L A M P I R A N

Lampiran 1. COA minyak atsiri daun kemangi (*Ocimum basilicum* L)

Happy Green

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

Certificate of Analysis

Product Name	: **BASIL OIL**
Botanical Name	: *Ocimum basilicum L.*
Material Code	: 776160003
Batch No	: 200125/177091
Appearance	: Clear Liquid
Color	: Colorless – Yellow
Odor	: Fresh, Spicy, Herbaceous-Aromatic
Country of Origin	: Egypt
Plant Part	: Leaves and Flowers Buds
Extraction Method	: Steam Distilled
Production Date	: January 25, 2020
Shelf Life	: 24 Months in Fully Sealed Containers
Quantity of Purchased	: 500 Gram
Packaging	: **1 Bottle @500 Gram**

Technical Analysis:

Test Item	Specification	Result
Density (@20ºC)	0.9319 – 0.9623	0.9471
Specific Gravity (@20ºC)	0.9336 – 0.9640	0.9488
Refractive Index (@20ºC)	1.4843 – 1.5147	1.4995
Flash Point (ºC)	75.00	Conform
Acid Value (mg KOH/g)	< 1.0	Conform
Solubilities	Soluble in Alcohol	Conform

Storage Condition : Store unopened containers with temperature between 10ºC to 25ºC

Lampiran 2. Perhitungan formula emulgel minyak atsiri daun kemangi

1. Formula 1 carbopol 0,5%

Minyak atsiri daun kemangi $= \frac{8}{100} \times 100$ gram = 8 gram

Carbopol 940 $= \frac{0,5}{100} \times 100$ gram = 0,5 gram

Parafin cair $= \frac{7,5}{100} \times 100$ gram = 7,5 gram

Spaan 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Tween 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Propilenglikol $= \frac{5}{100} \times 100$ gram = 5 gram

Metil paraben $= \frac{0,03}{100} \times 100$ gram = 0,03 gram

Propil paraben $= \frac{0,01}{100} \times 100$ gram = 0,01 gram

TEA = 16 tetes

Aquadest = 100 – (24,04) = 75,96 gram

2. Formula 2 carbopol 1,0%

Minyak atsiri daun kemangi $= \frac{8}{100} \times 100$ gram = 8 gram

Carbopol 940 $= \frac{1}{100} \times 100$ gram = 1 gram

Parafin cair $= \frac{7,5}{100} \times 100$ gram = 7,5 gram

Spaan 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Tween 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Propilenglikol $= \frac{5}{100} \times 100$ gram = 5 gram

Metil paraben $= \frac{0,03}{100} \times 100$ gram = 0,03 gram

Propil paraben $= \frac{0,01}{100} \times 100$ gram = 0,01 gram

TEA = 16 tetes

Aquadest = 100 – (24,54) = 75,46 gram

3. Formula 3 carbopol 1,5%

Minyak atsiri daun kemangi $= \frac{8}{100} \times 100$ gram = 8 gram

Carbopol 940 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Parafin cair $= \frac{7,5}{100} \times 100$ gram = 7,5 gram

Spaan 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Tween 80 $= \frac{1,5}{100} \times 100$ gram = 1,5 gram

Propilenglikol $= \frac{5}{100} \times 100$ gram = 5 gram

Metil paraben $= \frac{0,03}{100} \times 100$ gram = 0,03 gram

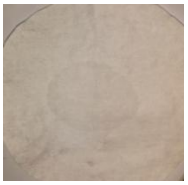
Propil paraben $= \frac{0,01}{100} \times 100$ gram = 0,01 gram

TEA = 16 tetes

Aquadest = 100 – (25,04) = 74,96 gram

Lampiran 3. Hasil gambar analisis minyak atsiri daun kemangi

1. Uji organoleptis minyak atsiri daun kemangi



Bau

Warna dan bentuk

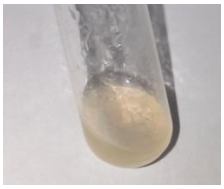
Minyak atsiri daun kemangi

2. Identifikasi minyak atsiri

Diteteskan pada kertas saring

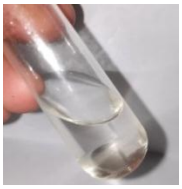
Minyak atsiri menguap sempurna

3. Kelarutan dalam etanol



Minyak atsiri + etanol

Setelah dikocok



Didiamkan 24 jam

4. Bobot jenis

Bobot pikno kosong

Bobot pikno + minyak atsiri

Bobot pikno + aqua

Perhitungan bobot jenis minyak atsiri daun kemangi :

