

LAMPIRAN

Lampiran 1. COA minyak atsiri daun cengkeh



Importer of Essential Oils, Absolutes, and Carrier Oils
 Jakarta, Indonesia Customessentialoil@gmail.com Phone 081295037988

Certificate of Analysis

Product Name : **MINYAK DAUN CENGEK I CLOVE LEAF OIL (LIGHT)**
 Botanical Name : *Syzygium aromatic*11111
 Product Code : 150009
 Batch Number : 201 8000♦ - 04 - I 7LAB
 Appearance : Pale yellow liquid
 Odour : Clove sweet spicy caryophyllene
 Production Date : April 17^{Lh}, 2018
 Shelf Life : 24 Months in fully sealed containers

Technical Analysis:

Test Item	Specification	Result
Specific Gravity (@20 C)	1.0350- 1.0460	L0359
Refractive Index (@20 C)	1.5300- 1.5380	1.5309
Optical Rotation	-2.00-0.00	-2.00
Solubility	Soluble in alcohol and oils. Not soluble in water	Conform 10 standard
Fatty Oil	Negative	Passed
Mineral Oil	Negative	Passed

DISCLAIMER:

The information contained in this Certificate of Analysis is obtained from current and reliable sources. The information is correct at the time of testing, and the results may vary depending on batch and time of testing. Happy Green shall not be liable for any errors or delays in the content, or for any actions taken in reliance thereon. The information remains property of Happy Green and should not be propagate or used for any other purpose.

Lampiran 2. Data Sifat Fisis Gel Minyak Atsiri

1. ORGANOLEPTIS

FORMULA	UJI				
	Bau	Warna	Homogenitas	Bentuk	Konsistensi
FORMULA F1					
1	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
2	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
3	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
FORMULA F2					
1	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
2	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
3	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
FORMULA F3					
1	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
2	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
3	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
FORMULA F4					
1	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
2	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental
3	Khas daun cengkeh	Putih keruh	Homogen	Gel, semisolid	Kental

2. UJI pH

REPLIKASI	pH			
	F1	F2	F3	F4
1	6	5	5	6
2	6	5	5	6
3	6	5	5	6
RATA-RATA	6 ± 0	5 ± 0	5 ± 0	6 ± 0

3. HOMOGENITAS

REPLIKASI	HOMOGENITAS			
	F1	F2	F3	F4
1	HOMOGEN	HOMOGEN	HOMOGEN	HOMOGEN
2	HOMOGEN	HOMOGEN	HOMOGEN	HOMOGEN
3	HOMOGEN	HOMOGEN	HOMOGEN	HOMOGEN
RATA-RATA	HOMOGEN	HOMOGEN	HOMOGEN	HOMOGEN

4. DAYA SEBAR

FORMULA 1	Beban (cm)			
	Kaca	5 gram	20 gram	100 gram
F1 Replikasi 1	5,6	5,7	5,7	5,8
F1 Replikasi 2	5,5	5,8	5,8	6,0
F1 Replikasi 3	5,7	5,7	5,8	5,9
RATA-RATA	5,6 ± 0,07	5,7 ± 0	5,7 ± 0,07	5,9 ± 0,07

FORMULA 2	Beban (cm)			
	Kaca	5 gram	20 gram	100 gram
F2 Replikasi 1	5,5	5,6	5,8	6,0
F2 Replikasi 2	5,6	5,6	5,8	6,2
F2 Replikasi 3	5,6	5,7	5,8	6,2
RATA-RATA	5,5 ± 0,07	5,6 ± 0,07	5,8 ± 0	6,1 ± 0,14

FORMULA 3	Beban (cm)			
	Kaca	5 gram	20 gram	100 gram
F3 Replikasi 1	6,0	6,2	6,5	6,5
F3 Replikasi 2	6,2	6,3	6,6	6,8
F3 Replikasi 3	6,2	6,3	6,6	6,9
RATA-RATA	6,1 ± 0,14	6,2 ± 0,07	6,5 ± 0,07	6,7 ± 0,28

