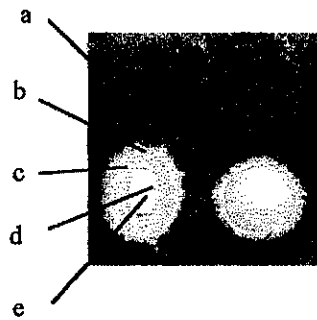
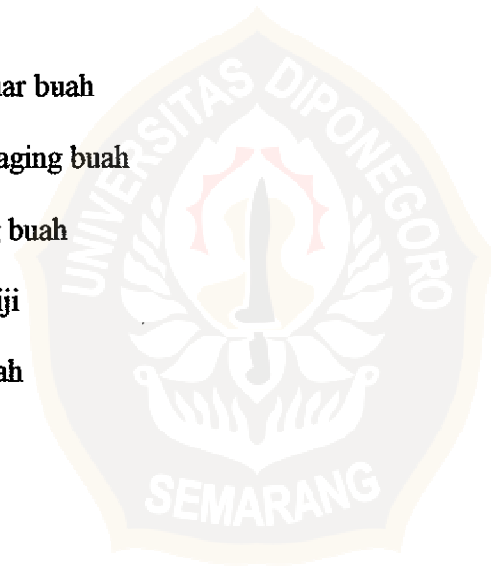


LAMPIRAN A. PENAMPANG MELINTANG BUAH RAMBUTAN**Keterangan:**

- a. Kulit luar buah
- b. Kulit daging buah
- c. Daging buah
- d. Kulit biji
- e. Biji buah



Lampiran B. Penentuan Bilangan Asam

$$\text{Bilangan asam} = \frac{b \times M \text{ NaOH} \times 40}{a}$$

a = berat cuplikan (g)

b = mL NaOH yang diperlukan

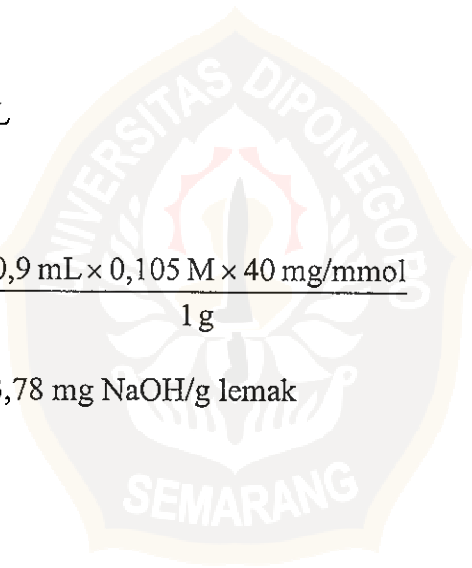
Penentuan bilangan asam pada lemak yang ditransesterifikasi:

M NaOH = 0,105 M

a = 1 g

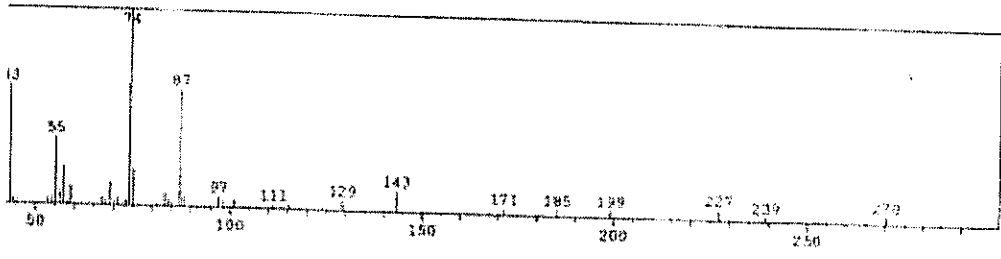
b = 0,9 mL

$$\begin{aligned} \text{Bilangan asam} &= \frac{0,9 \text{ mL} \times 0,105 \text{ M} \times 40 \text{ mg/mmol}}{1 \text{ g}} \\ &= 3,78 \text{ mg NaOH/g lemak} \end{aligned}$$