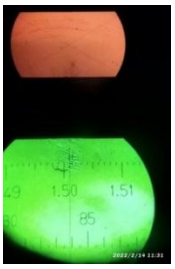
$$\text{Berat jenis} = \frac{\text{Pikno minyak atsiri} - \text{pikno kosong}}{\text{Pikno aquadest} - \text{pikno kosong}}$$

$$\text{Berat jenis} = \frac{21.620 - 12.014}{22.004 - 12.014}$$

$$= \frac{9.516}{9.900} = 0{,}9612$$

5. Indeks bias

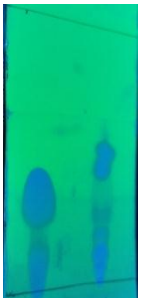
Alat refraktometer



Hasil indeks bias

6. KLT

Chamber



UV 366

UV 254

penyemprotan

Perhitungan Rf :

$$Rf = \frac{\text{Jarak bercak}}{\text{Jarak yang ditempuh oleh fase gerak}}$$

Rf_1 sampel : $\frac{0{,}7\text{ cm}}{7\text{ cm}}$

: 0,1

Rf_2 sampel : $\frac{3\text{ cm}}{7\text{ cm}}$

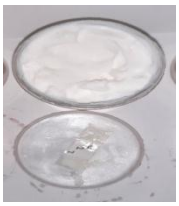
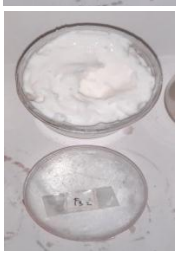
: 0,4

Rf_1 pembanding : $\frac{0{,}7\text{ cm}}{7\text{ cm}}$

: 0,1

Lampiran 4. Hasil gambar uji emulgel minyak atsiri daun kemangi

1. Organoleptis

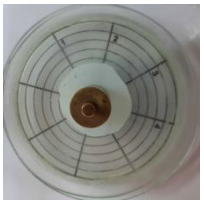
Formulasi	Gambar	Hasil
Carbopol 0,5%		Konsistensi: agak kental Bau : daun kemangi Warna : putih
Carbopol 1,0%		Konsistensi: kental Bau : daun kemangi Warna : putih
Carbopol 1,5%		Konsistensi: sangat kental Bau : daun kemangi Warna : putih

2. Homogenitas

3. Uji pH

4. Uji viskositas

5. Uji daya sebar


Formula + tanpa beban

Formula + 50 g

Formula + 100 g


Formula + 150 g

6. Uji daya lekat


Alat uji daya lekat

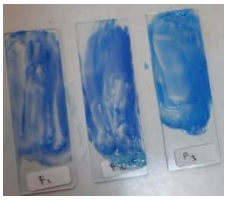
Lampiran 5. Hasil gambar uji tipe emulsi

1. **Metode pengenceran dengan air**



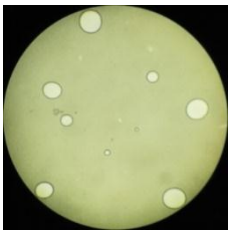
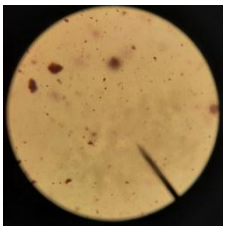
Carbopol 0,5% **Carbopol 1,0%** **Carbopol 1,5%**

