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## Lampiran 1. Surat Keterangan Determinasi Tanaman



**KEMENTERIAN KESEHATAN REPUBLIK INDONESIA**  
**BADAN PENELITIAN DAN PENGEMBANGAN KESEHATAN**  
 BALAI BESAR PENELITIAN DAN PENGEMBANGAN  
 TANAMAN OBAT DAN OBAT TRADISIONAL  
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Nomor : KM.04.02/2/2359/2021 18 Oktober 2021  
 Lampiran : -  
 Hal : Keterangan Determinasi

Yth. Dekan Fakultas Farmasi Universitas Setia Budi  
 Jalan Letjend. Sutoyo Solo 57127

Merujuk surat Saudara nomor: 424/H6-04/31.08.2021 tanggal 31 Agustus 2021 hal permohonan determinasi, dengan ini kami sampaikan bahwa hasil determinasi sampel tanaman sebagai berikut:

Nama Pemohon : Morenza Janeitte Frisillia  
 Nama Sampel : Bidara Arab  
 Sampel : Segar  
 Spesies : *Ziziphus jujuba* Mill.  
 Sinonim : *Ziziphus mauritiana* Lam.; *Rhamnus jujuba* L.  
 Familia : Rhamnaceae  
 Penanggung Jawab : Nur Rahmawati Wijaya, S.Si.

Hasil determinasi tersebut hanya mencakup sampel tanaman yang telah dikirimkan ke B2P2TOOT.

Atas perhatian Saudara, kami sampaikan terima kasih.

Kepala Balai Besar Penelitian  
 dan Pengembangan Tanaman Obat  
 dan Obat Tradisional  
 Tawangmangu,



**Akhmad Saikhu, S.K.M.,**  
**M.Sc.PH.**  
 NIP 196805251992031004

Tembusan :

-

**Lampiran 2. Gambar tanaman bidara (*Ziziphus mauritiana* L.)**



Tanaman bidara (*Ziziphus mauritiana* L.)



Daun bidara kering



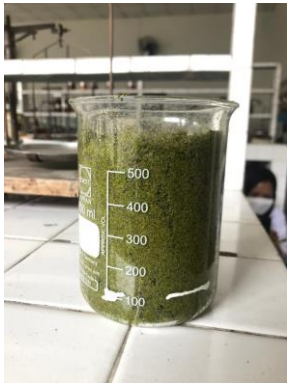
Serbuk daun bidara



Ekstrak daun bidara

**Lampiran 3. Gambar alat penelitian***Autoclave**Inkubator**Laminar air flow**Vortex**pH meter**Panci infus**Oven**Moisture Balance**Mikroskop*

#### Lampiran 4. Proses pembuatan ekstrak



Serbuk daun bidara



Daun bidara dilarutkan dengan *aquadest*



Proses infundasi



Pengecekan suhu



Penyaringan hasil infundasi



*Water bath*



Ekstrak daun bidara



Ekstrak kental daun bidara

**Lampiran 5. Uji mutu fisik**

Uji daya lekat



Uji daya sebar



Uji pH



Uji homogenitas



Uji viskositas

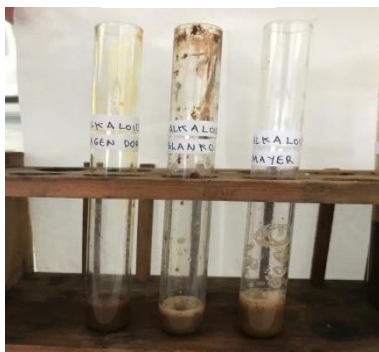
**Lampiran 6. Hasil uji kandungan kimia**