FORMULA 4	Beban (cm)			
	Kaca	5 gram	20 gram	100 gram
F4 Replikasi 1	6,2	6,3	6,7	7,0
F4 Replikasi 2	6,4	6,3	6,8	6,9
F4 Replikasi 3	6,2	6,5	6,7	7,2
RATA-RATA	6,2 ± 0	6,3 ± 0,14	6,7 ± 0	7,0 ± 0,14

5. DAYA LEKAT

REPLIKASI	DAYA LEKAT (detik)			
	F1	F2	F3	F4
1	7,8	15,8	13,7	34,8
2	7,9	15,7	13,21	34,6
3	7,7	15,8	13,55	34,6
RATA-RATA	7,8 ± 0,1	15,7 ± 0,05	13,48 ± 0,25	34,6 ± 0,11

6. VISKOSITAS

REPLIKASI	Viskositas (dPas)			
	F1	F2	F3	F4
1	240	410	350	470
2	240	410	350	470
3	240	410	350	470
RATA-RATA	240 ± 0	410 ± 0	350 ± 0	470 ± 0

7. DAYA PROTEKSI

REPLIKASI	FORMULA (menit)			
	F1	F2	F3	F4
1	5	5	5	5
2	5	5	5	5
3	5	5	5	5
X	5 ± 0	5 ± 0	5 ± 0	5 ± 0

Lampiran 3. Perhitungan Gel Tiap Formula Menurut Desain Faktorial

BAHAN	F1 (gr)	F2 (gr)	F3 (gr)	F4 (gr)
Carbopol	0,25	1,0	0,25	1,0
Propilen Glikol	2,5	2,5	4,5	4,5
Aquadest	Ad 50	Ad 50	Ad 50	Ad 50

Faktor A = Carbopol

Faktor B = Propilen glikol

Keterangan :

- F1 : Konsentrasi Carbopol rendah – Propilen glikol rendah
- F2 : Konsentrasi Carbopol tinggi – Propilen glikol rendah
- F3 : Konsentrasi Carbopol rendah – Propilen glikol tinggi
- F4 : Konsentrasi Carbopol tinggi – Propilen glikol tinggi

- F1 Carbopol level rendah dan Propilen glikol level rendah
 Carbopol = $0,5\% \times 50 \text{ gram} = 0,25 \text{ gram}$
 Propilen glikol = $5,0\% \times 50 \text{ gram} = 2,5 \text{ gram}$
- F2 Carbopol level tinggi dan Propilen glikol level rendah
 Carbopol = $2,0\% \times 50 \text{ gram} = 1,0 \text{ gram}$
 Propilen glikol = $5,0\% \times 50 \text{ gram} = 2,5 \text{ gram}$
- F3 Carbopol level rendah dan Propilen glikol level tinggi
 Carbopol = $0,5\% \times 50 \text{ gram} = 0,25 \text{ gram}$
 Propilen glikol = $9,0\% \times 50 \text{ gram} = 4,5 \text{ gram}$
- F4 Carbopol level tinggi dan Propilen glikol level tinggi
 Carbopol = $2,0\% \times 50 \text{ gram} = 1,0 \text{ gram}$
 Propilen glikol = $9,0\% \times 50 \text{ gram} = 4,5 \text{ gram}$

Lampiran 4. Not asi Desain Faktorial dan Persamaan Umum Desain Faktorial

No	FORMULA	FAKTOR A	FAKTOR B	INTERAKSI
1	(1) F1	-	-	+
2	(a) F2	+	-	-
3	(b) F3	-	+	-
4	(ab) F4	+	+	+

Keterangan :

Level Tinggi = +

Level Rendah = -

Faktor A = Carbopol

Faktor B = Propilen glikol

Persamaan umum menggunakan faktorial desain

$$Y = b_0 + X_1b_1 + X_2b_2 + X_1b_2b_{12}$$

Keterangan :