2. **Metode pewarnaan dengan methylen blue**



3. **Metode daya hantar listrik**

4. **Metode mikroskop**

methylen blue Sudan III

Lampiran 6. Hasil gambar uji daya proteksi

Fenolftalein + emulgel

Parafin padat

Diteteskan KOH

Lampiran 7. Hasil gambar uji stabilitas

Carbopol 0,5%

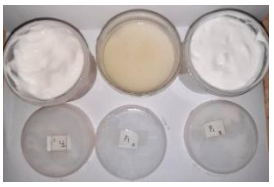

Siklus pertama


Siklus kedua


Siklus ketiga


Siklus keempat


Siklus kelima


Siklus keenam

Carbopol 1,0%


Siklus pertama


Siklus kedua


Siklus ketiga


Siklus keempat


Siklus kelima

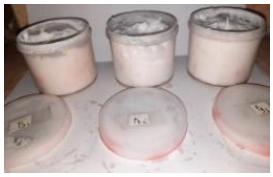

Siklus keenam

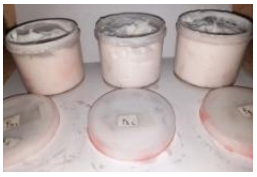
Carbopol 1,5%


Siklus pertama


Siklus kedua


Siklus ketiga


Siklus keempat


Siklus kelima


Siklus keenam

Lampiran 8. Data hasil pengujian sifat fisik emulgel minyak atsiri daun kemangi.

1. Hasil uji pH dengan alat pH meter

Uji pH						
Waktu	Formula	Replikasi 1	Replikasi 2	Relikasi 3	rata-rata	±SD
sebelum cycling test	formula 1	5,24	5,23	5,23	5,23	± 0,005
	formula 2	5,41	5,36	5,34	5,37	± 0,036
	formula 3	5,44	5,43	5,42	5,43	± 0,01
sesudah cycling test	formula 1	6,9	6,11	6,12	6,37	± 0,45
	formula 2	5,67	5,6	5,6	5,62	± 0,040
	formula 3	5,81	5,83	5,8	5,81	± 0,015

2. Hasil uji viskositas (poise) dengan spindle nomor 2

Uji viskositas						
Waktu	Formula	Replikasi 1	Replikasi 2	Relikasi 3	rata-rata	±SD
sebelum cycling test	formula 1	95	100	99	98	± 2,64
	formula 2	210	210	205	208,3	± 2,88
	formula 3	305	300	305	303,3	± 2,88
sesudah cycling test	formula 1	150	145	155	150	± 5
	formula 2	250	245	249	248	± 2,64
	formula 3	400	395	400	398,3	± 2,88

3. Uji daya lekat

Uji daya lekat						
Waktu	Formula	Replikasi 1	Replikasi 2	Relikasi 3	rata-rata	±SD
sebelum cycling test	formula 1	0,40	0,45	0,48	0,44	± 0,04
	formula 2	1,00	1, 04	1,02	1,02	± 0,02
	formula 3	1,05	1,06	1,03	1,04	± 0,01
sesudah cycling test	formula 1	0,55	0,50	0,58	0,54	± 0,04
	formula 2	1,05	1,03	1,02	1,03	± 0,01
	formula 3	1,07	1,06	1,09	1,07	± 0,01

4. Uji daya sebar

Formula	Beban (kg)	Sebelum cycling test (cm) Replikasi			Sesudah cycling test (cm) Replikasi		
		1	**2**	**3**	**1**	**2**	**3**
0,5 %	Tanpa beban	4	4,7	4,6	4,5	4,7	4,4
	50	4,7	5,7	5,6	5,2	5,3	5
	100	5	6	6,1	5,7	5,9	5,4
	150	5,4	6,5	6,6	6	6,3	6,1
1,0%	Tanpa beban	3,5	3,6	4,4	3,6	3,3	3,1
	50	3,8	3,9	4,6	4	3,8	3,5
	100	4,3	4,5	5,2	4,4	4	4
	150	4,8	4,9	5,5	4,6	4,5	4,3
1,5%	Tanpa beban	3,2	3,1	3	3	2,8	3
	50	3,5	3,8	3,5	3,5	3,2	3,3
	100	4	4	3,8	3,8	3,7	3,8
	150	4,2	4,3	4	4,3	4	4,1