Flavonoid



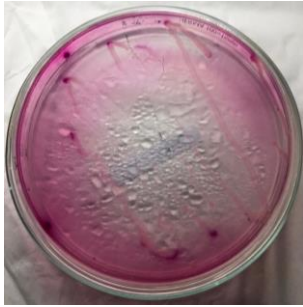
Saponin



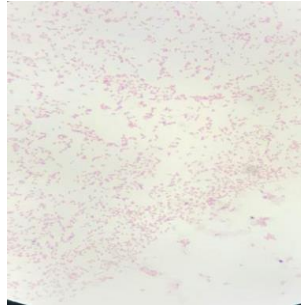
Alkaloid



Tanin

**Lampiran 7. Gambar hasil identifikasi *Escherichia coli***

Uji makroskopis *E. coli* pada media endo agar



Pewarnaan Gram



Uji katalase



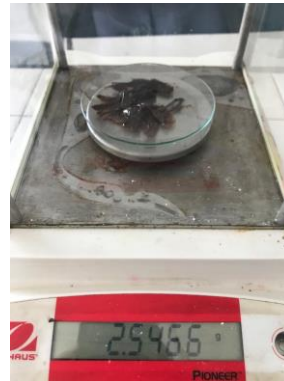
### Lampiran 8. Formula gel hand sanitizer ekstrak daun bidara



Metil paraben



TEA



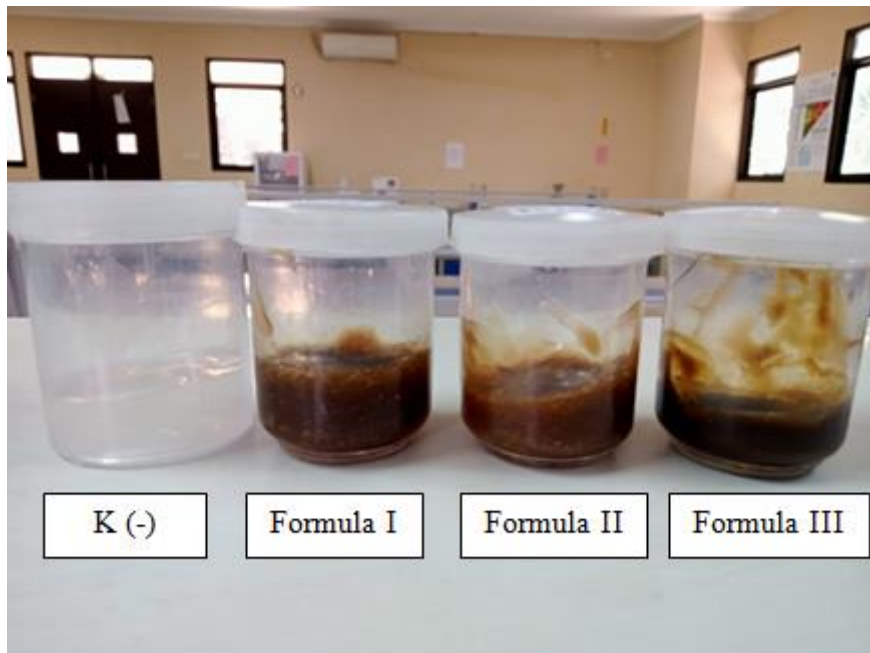
Ekstrak daun bidara

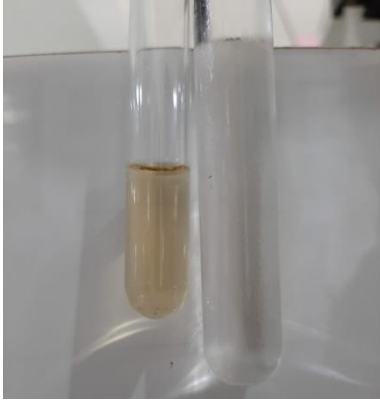


Carbopol 940



Basis

Basis dengan ekstrak  
daun bidaraSediaan gel *hand sanitizer* ekstrak daun bidara