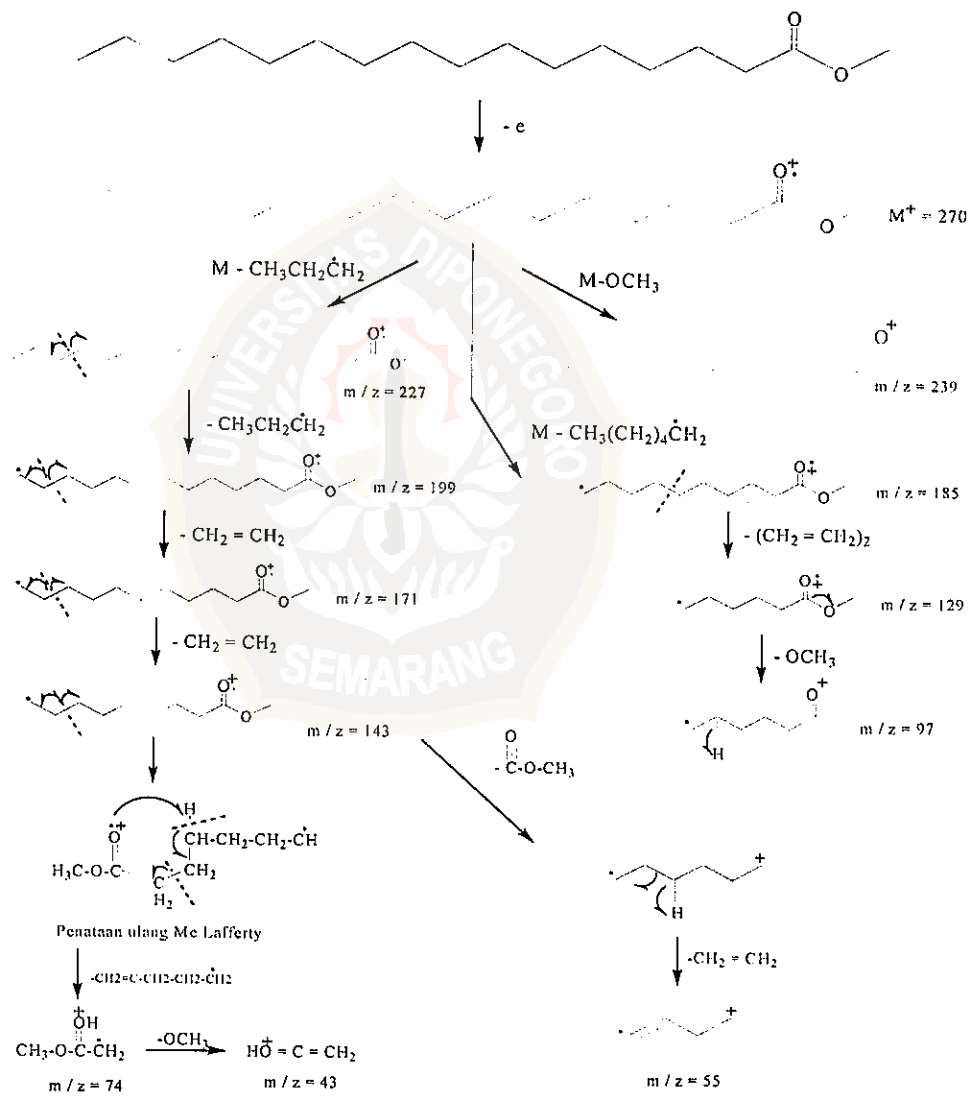


Lampiran C.1. Fragmentasi Spektra Massa Metil Ester Palmitat

Puncak Ke-1

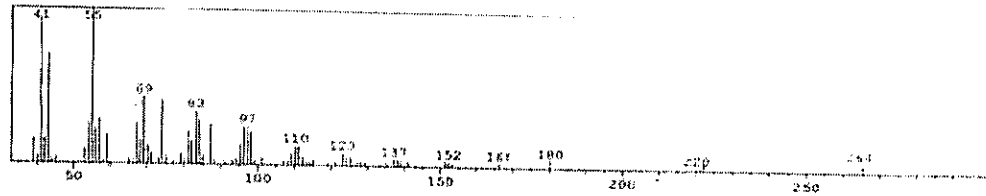


Fragmentasi:

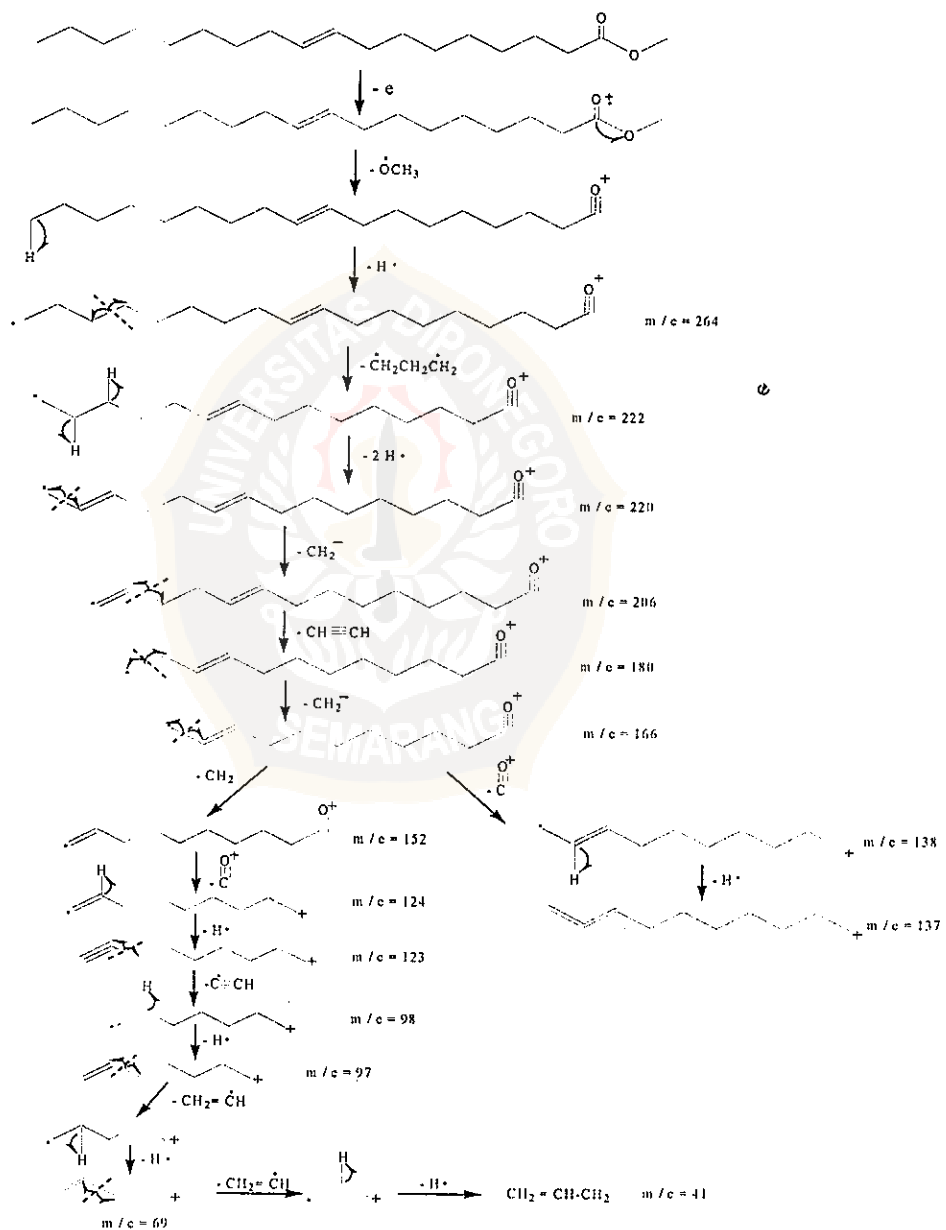


Lampiran C 2. Fragmentasi Spektra Massa Metil Ester Elaidat

Puncak Ke-2

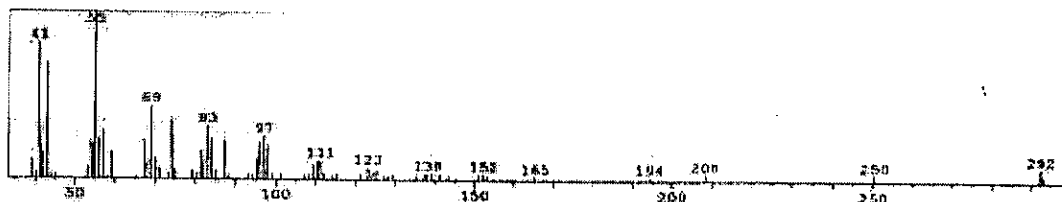


Fragmentasi :