Y = Respon hasil atau sifat yang diamati

X₁ = Level Carbopol

X₂ = Level Propilen glikol

b₁, b₂, b₁₂ = Koefisien yang dihitung dari hasil percobaan

b₀ = Respon semua percobaan

Lampiran 5. Perhitungan Persamaan

1. UJI DAYA SEBAR

NO	FORMULA	FAKTOR A	FAKTOR B	INTERAKSI	RESPON
1	(1) F1	-	-	+	5,9
2	(a) F2	+	-	-	6,1
3	(b) F3	-	+	-	6,7
4	(ab) F4	+	+	+	7,0

$$\begin{aligned}
 \text{Efek Faktor A} &= \frac{[(a-(1)) + (ab-b)]}{2} \\
 &= \frac{[(6,1-5,9) + (7,0-6,7)]}{2} \\
 &= \frac{0,5}{2} \\
 &= 0,25
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Faktor B} &= \frac{[(b-(1)) + (ab-a)]}{2} \\
 &= \frac{[(6,7-5,9) + (7,0-6,1)]}{2} \\
 &= \frac{1,7}{2} \\
 &= 0,85
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Interaksi} &= \frac{[(ab-b) - (a-1)]}{2} \\
 &= \frac{[(7,0-6,7) - (6,1-5,9)]}{2} \\
 &= \frac{0,1}{2} \\
 &= 0,05
 \end{aligned}$$

Persamaan umum menggunakan faktorial desain

$$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$$

$$(1) F1 \quad 5,9 = b_0 + 0,25b_1 + 2,5b_2 + (0,25) (2,5) b_{12}$$

$$5,9 = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(a) F2 \quad 6,1 = b_0 + 1,0b_1 + 2,5b_2 + (1,0) (2,5) b_{12}$$

$$6,1 = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F3 \quad 6,7 = b_0 + 0,25b_1 + 4,5b_2 + (0,25) (4,5) b_{12}$$

$$6,7 = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$(ab) F4 \quad 7,0 = b_0 + 1,0b_1 + 4,5b_2 + (1,0) (4,5) b_{12}$$

$$7,0 = b_0 + 1,0b_1 + 4,5b_2 + 4,5 b_{12}$$

Eliminasi (1) dan (b)

$$(1) \cancel{F1} \quad / \quad 5,9 = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(b) \cancel{F3} \quad / \quad 6,7 = b_0 + 0,25b_1 + 2,5b_2 + 1,125b_{12}$$

$$-0,8 = -2,0b_2 - 0,5b_{12} \dots\dots\dots (I)$$

Eliminasi (a) dan (ab)

$$(a) \cancel{F2} \quad / \quad 6,1 = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) \cancel{F4} \quad / \quad 7,0 = b_0 + 1,0b_1 + 4,5b_2 + 4,5b_{12}$$

$$-0,9 = -2,0b_2 - 2,0b_{12} \dots\dots\dots (II)$$

Eliminasi (I) dan (II)

$$(I) \quad / \quad 0,8 = -2,0b_2 - 0,5b_{12}$$

$$(II) \quad / \quad 0,9 = -2,0b_2 - 2,0b_{12}$$

$$0,1 = 1,5b_{12}$$

$$b_{12} = \mathbf{0,066}$$

Substitusi b_{12} ke (I)

$$\begin{aligned}
 \text{(I)} \quad -0,8 &= -2,0b_2 - 0,5b_{12} \\
 -0,8 &= -2,0b_2 - 0,5(0,066) \\
 -0,8 &= -2,0b_2 - 0,033 \\
 -0,767 &= -2,0b_2 \\
 \mathbf{b_2} &= \mathbf{-1,233}
 \end{aligned}$$

Eliminasi (I) dan (a)

$$\begin{array}{r}
 \text{(I)} \cancel{F1} \quad 5,9 \cancel{=} b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 \text{(a)} \cancel{F2} \quad 6,1 \cancel{=} b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12} \\
 \hline
 \quad \quad \quad -0,2 = -0,75b_2 - 1,875b_{12} \dots\dots\dots \text{(III)}
 \end{array}$$

Substitusi b_{12} ke (III)

$$\begin{aligned}
 b_{12} &= -0,133 \\
 -0,2 &= -0,75b_1 - 1,875 b_{12} \\
 -0,2 &= -0,75b_1 - 1,875 (-1,233) \\
 -0,2 &= -0,75b_1 + 2,311 \\
 \mathbf{b_1} &= \mathbf{-3,348}
 \end{aligned}$$

Substitusi b_1 b_2 b_{12} ke persamaan (I)

$$\begin{aligned}
 \text{(1) F1} \quad 5,9 &= b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 5,9 &= b_0 + 0,25(-3,348) + 2,5(-1,233) + 0,625(-0,066) \\
 5,9 &= b_0 - 0,837 - 3,082 - 0,041 \\
 5,9 &= b_0 - 3,96 \\
 \mathbf{b_0} &= \mathbf{1,94}
 \end{aligned}$$