**Lampiran 9. Gambar suspensi bakteri Escherichia coli**

Suspensi bakteri *E.coli*  
dibandingkan dengan  
standar *Mc Farland* 0,5

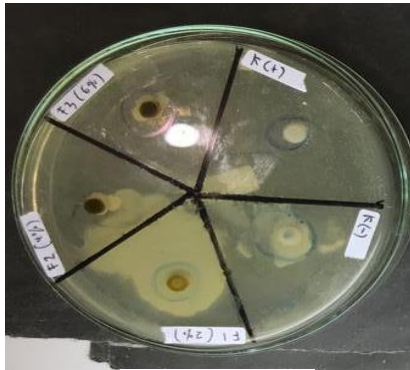


Pembiakan bakteri *E.coli*

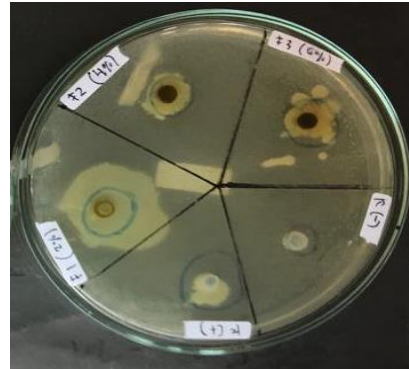


Biakan murni bakteri *E.coli*

**Lampiran 10. Hasil pengujian aktivitas antibakteri formula gel *hand sanitizer***



Replikasi 1



Replikasi 2



Replikasi 3

### Lampiran 11. Perhitungan persentase rendemen daun bidara

| Bahan awal (g) | Simplisia kering (g) | Rendemen (%) |
|----------------|----------------------|--------------|
| 23.000         | 6.721                | 29,22%       |

$$\begin{aligned}
 \text{Rendemen simplisia kering} &= \frac{\text{Bobot kering (gram)}}{\text{Bobot basah (gram)}} \times 100\% \\
 &= \frac{6.721}{23.000} \times 100\% \\
 &= 29,22\%
 \end{aligned}$$

| Simplisia kering (g) | Serbuk daun bidara (g) | Rendemen (%) |
|----------------------|------------------------|--------------|
| 6.721                | 2.202                  | 32,76%       |

$$\begin{aligned}
 \text{Rendemen serbuk} &= \frac{\text{Bobot serbuk (gram)}}{\text{Bobot kering (gram)}} \times 100\% \\
 &= \frac{2.202}{6.721} \times 100\% \\
 &= 32,76\%
 \end{aligned}$$

| Serbuk daun bidara (g) | Ekstrak kental (g) | Rendemen (%) |
|------------------------|--------------------|--------------|
| 1.100                  | 405                | 36,81%       |

$$\begin{aligned}
 \text{Rendemen ekstrak kental} &= \frac{\text{Bobot ekstrak kental (gram)}}{\text{Bobot serbuk (gram)}} \times 100\% \\
 &= \frac{405}{1.100} \times 100\% \\
 &= 36,81\%
 \end{aligned}$$

**Lampiran 12. Perhitungan penetapan susut pengeringan serbuk daun bidara menggunakan moisture balance**

| No             | Berat serbuk (gram) | Kadar air (%) |
|----------------|---------------------|---------------|
| 1              | 2,0                 | 6,5           |
| 2              | 2,0                 | 7,5           |
| 3              | 2,0                 | 7,0           |
| Rata-rata ± SD |                     | 7 ± 0,05 %    |

$$\text{Rata-rata susut pengeringan} = \frac{6,5+7,5+7}{3} = 7\%$$

**Lampiran 13. Perhitungan kadar air serbuk daun bidara menggunakan metode destilasi**

| Replikasi | Berat serbuk (g) | Volume air (mL) | Kadar air (%b/v) |
|-----------|------------------|-----------------|------------------|
| 1         | 20               | 1,5             | 7,5              |
| 2         | 20               | 1,3             | 6,5              |
| 3         | 20               | 1,6             | 8                |
|           | Rata-rata        |                 | 7,33             |

$$\text{Kadar air serbuk} = \frac{\text{volume air (mL)}}{\text{Berat serbuk}} \times 100\%$$

$$\text{Replikasi 1} = \frac{1,5 \text{ mL}}{20 \text{ g}} \times 100\% = 7,5\%$$

$$\text{Replikasi 2} = \frac{1,3 \text{ mL}}{20 \text{ g}} \times 100\% = 6,5\%$$

$$\text{Replikasi 3} = \frac{1,6 \text{ mL}}{20 \text{ g}} \times 100\% = 8\%$$

$$\text{Rata-rata kadar air serbuk} = \frac{7,5+6,5+8}{3} = 7,33\%$$

**Lampiran 14. Perhitungan kadar air ekstrak daun bidara menggunakan metode gravimetri**

| Replikasi      | Berat wadah kosong (g) | Berat ekstrak (g) | Penimbangan sebelum pemanasan (g) | Penimbangan setelah pemanasan (g) | Persentase (%) |
|----------------|------------------------|-------------------|-----------------------------------|-----------------------------------|----------------|
| 1              | 33,41                  | 10,00             | 43,60                             | 43,23                             | 4,09%          |
| 2              | 38,32                  | 10,00             | 48,50                             | 48,05                             | 4,42%          |
| 3              | 39,95                  | 10,00             | 50,16                             | 49,79                             | 3,52%          |
| Rata-rata ± SD |                        |                   | 38,65 ± 3,04                      | 38,62 ± 3,05                      |                |