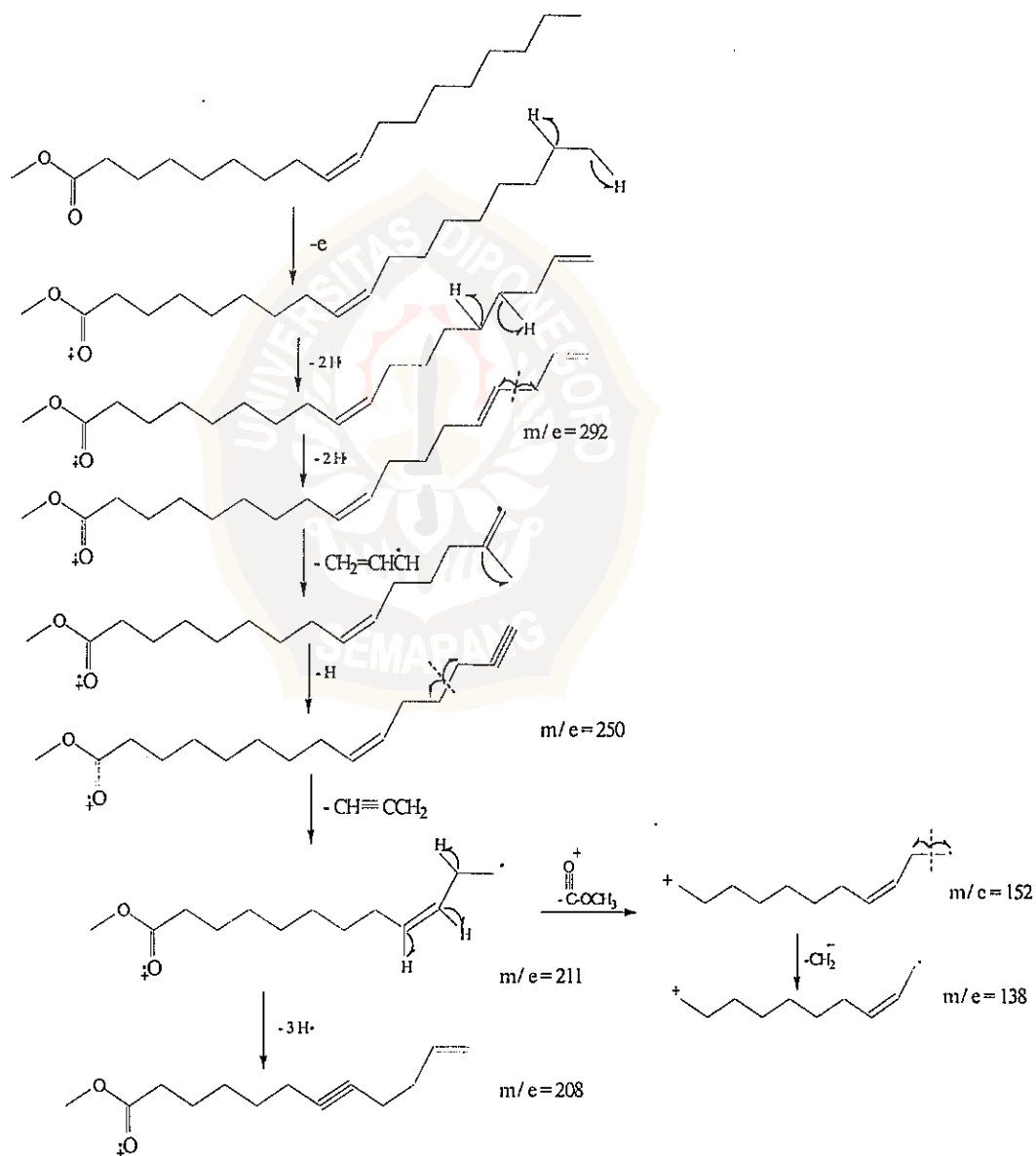


Lampiran C.4. Fragmentasi Spektra Massa Metil Ester Oleat

Puncak ke-4

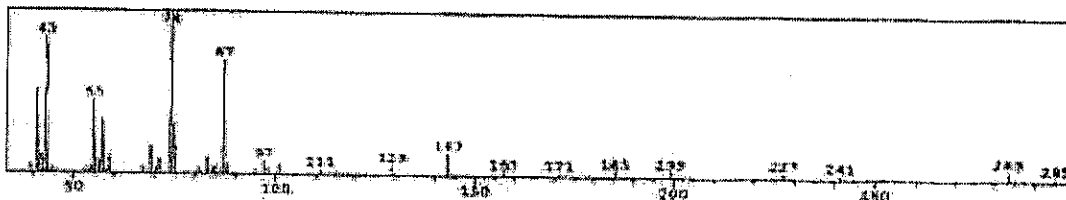


Fragmentasi :