Lampiran 9. Hasil analisis statistik

SPSS *one way anova* pH sebelum *cycling test*

One-Sample Kolmogorov-Smirnov Test

		formula	Uji_pH
N		9	9
Normal Parameters[a,b]	Mean	2.00	5.3444
	Std. Deviation	.866	.08932
Most Extreme Differences	Absolute	.209	.213
	Positive	.209	.212
	Negative	-.209	-.213
Test Statistic		.209	.213
Asymp. Sig. (2-tailed)		.200[c,d]	.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
4.986	2	6	.053

ANOVA

Uji_pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.061	2	.030	63.791	.000
Within Groups	.003	6	.000		
Total	.064	8			

Uji_pH

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05		
		1	2	3
carbopol 0,5%	3	5.2333		
carbopol 1,0%	3		5.3700	
carbopol 1,5%	3			5.4300
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *one way anova* pH sesudah *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji_pH
N		9	9
Normal Parameters[a,b]	Mean	2.00	5.9378
	Std. Deviation	.866	.40859
Most Extreme Differences	Absolute	.209	.271
	Positive	.209	.271
	Negative	-.209	-.204
Test Statistic		.209	.271
Asymp. Sig. (2-tailed)		.200[c,d]	.056[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
11.082	2	6	.050

ANOVA

Uji_pH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.921	2	.460	6.664	.030
Within Groups	.415	6	.069		
Total	1.336	8			

Uji_pH

Tukey HSD[a]

		Subset for alpha = 0.05	
Formula	N	1	2
Carbopol 1,0%	3	5.6233	
Carbopol 1,5%	3	5.8133	5.8133
Carbopol 0,5%	3		6.3767
Sig.		.668	.087

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *paired t test* pH sebelum dan sesudah *cycling test*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum	5.3444	9	.08932	.02977
	Sesudah	5.9378	9	.40859	.13620

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Sebelum & Sesudah	9	-.665	.051

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Sebelum - Sesudah	-.59333	.47273	.15758	-.95671	-.22996	-3.765	8	.006

SPSS *one way anova* viskositas sebelum *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji_Viskositas
N		9	9
Normal Parameters[a,b]	Mean	2.00	203.22
	Std. Deviation	.866	89.028
Most Extreme Differences	Absolute	.209	.210
	Positive	.209	.210
	Negative	-.209	-.195
Test Statistic		.209	.210
Asymp. Sig. (2-tailed)		.200[c,d]	.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.039	2	6	.962

ANOVA

Uji_Viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	63360.222	2	31680.111	4015.789	.000
Within Groups	47.333	6	7.889		
Total	63407.556	8			

Uji_Viskositas

Tukey HSD[a]

		Subset for alpha = 0.05		
Formula	N	1	2	3
Carbopol 0,5%	3	98.00		
Carbopol 1,0%	3		208.33	
Carbopol 1,5%	3			303.33
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *one way anova* viskositas sesudah *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji_Viskositas
N		9	9
Normal Parameters[a,b]	Mean	2.00	265.44
	Std. Deviation	.866	108.371
Most Extreme Differences	Absolute	.209	.223
	Positive	.209	.223
	Negative	-.209	-.217
Test Statistic		.209	.223
Asymp. Sig. (2-tailed)		.200[c,d]	.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.450	2	6	.658

ANOVA

Uji_Viskositas

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	93873.556	2	46936.778	3491.165	.000
Within Groups	80.667	6	13.444		
Total	93954.222	8			

Uji_Viskositas

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05		
		1	2	3
Carbopol 0,5%	3	150.00		
Carbopol 1,0%	3		248.00	
Carbopol 1,5%	3			398.33
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *paired t test* viskositas sebelum dan sesudah *cycling test*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	sebelum	203.22	9	89.028	29.676
	sesudah	265.44	9	108.371	36.124

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	sebelum & sesudah	9	.986	.000

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	sebelum - sesudah	-62.222	25.440	8.480	-81.777	-42.667	-7.338	8	.000

SPSS *one way anova* uji daya sebar sebelum *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji Daya Sebar
N		36	36
Normal Parameters[a,b]	Mean	2.0000	4.5083
	Std. Deviation	.82808	.94850
Most Extreme Differences	Absolute	.220	.121
	Positive	.220	.121
	Negative	-.220	-.061
Test Statistic		.220	.121
Asymp. Sig. (2-tailed)		.000[c]	.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
2.535	2	33	.095

ANOVA

Uji Daya Sebar

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	17.662	2	8.831	21.078	.000
Within Groups	13.826	33	.419		
Total	31.487	35			

Uji Daya Sebar

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05		
		1	2	3
Carbool 1,5%	12	3.7000		
Carbool 1,0%	12		4.4167	
Carbool 0,5%	12			5.4083
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 12.000.