$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$ $Y = 1,94 - 3,348 X_1 - 1,233 X_2 - 0,066 X_1X_2$
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2. UJI DAYA LEKAT

NO	FORMULA	FAKTOR A	FAKTOR B	INTERAKSI	RESPON
1	(1) F1	-	-	+	7,8
2	(a) F2	+	-	-	15,7
3	(b) F3	-	+	-	13,48
4	(ab) F4	+	+	+	34,6

$$\begin{aligned}
 \text{Efek Faktor A} &= \frac{[(a-1) + (ab-b)]}{2} \\
 &= \frac{[(15,7-5,4) + (34,6-13,48)]}{2} \\
 &= \frac{31,42}{2} \\
 &= 15,71
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Faktor B} &= \frac{[(b-1) + (ab-a)]}{2} \\
 &= \frac{[(13,48-5,4) + (34,6-15,7)]}{2} \\
 &= \frac{26,98}{2} \\
 &= 13,49
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Interaksi} &= \frac{[(ab-b) - (a-1)]}{2} \\
 &= \frac{[(34,6-13,48) - (15,7-7,8)]}{2} \\
 &= \frac{13,22}{2} \\
 &= 6,61
 \end{aligned}$$

Persamaan umum menggunakan faktorial desain

$$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$$

$$(1) F1 \quad 7,8 = b_0 + 0,25b_1 + 2,5b_2 + (0,25) (2,5) b_{12}$$

$$7,8 = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(a) F2 \quad 15,7 = b_0 + 1,0b_1 + 2,5b_2 + (1,0) (2,5) b_{12}$$

$$15,7 = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F3 \quad 13,48 = b_0 + 0,25b_1 + 4,5b_2 + (0,25) (4,5) b_{12}$$

$$13,48 = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$(ab) F4 \quad 34,6 = b_0 + 1,0b_1 + 4,5b_2 + (1,0) (4,5) b_{12}$$

$$34,6 = b_0 + 1,0b_1 + 4,5b_2 + 4,5 b_{12}$$

Eliminasi (1) dan (b)

$$(1) F1 \quad \cancel{7,8} = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(b) F3 \quad \cancel{13,48} = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$-5,68 = -2,0b_2 - 0,5b_{12} \dots\dots\dots (I)$$

Eliminasi (a) dan (ab)

$$(a) F2 \quad \cancel{15,7} = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F4 \quad \cancel{34,6} = b_0 + 1,0b_1 + 4,5b_2 + 4,5b_{12}$$

$$-18,9 = -2,0b_2 - 2,0b_{12} \dots\dots\dots (II)$$

Eliminasi (I) dan (II)

$$(I) \quad \cancel{-5,68} = -2,0b_2 - 0,5b_{12}$$

$$(II) \quad \cancel{-18,9} = -2,0b_2 - 2,0b_{12}$$

$$13,22 = 1,5b_{12}$$

$$b_{12} = 8,81$$

$$(1) F1 \quad 7,8 = b_0 + 0,25b_1 + 2,5b_2 + (0,25) (2,5) b_{12}$$

$$7,8 = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(a) F2 \quad 15,7 = b_0 + 1,0b_1 + 2,5b_2 + (1,0) (2,5) b_{12}$$

$$15,7 = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F3 \quad 13,48 = b_0 + 0,25b_1 + 4,5b_2 + (0,25) (4,5) b_{12}$$

$$13,48 = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$(ab) F4 \quad 34,6 = b_0 + 1,0b_1 + 4,5b_2 + (1,0) (4,5) b_{12}$$

$$34,6 = b_0 + 1,0b_1 + 4,5b_2 + 4,5 b_{12}$$

Eliminasi (1) dan (b)

$$(1) F1 \quad \cancel{7,8} = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(b) F3 \quad \cancel{13,48} = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$-5,68 = -2,0b_2 - 0,5b_{12} \dots \dots \dots (I)$$