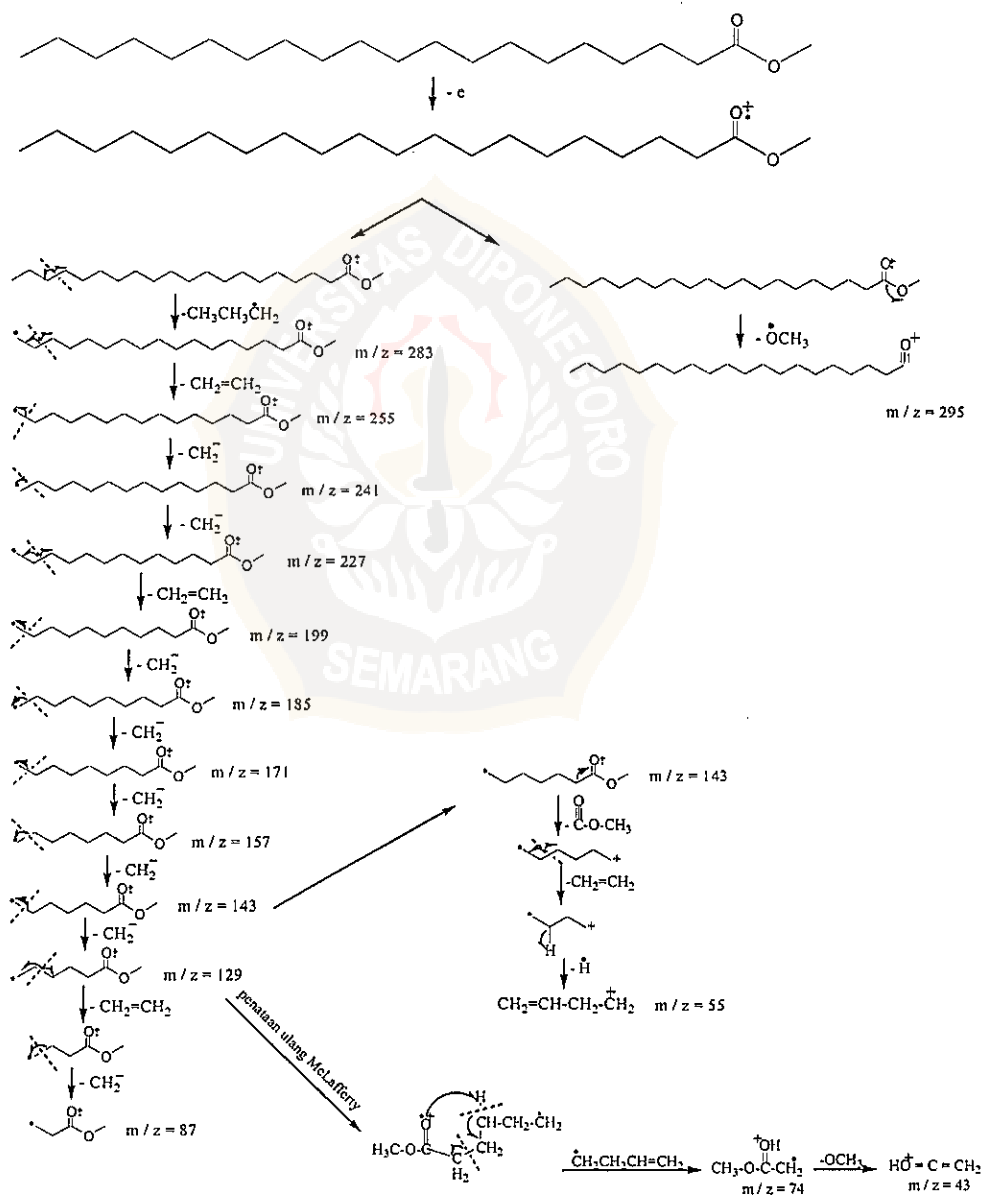


Lampiran C.5. Fragmentasi Spektra Massa Metil Ester Arakhidat

Puncak ke-5

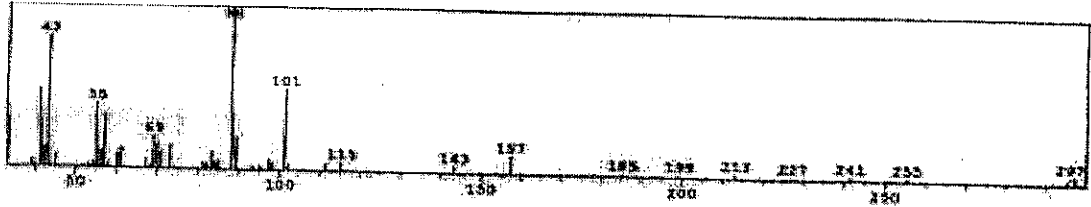


Fragmentasi :

