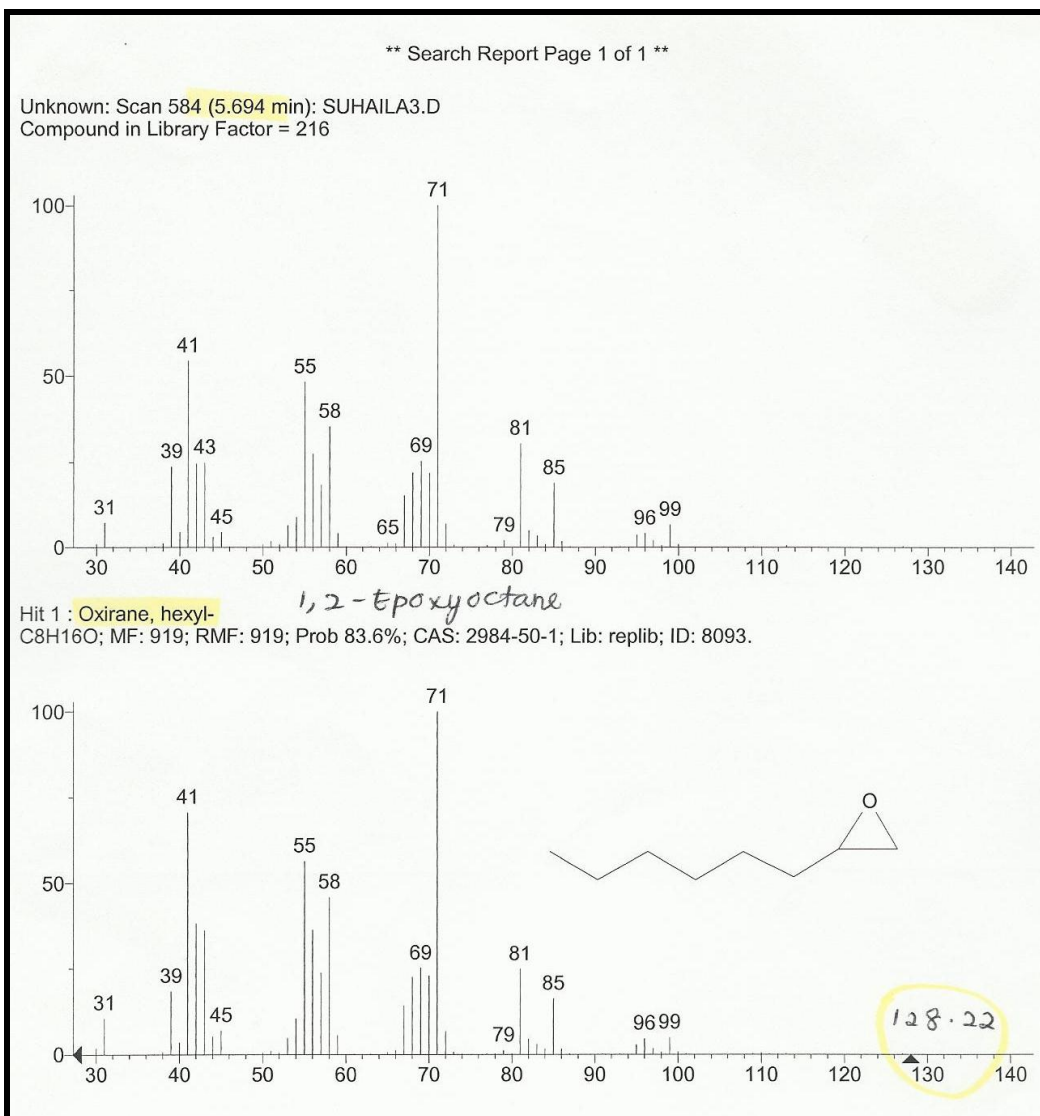
**Figure D.1:** Fragmentation patterns in the mass spectra of 1-octene in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.