Eliminasi (a) dan (ab)

$$(a) F2 \quad \cancel{15,7} = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F4 \quad \cancel{34,6} = b_0 + 1,0b_1 + 4,5b_2 + 4,5b_{12}$$

$$-18,9 = -2,0b_2 - 2,0b_{12} \dots \dots \dots (II)$$

Eliminasi (I) dan (II)

$$(I) \quad \cancel{-5,68} = -2,0b_2 - 0,5b_{12}$$

$$(II) \quad \cancel{-18,9} = -2,0b_2 - 2,0b_{12}$$

$$13,22 = 1,5b_{12}$$

$$b_{12} = 8,81$$

Substitusi b_{12} ke (I)

$$\begin{aligned}
 \text{(II)} \quad -5,68 &= -2,0b_2 - 0,5b_{12} \\
 -5,68 &= -2,0b_2 - 0,5(8,81) \\
 -5,68 &= -2,0b_2 - 4,405 \\
 10,08 &= -2,0b_2 \\
 \mathbf{b_2} &= \mathbf{5,04}
 \end{aligned}$$

Eliminasi (I) dan (a)

$$\begin{aligned}
 \text{(I)} \quad \cancel{F1} \quad 7,8 &= b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 \text{(a)} \quad \cancel{F2} \quad 15,7 &= b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12} \\
 \hline
 & -7,9 = -0,75b_1 - 1,875b_{12} \dots\dots\dots \text{(III)}
 \end{aligned}$$

Substitusi b_{12} ke (III)

$$\begin{aligned}
 b_{12} &= 8,81 \\
 -7,9 &= -0,75b_1 - 1,875b_{12} \\
 -7,9 &= -0,75b_1 - 1,875(8,81) \\
 -7,9 &= -0,75b_1 - 16,51 \\
 \mathbf{b_1} &= \mathbf{-11,48}
 \end{aligned}$$

Substitusi b_1 b_2 b_{12} ke persamaan (I)

$$\begin{aligned}
 \text{(1) F1} \quad 7,8 &= b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 7,8 &= b_0 + 0,25(-11,48) + 2,5(5,04) + 0,625(8,81) \\
 7,8 &= b_0 - 2,87 + 12,6 + 5,50 \\
 7,8 &= b_0 + 15,23 \\
 \mathbf{b_0} &= \mathbf{1,95}
 \end{aligned}$$

$$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$$

$$Y = 1,95 - 11,48 X_1 + 5,04 X_2 + 8,81 X_1X_2$$

3. UJI VISKOSITAS

NO	FORMULA	FAKTOR A	FAKTOR B	INTERAKSI	RESPON
1	(1) F1	-	-	+	230
2	(a) F2	+	-	-	450
3	(b) F3	-	+	-	280
4	(ab) F4	+	+	+	480

$$\begin{aligned}
 \text{Efek Faktor A} &= \frac{[(a-1) + (ab-b)]}{2} \\
 &= \frac{[(450-250) + (480-280)]}{2} \\
 &= \frac{400}{2} \\
 &= \boxed{200}
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Faktor B} &= \frac{[(b-1) + (ab-a)]}{2} \\
 &= \frac{[(280-250) + (480-450)]}{2} \\
 &= \frac{60}{2} \\
 &= \boxed{30}
 \end{aligned}$$

$$\begin{aligned}
 \text{Efek Interaksi} &= \frac{[(ab-b) - (a-1)]}{2} \\
 &= \frac{[(480-280) - (480-250)]}{2} \\
 &= \frac{-30}{2} \\
 &= \boxed{-15}
 \end{aligned}$$

Persamaan umum menggunakan faktorial desain

$$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$$

$$(1) F1 \quad 250 = b_0 + 0,25b_1 + 2,5b_2 + (0,25) (2,5) b_{12}$$

$$250 = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(a) F2 \quad 450 = b_0 + 1,0b_1 + 2,5b_2 + (1,0) (2,5) b_{12}$$

$$450 = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F3 \quad 280 = b_0 + 0,25b_1 + 4,5b_2 + (0,25) (4,5) b_{12}$$

$$280 = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$(ab) F4 \quad 480 = b_0 + 1,0b_1 + 4,5b_2 + (1,0) (4,5) b_{12}$$