**Lampiran 15. Hasil uji statistik pH Kolmogorov-smirnov, One Way ANOVA, Post Hoc dan Paired samples t-test**

a) Hasil uji pH hari ke-0 sampai hari ke-21

| Formula | Replikasi | Hari ke-0 | Hari ke-7 | Hari ke-14 | Hari ke-21 |
|---------|-----------|-----------|-----------|------------|------------|
| I       | 1         | 4,25      | 4,25      | 4,13       | 4,09       |
|         | 2         | 4,24      | 4,24      | 4,12       | 4,10       |
|         | 3         | 4,25      | 4,25      | 4,12       | 4,10       |
| II      | 1         | 5,08      | 5,07      | 4,98       | 4,93       |
|         | 2         | 5,07      | 5,06      | 4,96       | 4,93       |
|         | 3         | 5,07      | 5,07      | 4,95       | 4,92       |
| III     | 1         | 5,73      | 5,73      | 5,63       | 5,58       |
|         | 2         | 5,72      | 5,71      | 5,62       | 5,59       |
|         | 3         | 5,73      | 5,73      | 5,62       | 5,59       |
| K (-)   | 1         | 6,88      | 6,88      | 6,06       | 5,95       |
|         | 2         | 6,88      | 6,88      | 6,05       | 5,94       |
|         | 3         | 6,87      | 6,88      | 6,06       | 5,94       |
| K (+)   | 1         | 7,54      | 7,54      | 7,44       | 7,15       |
|         | 2         | 7,54      | 7,54      | 7,45       | 7,15       |
|         | 3         | 7,54      | 7,54      | 7,45       | 7,16       |

b) Rata-rata uji pH

| Formula     | Nilai pH ± SD |             |             |             |
|-------------|---------------|-------------|-------------|-------------|
|             | Hari ke-0     | Hari ke-7   | Hari ke-14  | Hari ke-21  |
| Formula I   | 4,25 ± 0,01   | 4,25 ± 0,01 | 4,12 ± 0,01 | 4,10 ± 0,01 |
| Formula II  | 5,07 ± 0,01   | 5,07 ± 0,01 | 4,96 ± 0,02 | 4,93 ± 0,01 |
| Formula III | 5,73 ± 0,01   | 5,73 ± 0,01 | 5,62 ± 0,01 | 5,59 ± 0,01 |
| Kontrol (-) | 6,88 ± 0,01   | 6,88 ± 0    | 6,88 ± 0,01 | 5,94 ± 0,01 |
| Kontrol (+) | 7,54 ± 0      | 7,54 ± 0    | 7,45 ± 0,01 | 7,15 ± 0,01 |

## NPar Tests

### Descriptive Statistics

|              | N  | Mean   | Std. Deviation | Minimum | Maximum |
|--------------|----|--------|----------------|---------|---------|
| pH           | 20 | 5,7430 | 1,17176        | 4,10    | 7,54    |
| Kelompok uji | 20 | 3,0000 | 1,45095        | 1,00    | 5,00    |

### One-Sample Kolmogorov-Smirnov Test

|                                  |                          | pH                  | Kelompok uji        |
|----------------------------------|--------------------------|---------------------|---------------------|
| N                                |                          | 20                  | 20                  |
| Normal Parameters <sup>a,b</sup> | Mean                     | 5,7430              | 3,0000              |
|                                  | Std. Deviation           | 1,17176             | 1,45095             |
|                                  | Most Extreme Differences |                     |                     |
|                                  | Absolute                 | ,134                | ,155                |
|                                  | Positive                 | ,117                | ,155                |
|                                  | Negative                 | -,134               | -,155               |
| Test Statistic                   |                          | ,134                | ,155                |
| Asymp. Sig. (2-tailed)           |                          | ,200 <sup>c,d</sup> | ,200 <sup>c,d</sup> |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

