

Lampiran 1

Data Hasil Pengujian Asam Lemak Universitas Airlangga

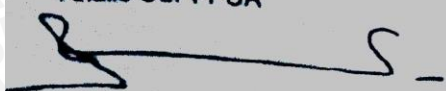
Tabel Profil Asam Lemak Sampel 4-268

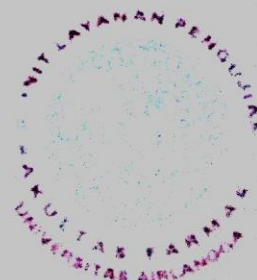
M. jarak

No	Waktu Tambat	Nama Komponen (metil ester)	% Area	Kesesuaian spektrum MS dengan Pustaka Alat
1	5.073	Asam miristat	0.06%	97%
2	7.827	Asam 7-heksadekenoat	0.04%	99%
3	7.908	Asam palmitoleat	0.75%	99%
4	8.298	Asam palmitat	18.04%	98%
5	10.321	Asam heptadekenoat	0.08%	99%
6	11.880	Asam linoleat	28.71%	99%
7	12.051	Asam oleat	43.80%	99%
8	12.116	Asam 7-oktadekenoat	1.70%	99%
9	12.579	Asam stearat	8.64%	99%
10	17.908	Asam eikosoat	0.18%	98%

Surabaya, 29 Mei 2014

Analisis ULPPFUA


Sri Gunarso, S.Si., Apt.