$$480 = b_0 + 1,0b_1 + 4,5b_2 + 4,5 b_{12}$$

Eliminasi (1) dan (b)

$$(1) F1 \quad \begin{array}{r} \cancel{250} \\ \hline \end{array} = b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12}$$

$$(b) F3 \quad \begin{array}{r} \cancel{280} \\ \hline \end{array} = b_0 + 0,25b_1 + 4,5b_2 + 1,125b_{12}$$

$$-30 = -2,0b_2 - 0,5b_{12} \dots \dots \dots (I)$$

Eliminasi (a) dan (ab)

$$(a) F2 \quad \begin{array}{r} \cancel{450} \\ \hline \end{array} = b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12}$$

$$(b) F4 \quad \begin{array}{r} \cancel{480} \\ \hline \end{array} = b_0 + 1,0b_1 + 4,5b_2 + 4,5b_{12}$$

$$-30 = -2,0b_2 - 2,0b_{12} \dots \dots \dots (II)$$

Eliminasi (I) dan (II)

$$(I) \quad \begin{array}{r} \cancel{-30} \\ \hline \end{array} = -2,0b_2 - 0,5b_{12}$$

$$(II) \quad \begin{array}{r} \cancel{-30} \\ \hline \end{array} = -2,0b_2 - 2,0b_{12}$$

$$0 = 1,5b_{12}$$

$$b_{12} = 0$$

Substitusi b_{12} ke (I)

$$\begin{aligned}
 \text{(II)} \quad -30 &= -2,0b_2 - 0,5b_{12} \\
 -30 &= -2,0b_2 - 0,5(0) \\
 -30 &= -2,0b_2 + 0 \\
 30 &= -2,0b_2 \\
 \mathbf{b_2} &= \mathbf{15}
 \end{aligned}$$

Eliminasi (I) dan (a)

$$\begin{aligned}
 \text{(I)} \quad \cancel{F1} \quad 250 &\cancel{=} b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 \text{(a)} \quad \cancel{F2} \quad 450 &\cancel{=} b_0 + 1,0b_1 + 2,5b_2 + 2,5b_{12} \\
 \hline
 &-200 = -0,75b_2 - 1,875b_{12} \dots\dots\dots \text{(III)}
 \end{aligned}$$

Substitusi b_{12} ke (III)