SPSS *one way anova* uji daya sebar sesudah *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji Daya Sebar
N		36	36
Normal Parameters[a,b]	Mean	2.0000	4.2806
	Std. Deviation	.82808	.95702
Most Extreme Differences	Absolute	.220	.115
	Positive	.220	.115
	Negative	-.220	-.070
Test Statistic		.220	.115
Asymp. Sig. (2-tailed)		.000[c]	.200[c,d]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.875	2	33	.426

ANOVA

Uji Daya Sebar

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	22.442	2	11.221	38.516	.000
Within Groups	9.614	33	.291		
Total	32.056	35			

Uji Daya Sebar

Tukey HSD[a]

		Subset for alpha = 0.05	
Formula	N	1	2
Carbool 1,5%	12	3.5417	
Carbool 1,0%	12	3.9250	
Carbool 0,5%	12		5.3750
Sig.		.206	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 12.000.

SPSS *paired t test* uji daya sebar sebelum dan sesudah *cycling test*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	sebelum	4.5083	36	.94850	.15808
	sesudah	4.2806	36	.95702	.15950

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	sebelum & sesudah	36	.874	.000

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	sebelum - sesudah	.22778	.47786	.07964	.06609	.38946	2.860	35	.007

SPSS *one way anova* uji daya lekat sebelum *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji_Daya_Lekat
N		9	9
Normal Parameters[a,b]	Mean	2.00	.8367
	Std. Deviation	.866	.29618
Most Extreme Differences	Absolute	.209	.376
	Positive	.209	.225
	Negative	-.209	-.376
Test Statistic		.209	.376
Asymp. Sig. (2-tailed)		.200[c,d]	.057[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.451	2	6	.306

ANOVA

Uji_Daya_Lekat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.697	2	.349	461.426	.000
Within Groups	.005	6	.001		
Total	.702	8			

Uji_Daya_Lekat

Tukey HSD[a]

		Subset for alpha = 0.05	
Formula	N	1	2
Carbopol 0,5%	3	.4433	
Carbopol 1,0%	3		1.0200
Carbopol 1,5%	3		1.0467
Sig.		1.000	.502

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *one way anova* uji daya lekat sesudah *cycling test*

One-Sample Kolmogorov-Smirnov Test

		Formula	Uji_Daya_Lekat
N		9	9
Normal Parameters[a,b]	Mean	2.00	.8833
	Std. Deviation	.866	.25661
Most Extreme Differences	Absolute	.209	.370
	Positive	.209	.215
	Negative	-.209	-.370
Test Statistic		.209	.370
Asymp. Sig. (2-tailed)		.200[c,d]	.057[c]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
1.910	2	6	.228

ANOVA

Uji_Daya_Lekat

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.523	2	.261	373.286	.000
Within Groups	.004	6	.001		
Total	.527	8			

Uji_Daya_Lekat

Tukey HSD[a]

Formula	N	Subset for alpha = 0.05	
		1	2
Carbopol 0,5%	3	.5433	
Carbopol 1,0%	3		1.0333
Carbopol 1,5%	3		1.0733
Sig.		1.000	.232

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3.000.

SPSS *paired t test* uji daya lekat sebelum dan sesudah *cycling test*

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum	.8367	9	.29618	.09873
	sesudah	.8833	9	.25661	.08554

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	sebelum & sesudah	9	.992	.000

Paired Samples Test

		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	sebelum - sesudah	-.04667	.05244	.01748	-.08698	-.00636	-2.670	8	.028