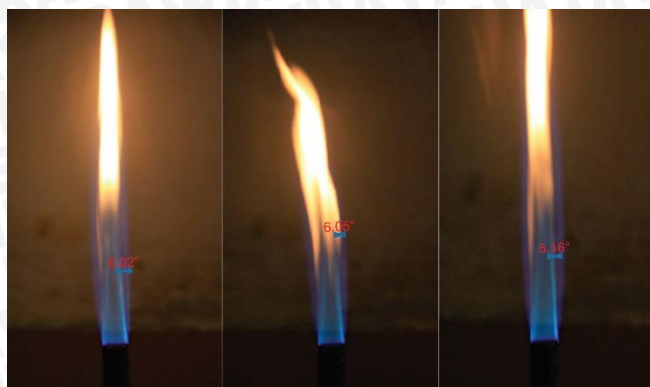


Lampiran 2

Visualisasi Api

- Minyak Jarak Mentah

Equivalence Ratio 2,896



Equivalence Ratio 1,931



Equivalence Ratio 1,448



Equivalence Ratio 1,158



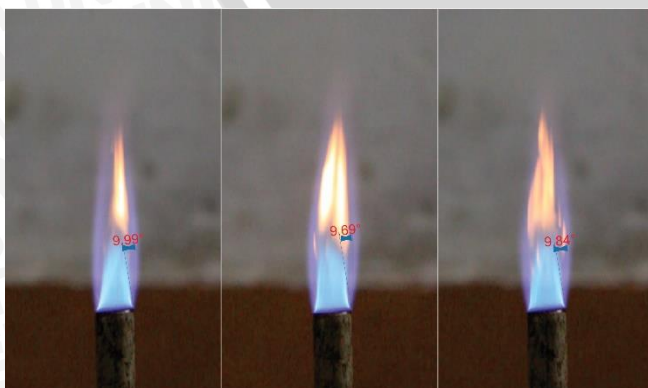
Equivalence Ratio 0,965



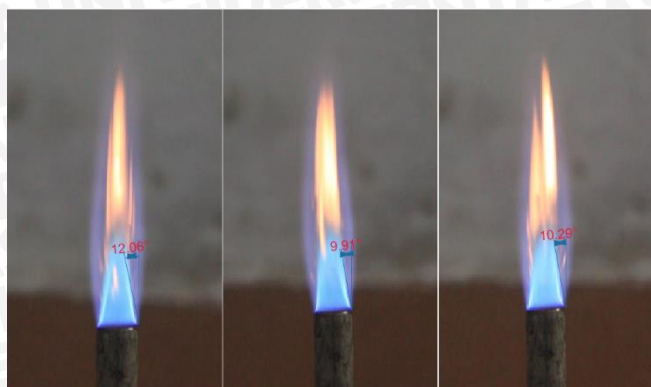
Equivalence Ratio 0,827



Equivalence Ratio 0,724

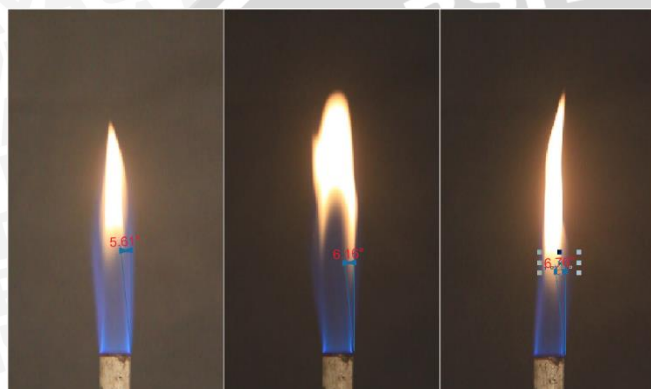


Equivalence Ratio 0,644

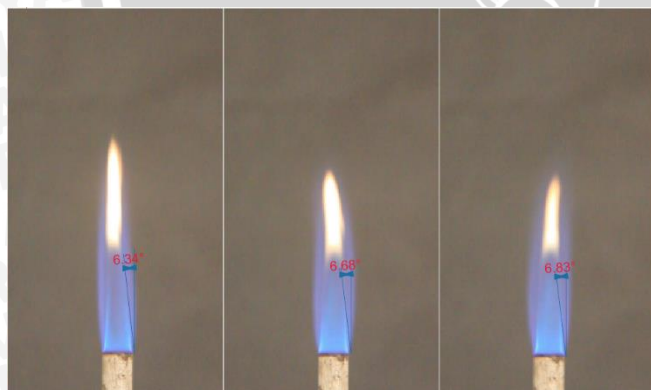


- Minyak Jarak Non Gliserol

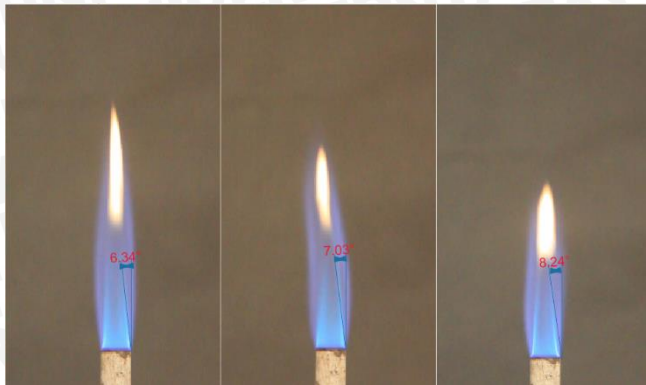
Equivalence Ratio 3,816



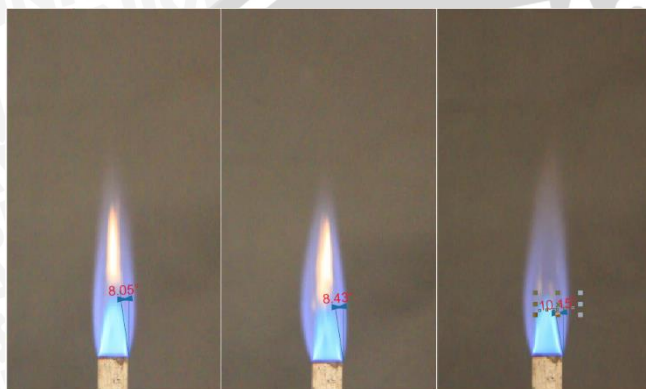
Equivalence Ratio 2,544



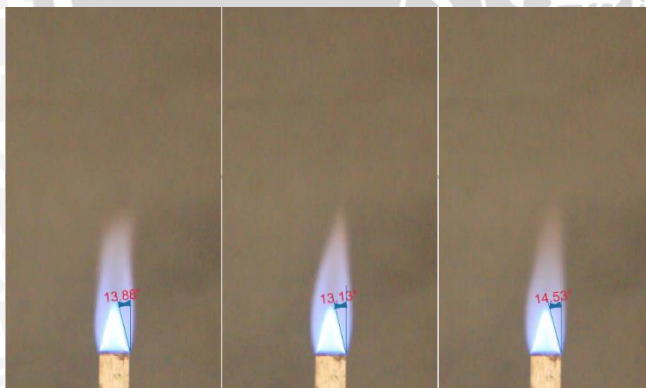
Equivalence Ratio 1,908



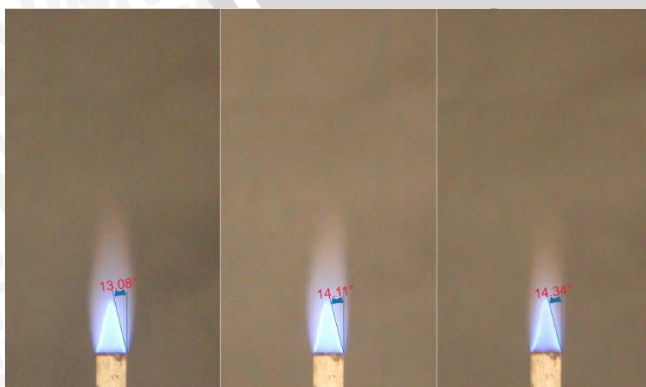
Equivalence Ratio 1,526



Equivalence Ratio 1,272



Equivalence Ratio 1,090



Lampiran 3**Tabel Data Massa Alir dan Massa Jenis**

	Massa Alir	Massa Jenis
Mentah	0,319 g/menit	3500 g/m ³
Non Gliserol	0,397 g/menit	6500 g/m ³