## Oneway

### Descriptives

pH

|       | N  | Mean   | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|-------|----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|       |    |        |                |            | Lower Bound                      | Upper Bound |         |         |
| FI    | 4  | 4,1800 | ,08124         | ,04062     | 4,0507                           | 4,3093      | 4,10    | 4,25    |
| FII   | 4  | 5,0075 | ,07320         | ,03660     | 4,8910                           | 5,1240      | 4,93    | 5,07    |
| FIII  | 4  | 5,6675 | ,07320         | ,03660     | 5,5510                           | 5,7840      | 5,59    | 5,73    |
| K (-) | 4  | 6,4400 | ,51042         | ,25521     | 5,6278                           | 7,2522      | 5,94    | 6,88    |
| K (+) | 4  | 7,4200 | ,18493         | ,09247     | 7,1257                           | 7,7143      | 7,15    | 7,54    |
| Total | 20 | 5,7430 | 1,17176        | ,26201     | 5,1946                           | 6,2914      | 4,10    | 7,54    |

### Test of Homogeneity of Variances

pH

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 41,825           | 4   | 15  | ,000 |

### ANOVA

pH

|                | Sum of Squares | df | Mean Square | F       | Sig. |
|----------------|----------------|----|-------------|---------|------|
| Between Groups | 25,151         | 4  | 6,288       | 100,749 | ,000 |
| Within Groups  | ,936           | 15 | ,062        |         |      |
| Total          | 26,087         | 19 |             |         |      |



## Post Hoc Tests

### Multiple Comparisons

Dependent Variable: pH  
Tukey HSD

| (I) Kelompok uji | (J) Kelompok uji | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|------------------|------------------|-----------------------|------------|------|-------------------------|-------------|
|                  |                  |                       |            |      | Lower Bound             | Upper Bound |
| FI               | FII              | -,82750*              | ,17665     | ,002 | -1,3730                 | -,2820      |
|                  | FIII             | -1,48750*             | ,17665     | ,000 | -2,0330                 | -,9420      |
|                  | K (-)            | -2,26000*             | ,17665     | ,000 | -2,8055                 | -1,7145     |
|                  | K (+)            | -3,24000*             | ,17665     | ,000 | -3,7855                 | -2,6945     |
| FII              | FI               | ,82750*               | ,17665     | ,002 | ,2820                   | 1,3730      |
|                  | FIII             | -,66000*              | ,17665     | ,015 | -1,2055                 | -,1145      |
|                  | K (-)            | -1,43250*             | ,17665     | ,000 | -1,9780                 | -,8870      |
|                  | K (+)            | -2,41250*             | ,17665     | ,000 | -2,9580                 | -1,8670     |
| FIII             | FI               | 1,48750*              | ,17665     | ,000 | ,9420                   | 2,0330      |
|                  | FII              | ,66000*               | ,17665     | ,015 | ,1145                   | 1,2055      |
|                  | K (-)            | -,77250*              | ,17665     | ,004 | -1,3180                 | -,2270      |
|                  | K (+)            | -1,75250*             | ,17665     | ,000 | -2,2980                 | -1,2070     |
| K (-)            | FI               | 2,26000*              | ,17665     | ,000 | 1,7145                  | 2,8055      |
|                  | FII              | 1,43250*              | ,17665     | ,000 | ,8870                   | 1,9780      |
|                  | FIII             | ,77250*               | ,17665     | ,004 | ,2270                   | 1,3180      |
|                  | K (+)            | -,98000*              | ,17665     | ,000 | -1,5255                 | -,4345      |
| K (+)            | FI               | 3,24000*              | ,17665     | ,000 | 2,6945                  | 3,7855      |
|                  | FII              | 2,41250*              | ,17665     | ,000 | 1,8670                  | 2,9580      |
|                  | FIII             | 1,75250*              | ,17665     | ,000 | 1,2070                  | 2,2980      |
|                  | K (-)            | ,98000*               | ,17665     | ,000 | ,4345                   | 1,5255      |

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

pH

Tukey HSD<sup>a</sup>

| Kelompok uji | N | Subset for alpha = 0.05 |        |        |        |        |
|--------------|---|-------------------------|--------|--------|--------|--------|
|              |   | 1                       | 2      | 3      | 4      | 5      |
| FI           | 4 | 4,1800                  |        |        |        |        |
| FII          | 4 |                         | 5,0075 |        |        |        |
| FIII         | 4 |                         |        | 5,6675 |        |        |
| K (-)        | 4 |                         |        |        | 6,4400 |        |
| K (+)        | 4 |                         |        |        |        | 7,4200 |
| Sig.         |   | 1,000                   | 1,000  | 1,000  | 1,000  | 1,000  |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4,000.