**Figure D.2 :** Fragmentation patterns in the mass spectra of *tert*-butyl hydroperoxide (TBHP) in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.

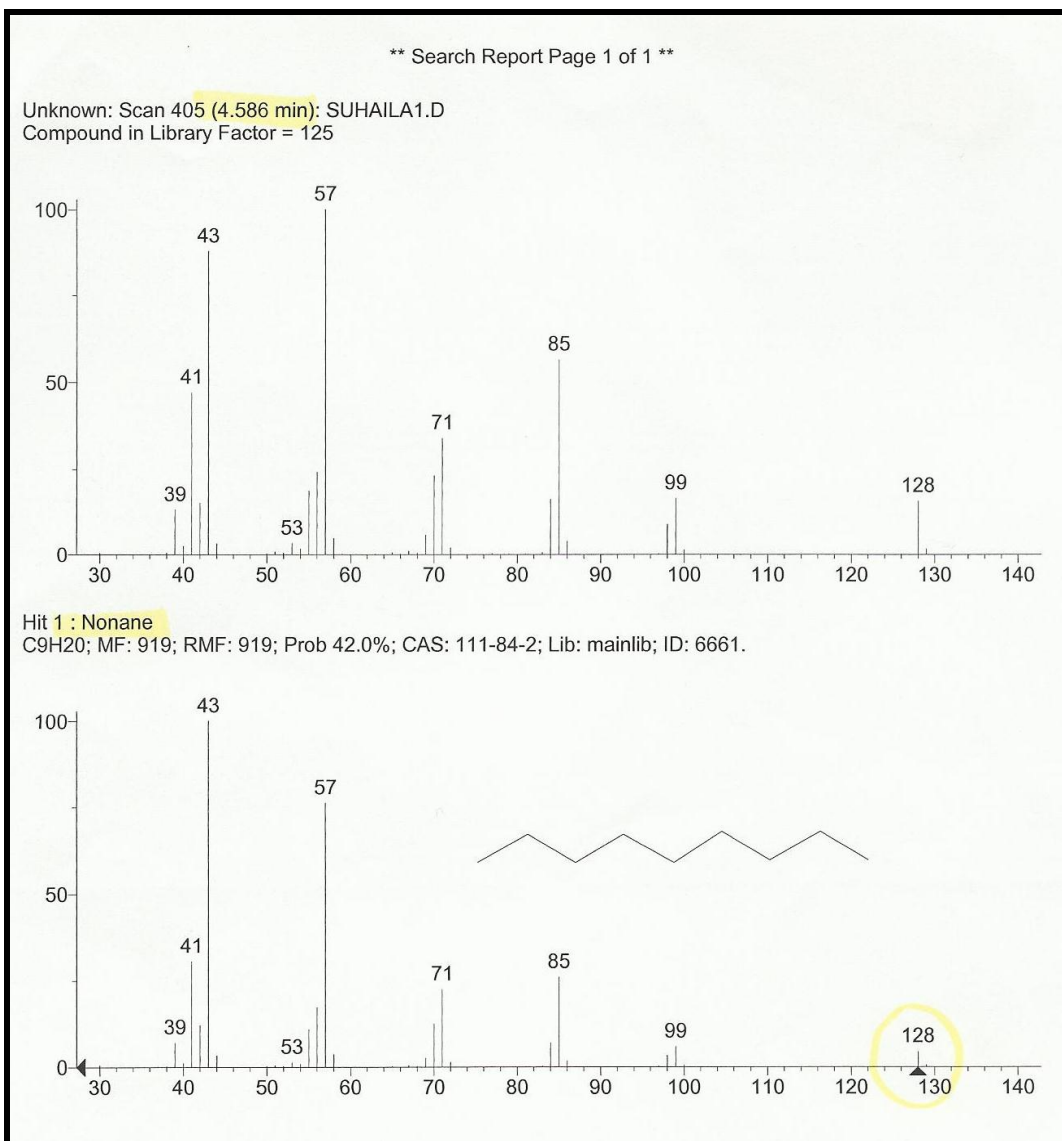


**Figure D.3 :** Fragmentation patterns in the mass spectra of Di-*tert*-butyl peroxide (DTBP) in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.