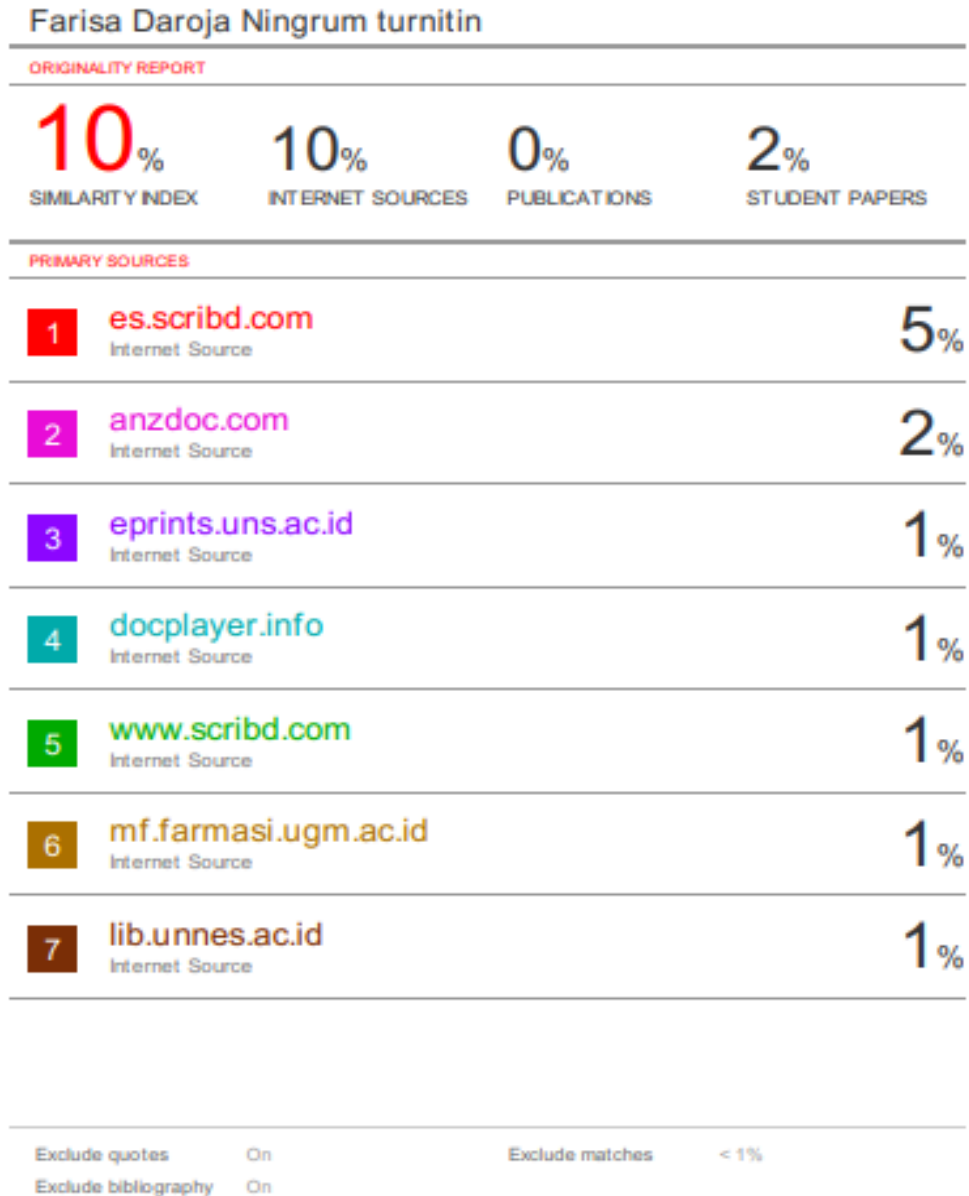
$$\begin{aligned}
 b_{12} &= 15 \\
 -200 &= -0,75b_1 - 1,875 b_{12} \\
 -200 &= -0,75b_1 - 1,875(15) \\
 -200 &= -0,75b_1 - 28,12 \\
 \mathbf{b_1} &= \mathbf{229,17}
 \end{aligned}$$

Substitusi b_1 b_2 b_{12} ke persamaan (I)

$$\begin{aligned}
 \text{(1) F1} \quad 250 &= b_0 + 0,25b_1 + 2,5b_2 + 0,625b_{12} \\
 250 &= b_0 + 0,25(229,71) + 2,5(15) + 0,625(0) \\
 250 &= b_0 + 54,42 + 37,5 + 0 \\
 250 &= b_0 + 91,92 \\
 \mathbf{b_0} &= \mathbf{0,36}
 \end{aligned}$$

$Y = b_0 + X_1b_1 + X_2b_2 + X_1X_2b_{12}$ $Y = 0,30 + 229,71 X_1 + 15 X_2 + 0 X_1X_2$
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Lampiran 6. Hasil Cek Turnitin



Lampiran 7. Dokumentasi Penelitian



Gambar 1. Minyak Atsiri Daun Cengkeh



Gambar 2. Instrumen *Viscometer* Brookfield DV2T



Gambar 3. Uji daya sebar dengan metode “*parallel plate*”



Gambar 4. Uji daya lekat



Formula 1



Formula 2



Formula 2



Formula 4

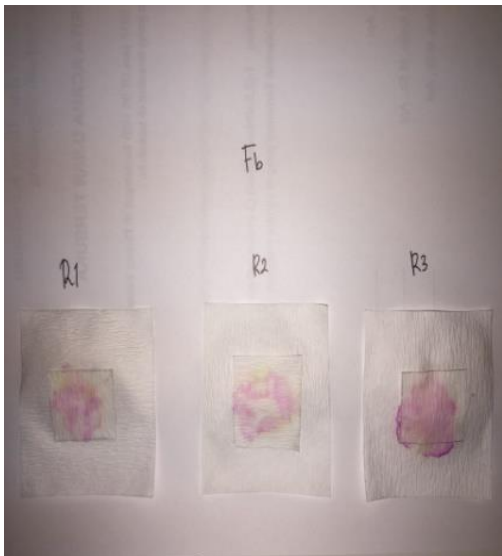
Gambar 5. Sediaan gel minyak atsiri daun cengkeh