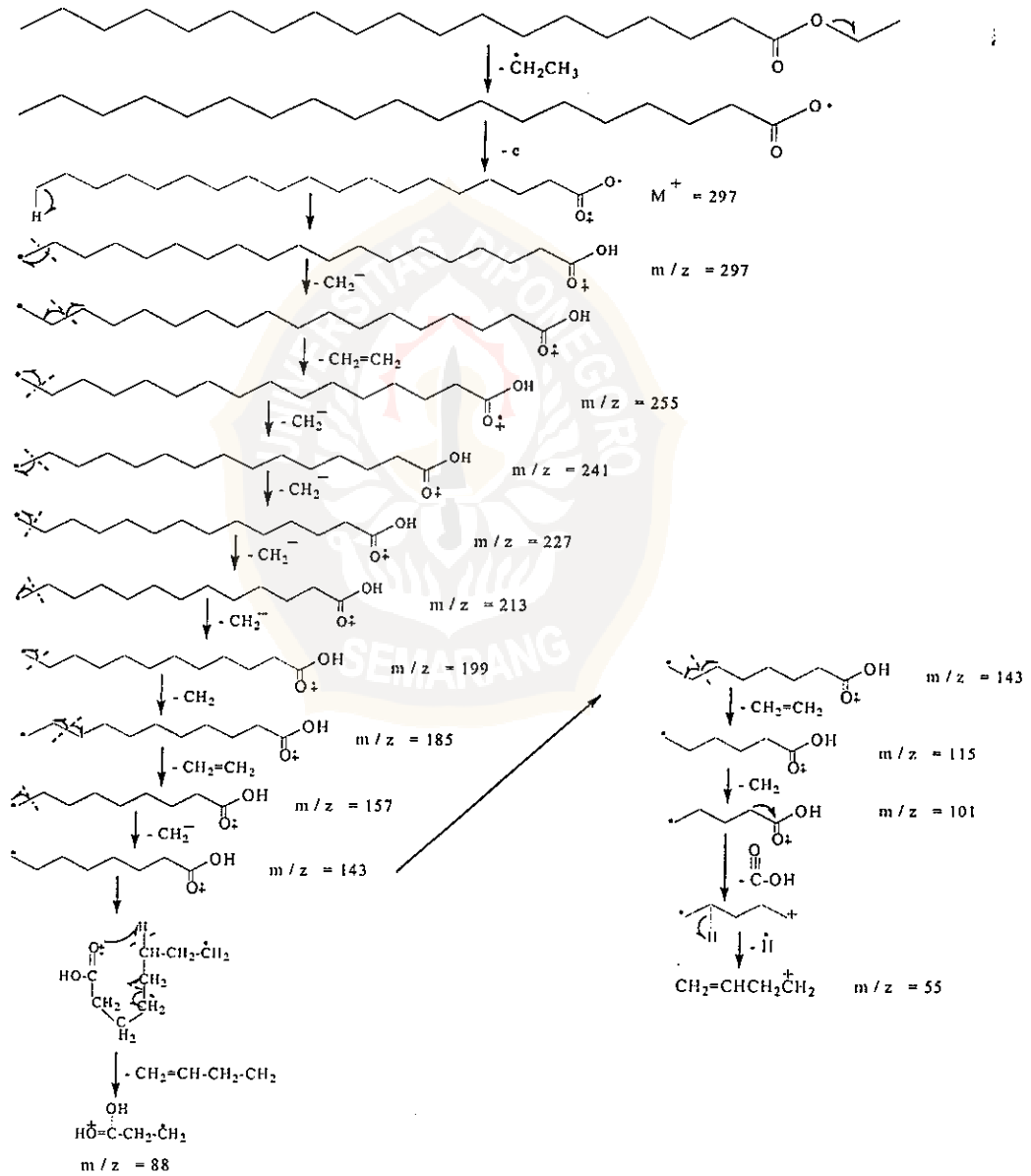


Lampiran C.6. Fragmentasi Spektra Massa Etil Ester Nonadekanoat

Puncak ke-6

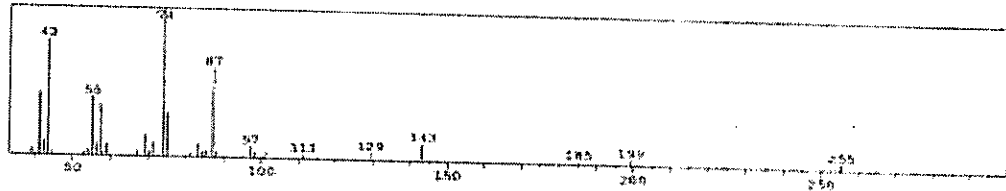