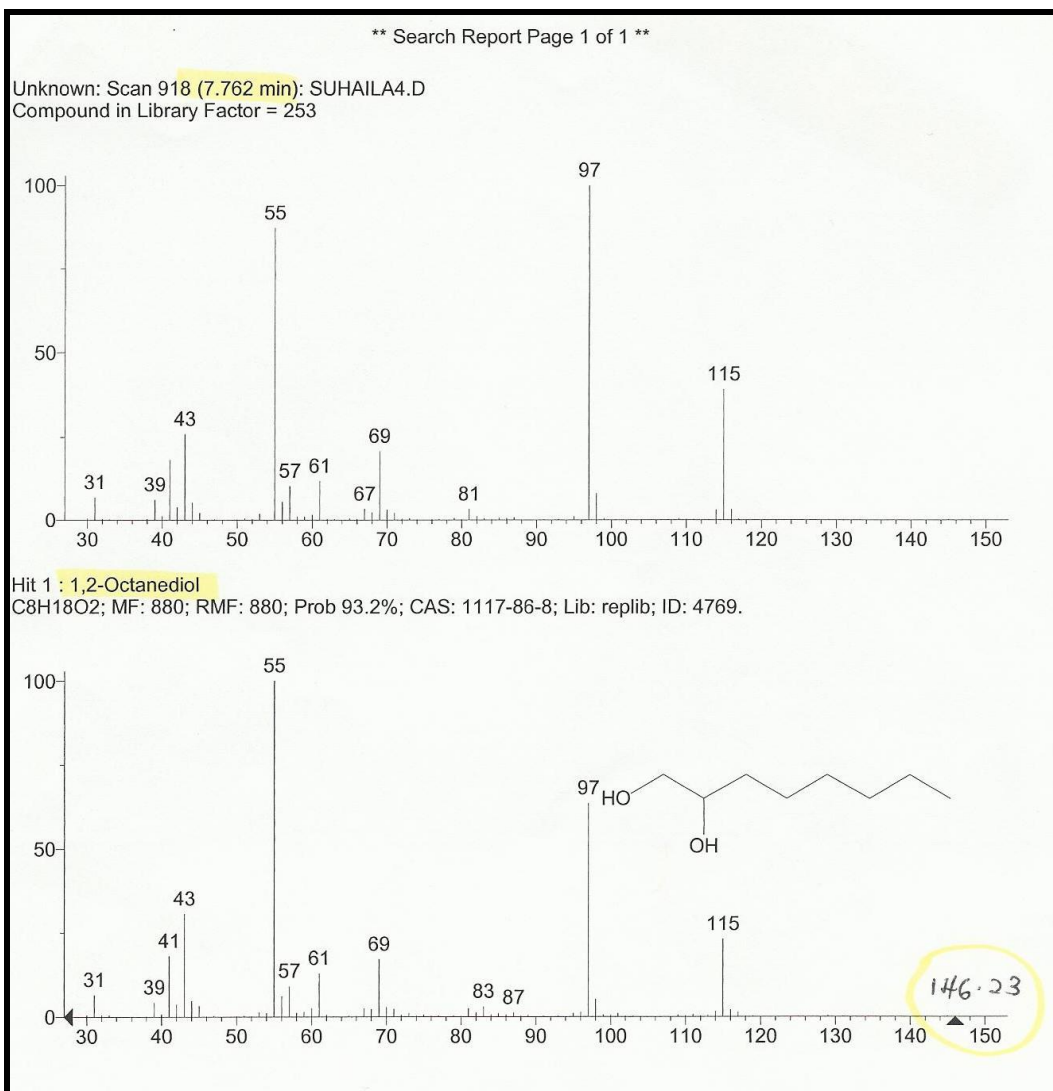


**Figure D.4** : Fragmentation patterns in the mass spectra of 1,2-epoxyoctane in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.