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Lampiran 4

Tabel Data Kecepatan

Data Minyak Jarak

Q udara (l/min)	<i>equivalence ratio (Φ)</i>	α	SIN α	Vu	SL
1	2,896	6,36	0,110775124	19,69941753	3,637009039
1,5	1,931	7,43	0,129314817	28,72638288	6,191244894
2	1,448	8,13	0,141419588	37,75334823	8,89843824
2,5	1,158	7,73	0,134505045	46,78031358	10,48698028
3	0,965	7,51	0,13069923	55,80727893	12,15661397
3,5	0,827	11,41	0,197828427	64,83424428	21,37676093
4	0,724	12,09	0,209447904	73,86120963	25,78345928
4,5	0,644	14,63	0,252576015	82,88817498	34,89260821

Data Minyak Jarak Non Gliserol

Q udara (l/min)	<i>equivalence ratio (Φ)</i>	α	SIN α	Vu	SL
1	3,816	7,4	0,128795597	19,15660924	4,112144859
1,5	2,544	7,52	0,130872264	28,18357459	6,147413681
2	1,908	8,55	0,148672434	37,21053994	9,220302566
2,5	1,526	9,95	0,172788705	46,23750529	13,31553108
3	1,272	14,04	0,242599231	55,26447064	22,34519678
3,5	1,090	19,32	0,330843821	64,29143599	35,45070726

Lampiran 5

Minyak Jarak Crude

Asam lemak	Rumus kimia	Mr	Massa (mg)	Mol	Mol C	Mol H	Mol O
Asam miristat	$C_{14}H_{28}O_2$	228	0,05	0,000234	0.003276	0,006552	0,000468
Asam 7-heksadekenoat	$C_{16}H_{30}O_2$	254	0,03	0,000135	0.00216	0,00405	0,00027
Asam Palmitoleat	$C_{16}H_{30}O_2$	254	0,67	0,002655	0.04248	0,07965	0,00531
Asam Palmitat	$C_{16}H_{32}O_2$	256	14,43	0,056385	0.90216	1,80432	0,11277
Asam Heptadekanoat	$C_{17}H_{34}O_2$	270	0,07	0,000261	0.004437	0,008874	0,000522
Asam Linoleat	$C_{18}H_{32}O_2$	280	25,84	0,092277	1.660986	2,952864	0,184554
Asam oleat	$C_{18}H_{34}O_2$	282	39,42	0,139779	2.516022	4,752486	0,279558
Asam 7-oktadekenoat	$C_{18}H_{34}O_2$	282	1,53	0,005418	0.097524	0,184212	0,010836
Asam Stearat	$C_{18}H_{36}O_2$	284	7,78	0,027378	0.492804	0,985608	0,054756
Asam Eikosanoat	$C_{20}H_{40}O_2$	312	0,16	0,000513	0.01026	0,02052	0,001026
Gliserol	$C_3H_8O_3$	92	10,00	0,10868	0.326034652	0,869425739	0,326035
Total				0,433713217	6.058143652	11,66856174	0,975366652

Molekul	Mol	
	Reaktan	Produk
O_2	8,48495	-
N_2		31,90341298
CO_2	-	6,058143652
H_2O	-	5,82897987

Jumlah mol oksigen yang dibutuhkan untuk pembakaran=

Total Oksigen di produk – total oksigen di bahan bakar : 2

$$((2 \cdot 6,05813652 + 5,82897987) - 0,975366652) : 2 = 8,48495026$$

Minyak Jarak Non Gliserol

Asam lemak	Rumus kimia	Mr	Massa (mg)	Mol	Mol C	Mol H	Mol O
Asam miristat	C14H28O2	228	0,06	0,00026	0.00364	0,00728	0,00052
Asam 7-heksadekenoat	C16H30O2	254	0,04	0,00015	0.0024	0,0045	0,0003
Asam Palmitoleat	C16H30O2	254	0,75	0,00295	0.0472	0,0885	0,0059
Asam Palmitat	C16H32O2	256	16,04	0,06265	1.0024	2,0048	0,1253
Asam Heptadekanoat	C17H34O2	270	0,08	0,00029	0.00493	0,00986	0,00058
Asam Linoleat	C18H32O2	280	28,71	0,10253	1.84554	3,28096	0,20506
Asam oleat	C18H34O2	282	43,8	0,15531	2.79558	5,28054	0,31062
Asam 7-oktadekenoat	C18H34O2	282	1,7	0,00602	0.10836	0,20468	0,01204
Asam Stearat	C18H36O2	284	8,64	0,03042	0.54756	1,09512	0,06084
Asam Eikosoanoat	C20H40O2	312	0,18	0,00057	0.0114	0,0228	0,00114
Total					6.36901	11.99904	0,7223

Molekul	Mol	
	Reaktan	Produk
O ₂	9,00762	-
N ₂		33,8686
CO ₂	-	6,36901
H ₂ O	-	5,99952

Jumlah mol oksigen yang dibutuhkan untuk pembakaran =

Total Oksigen di produk – total oksigen di bahan bakar : 2

$$((2 \cdot 6.36901 + 5,99952) - 0,7223) : 2 = 9,00762$$