Fragmentasi :

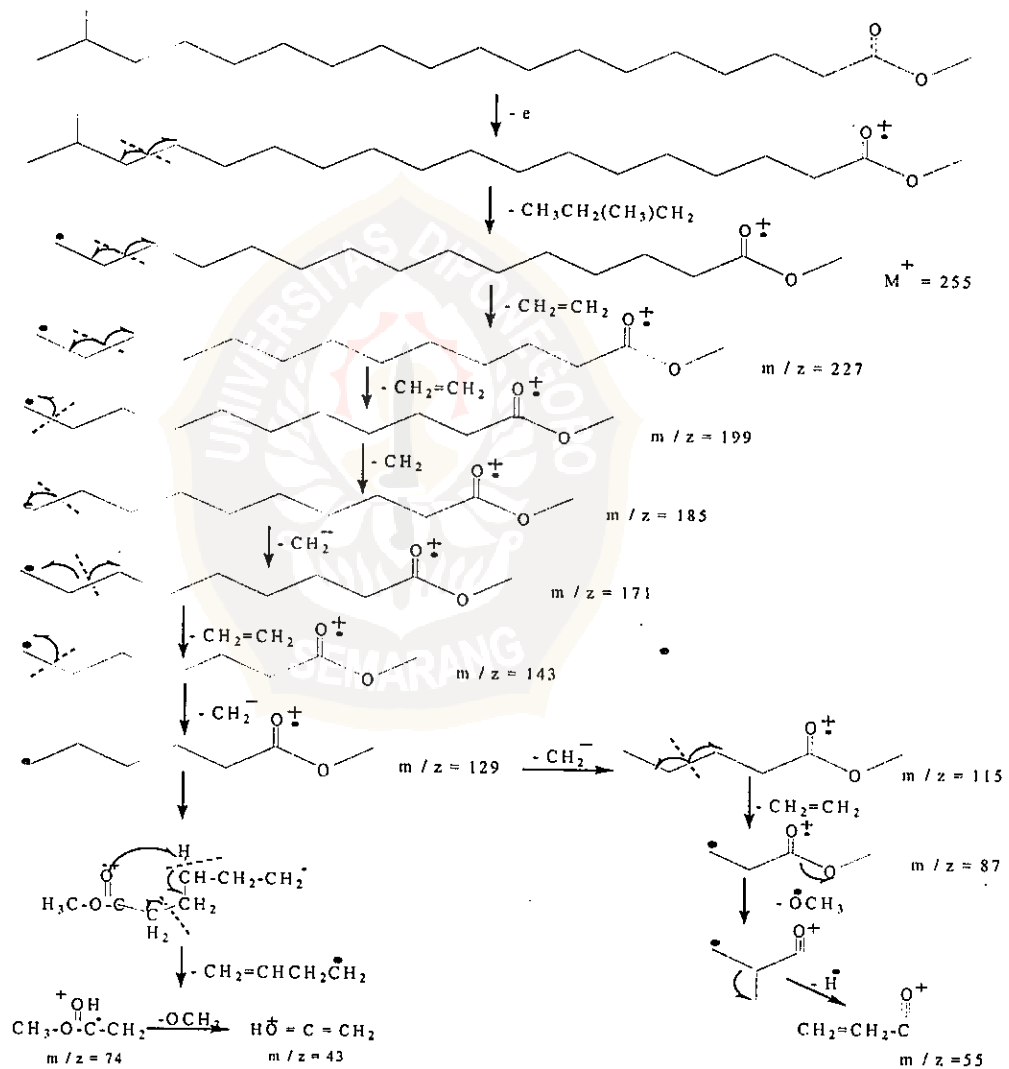


Lampiran C.7. Fragmentasi Spektra Massa Metil Ester 17-Metil Oktadekanoat

Puncak ke-7



Fragmentasi :