Formula 1



Formula 2

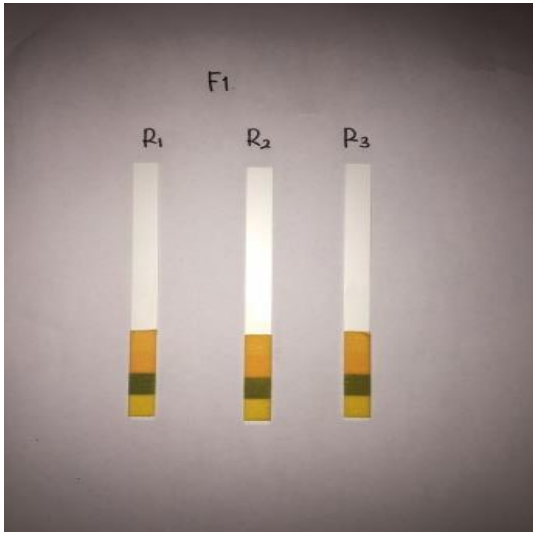


Formula 3

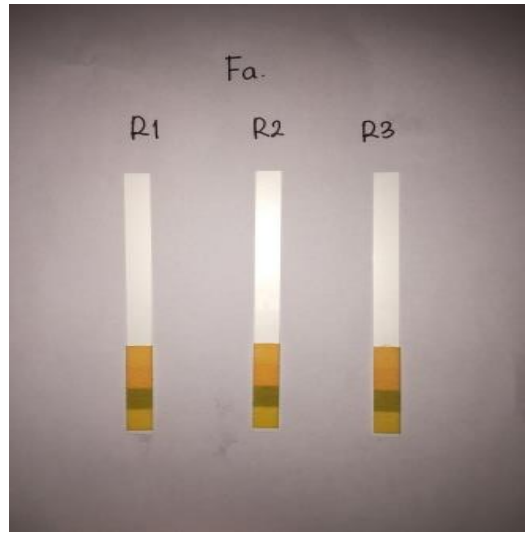


Formula 4

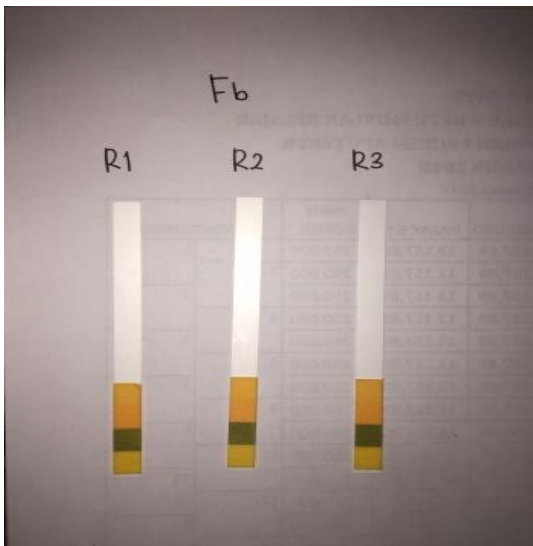
Gambar 6. Uji daya proteksi



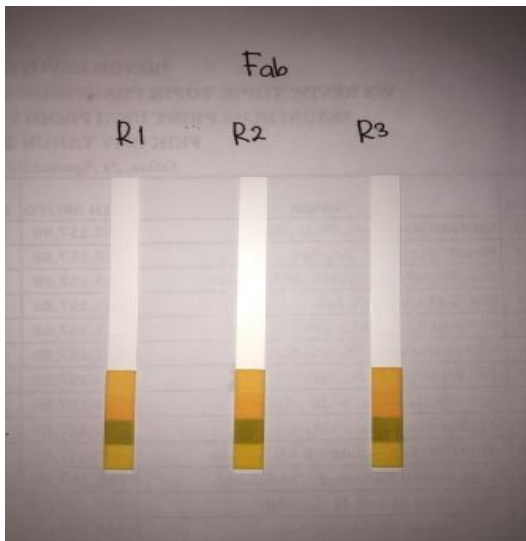
Formula 1



Formula 2



Formula 3



Formula 4

Gambar 7. Uji pH sediaan gel