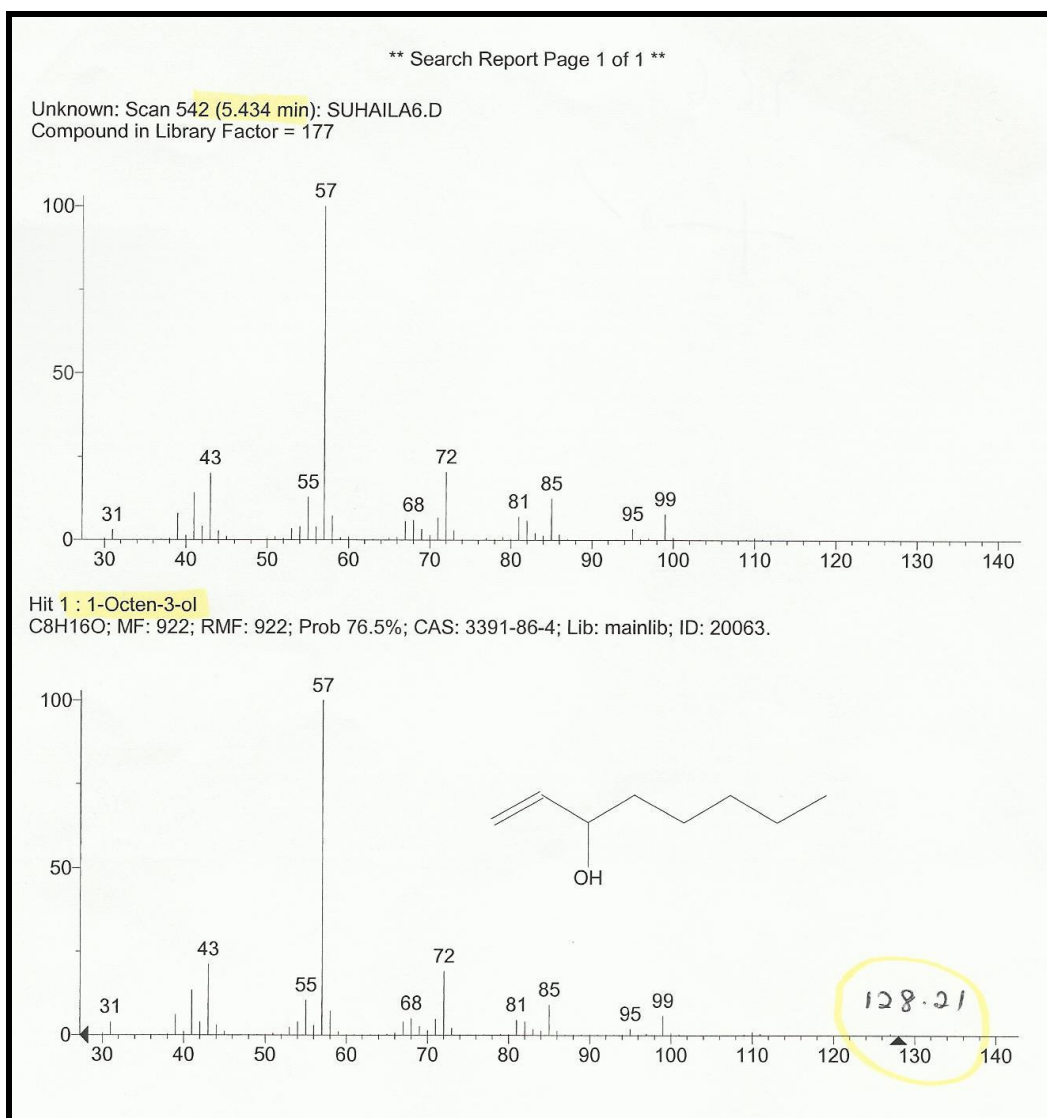




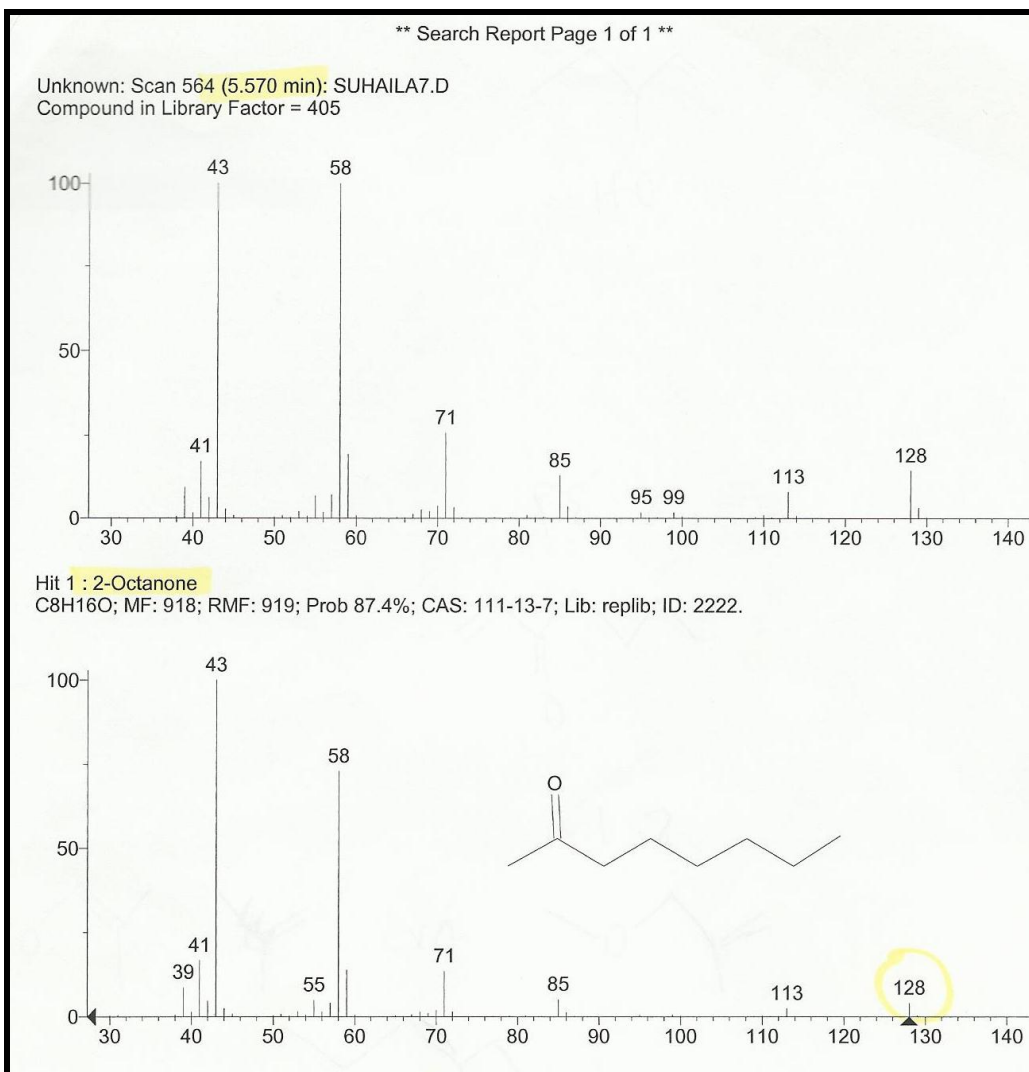
**Figure D.5** : Fragmentation patterns in the mass spectra of nonane as internal standard in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.



**Figure D.6 :** Fragmentation patterns in the mass spectra of octane-1,2-diol in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.



**Figure D.7 :** Fragmentation patterns in the mass spectra of octen-3-ol in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.



**Figure D.8 :** Fragmentation patterns in the mass spectra of octan-2-one in the epoxidation of 1-octene with TBHP using Ti-MCM-41 sample.