Lampiran D. Penentuan Berat Molekul Lemak Biji Rambutan

BM trigliserida = 3 BM asam lemak + BM gliserol – 3 BM H₂O

BM gliserol = 92 g/mol

BM H₂O = 18 g/mol

| Asam lemak | BM (g/mol) | Trigliserida | BM (g/mol) | kelimpahan |
|----------------------------|------------|---------------------------|------------|------------|
| Asam palmitat | 256 | Tripalmitin | 806 | 3,64 % |
| Asam elaidat | 282 | Trielaidin | 884 | 29,78 % |
| Asam stearat | 284 | Tristearin | 890 | 5,33 % |
| Asam oleat | 282 | Triolein | 884 | 8,49 % |
| Asam arakhidat | 312 | Triarakhidin | 974 | 44,69 % |
| Asam nonadekanoat | 298 | Trinonadekanoin | 932 | 2,48 % |
| Asam 17 metil oktadekanoat | 298 | Tri-17 metil oktadekanoin | 932 | 5,58 % |

$$\text{BM lemak rata - rata} = \frac{\text{BM lemak} \times \text{kelimpahan asam lemak}}{\text{kelimpahan total}}$$

$$= \frac{806 \times 3,64\% + 884 \times 29,78\% + 890 \times 5,33\% + 884 \times 8,49\% + 974 \times 44,69\% + 932 \times 2,48\% + 932 \times 5,58\%}{3,64\% + 29,78\% + 5,33\% + 8,49\% + 44,69\% + 2,48\% + 5,58\%}$$

$$= \frac{92.548,2}{99,99}$$

$$= 925,57 \text{ g/mol}$$

Lampiran E. Perbandingan Lemak, NaOH, dan Metanol

$$\text{Berat lemak} = 10 \text{ g}$$

$$\text{BM lemak} = 925,57 \text{ g/mol}$$

$$\begin{aligned} \text{Mol lemak} &= \frac{10 \text{ g}}{925,57 \text{ g/mol}} \\ &= 0,0108 \text{ mol} \end{aligned}$$

$$\text{Perbandingan mol lemak : mol metanol} = 1 : 6$$

$$\begin{aligned} \text{Mol metanol} &= 6 \times 0,0108 \text{ mol} \\ &= 0,0648 \text{ mol} \end{aligned}$$

$$\text{BM metanol} = 32 \text{ g/mol}$$

$$\begin{aligned} \text{Berat metanol} &= 32 \text{ g/mol} \times 0,0648 \text{ mol} \\ &= 2,0744 \text{ g} \end{aligned}$$

Variasi perbandingan persen berat NaOH terhadap lemak : 0,05 %, 0,075 %, 0,1 %, 0,3 %, dan 0,5 %.

| Variasi | Berat lemak | Berat metanol | % NaOH (w/w lemak) | Berat NaOH |
|---------|-------------|---------------|-----------------------|------------|
| 1. | 10 g | 2,0744 g | 0,05 % | 0,005 g |
| 2. | 10 g | 2,0744 g | 0,075 % | 0,075 g |
| 3. | 10 g | 2,0744 g | 0,1 % | 0,01 g |
| 4. | 10 g | 2,0744 g | 0,3 % | 0,03 g |
| 5. | 10 g | 2,0744 g | 0,5 % | 0,05 g |

Lampiran F. Perhitungan Randemen Metil Ester

Berat lemak yang ditransesterifikasi = 10 g

$$\text{Randemen metil ester} = \frac{\text{berat produk metil ester}}{\text{berat lemak yang ditransesterifikasi}} \times 100\%$$

| Variasi NaOH (% w/w lemak) | Berat metil ester | Randemen metil ester |
|-------------------------------|-------------------|----------------------|
| 0,05 % | 1,1700 g | 11,70 % |
| 0,075 % | 1,2400 g | 12,40 % |
| 0,1 % | 1,8507 g | 18,51 % * |
| 0,3 % | 1,7139 g | 17,14 % |
| 0,5 % | 1,0380 g | 10,38 % |

* variasi berat NaOH yang menghasilkan produk optimal