## T-Test

### Paired Samples Statistics

|                           | Mean   | N | Std. Deviation | Std. Error Mean |
|---------------------------|--------|---|----------------|-----------------|
| Pair 1 pH FI hari ke-0    | 4,1800 | 4 | ,08124         | ,04062          |
| pH FI hari ke-21          | 2,5000 | 4 | 1,29099        | ,64550          |
| Pair 2 pH FII hari ke-0   | 5,0075 | 4 | ,07320         | ,03660          |
| pH FII hari ke-21         | 2,5000 | 4 | 1,29099        | ,64550          |
| Pair 3 pH FIII hari ke-0  | 5,6675 | 4 | ,07320         | ,03660          |
| pH FIII hari ke-21        | 2,5000 | 4 | 1,29099        | ,64550          |
| Pair 4 pH K (-) hari ke-0 | 6,4400 | 4 | ,51042         | ,25521          |
| pH K (-) hari ke-21       | 2,5000 | 4 | 1,29099        | ,64550          |
| Pair 5 pH K (+) hari ke-0 | 7,4200 | 4 | ,18493         | ,09247          |
| pH K (+) hari ke-21       | 2,5000 | 4 | 1,29099        | ,64550          |

### Paired Samples Correlations

|   | N | Correlation | Sig. |
|---|---|-------------|------|
| Pair 1 pH FI hari ke-0 & pH FI hari ke-21       | 4 | -,922       | ,078 |
| Pair 2 pH FII hari ke-0 & pH FII hari ke-21     | 4 | -,935       | ,065 |
| Pair 3 pH FIII hari ke-0 & pH FIII hari ke-21   | 4 | -,935       | ,065 |
| Pair 4 pH K (-) hari ke-0 & pH K (-) hari ke-21 | 4 | -,921       | ,079 |
| Pair 5 pH K (+) hari ke-0 & pH K (+) hari ke-21 | 4 | -,880       | ,120 |

### 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 pH FI hari ke-0 - pH FI hari ke-21       | 1,68000            | 1,36624        | ,68312          | -,49399                                   | 3,85399 | 2,459 | 3  | ,091            |
| Pair 2 pH FII hari ke-0 - pH FII hari ke-21     | 2,50750            | 1,35967        | ,67983          | ,34397                                    | 4,67103 | 3,688 | 3  | ,035            |
| Pair 3 pH FIII hari ke-0 - pH FIII hari ke-21   | 3,16750            | 1,35967        | ,67983          | 1,00397                                   | 5,33103 | 4,659 | 3  | ,019            |
| Pair 4 pH K (-) hari ke-0 - pH K (-) hari ke-21 | 3,94000            | 1,77215        | ,88608          | 1,12011                                   | 6,75989 | 4,447 | 3  | ,021            |
| Pair 5 pH K (+) hari ke-0 - pH K (+) hari ke-21 | 4,92000            | 1,45632        | ,72816          | 2,60267                                   | 7,23733 | 6,757 | 3  | ,007            |

**Lampiran 16. Hasil uji statistik viskositas Kolmogorov-smirnov, One Way ANOVA, Post Hoc dan Paired samples t-test**

a) Hasil uji viskositas hari ke-0 sampai hari ke-21

| Formula | Replikasi | Hari ke-0 | Hari ke-7 | Hari ke-14 | Hari ke-21 |
|---------|-----------|-----------|-----------|------------|------------|
| I       | 1         | 3,2       | 3,3       | 3,1        | 3,0        |
|         | 2         | 3,3       | 3,4       | 3,1        | 3,1        |
|         | 3         | 3,2       | 3,4       | 3,0        | 3,0        |
| II      | 1         | 3,5       | 3,6       | 3,1        | 3,0        |
|         | 2         | 3,4       | 3,7       | 3,2        | 3,1        |
|         | 3         | 3,4       | 3,6       | 3,2        | 3,1        |
| III     | 1         | 3,7       | 3,8       | 3,7        | 3,4        |
|         | 2         | 3,6       | 3,7       | 3,6        | 3,5        |
|         | 3         | 3,7       | 3,8       | 3,6        | 3,4        |
| K (-)   | 1         | 3,0       | 3,2       | 3,1        | 3,0        |
|         | 2         | 3,1       | 3,3       | 3,0        | 2,9        |
|         | 3         | 3,0       | 3,2       | 3,0        | 2,9        |
| K (+)   | 1         | 3,6       | 3,6       | 3,5        | 3,4        |
|         | 2         | 3,6       | 3,6       | 3,4        | 3,3        |
|         | 3         | 3,6       | 3,6       | 3,4        | 3,3        |

b) Rata-rata uji viskositas

| Formula     | Nilai viskositas $\pm$ SD |                |                |                |
|-------------|---------------------------|----------------|----------------|----------------|
|             | Hari ke-0                 | Hari ke-7      | Hari ke-14     | Hari ke-21     |
| Formula I   | 3,2 $\pm$ 0,01            | 3,4 $\pm$ 0,01 | 3,1 $\pm$ 0,01 | 3,0 $\pm$ 0,01 |
| Formula II  | 3,4 $\pm$ 0,01            | 3,6 $\pm$ 0,01 | 3,2 $\pm$ 0,01 | 3,1 $\pm$ 0,01 |
| Formula III | 3,7 $\pm$ 0,01            | 3,8 $\pm$ 0,01 | 3,6 $\pm$ 0,01 | 3,4 $\pm$ 0,01 |
| Kontrol (-) | 3,0 $\pm$ 0,01            | 3,2 $\pm$ 0,01 | 3,0 $\pm$ 0,01 | 2,9 $\pm$ 0,01 |
| Kontrol (+) | 3,6 $\pm$ 0               | 3,6 $\pm$ 0    | 3,4 $\pm$ 0,01 | 3,3 $\pm$ 0,01 |

## NPar Tests

### Descriptive Statistics

|              | N  | Mean  | Std. Deviation | Minimum | Maximum |
|--------------|----|-------|----------------|---------|---------|
| Viskositas   | 20 | 3,325 | ,2653          | 2,9     | 3,8     |
| Kelompok uji | 20 | 3,000 | 1,4510         | 1,0     | 5,0     |

### One-Sample Kolmogorov-Smirnov Test

|                                  |                | Viskositas          | Kelompok uji        |
|----------------------------------|----------------|---------------------|---------------------|
| N                                |                | 20                  | 20                  |
| Normal Parameters <sup>a,b</sup> | Mean           | 3,325               | 3,000               |
|                                  | Std. Deviation | ,2653               | 1,4510              |
| Most Extreme Differences         | Absolute       | ,150                | ,155                |
|                                  | Positive       | ,131                | ,155                |
|                                  | Negative       | -,150               | -,155               |
| Test Statistic                   |                | ,150                | ,155                |
| Asymp. Sig. (2-tailed)           |                | ,200 <sup>c,d</sup> | ,200 <sup>c,d</sup> |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

## Oneway

### Descriptives

Viskositas

|       | N  | Mean  | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|-------|----|-------|----------------|------------|----------------------------------|-------------|---------|---------|
|       |    |       |                |            | Lower Bound                      | Upper Bound |         |         |
| FI    | 4  | 3,175 | ,1708          | ,0854      | 2,903                            | 3,447       | 3,0     | 3,4     |
| FII   | 4  | 3,325 | ,2217          | ,1109      | 2,972                            | 3,678       | 3,1     | 3,6     |
| FIII  | 4  | 3,625 | ,1708          | ,0854      | 3,353                            | 3,897       | 3,4     | 3,8     |
| K (-) | 4  | 3,025 | ,1258          | ,0629      | 2,825                            | 3,225       | 2,9     | 3,2     |
| K (+) | 4  | 3,475 | ,1500          | ,0750      | 3,236                            | 3,714       | 3,3     | 3,6     |
| Total | 20 | 3,325 | ,2653          | ,0593      | 3,201                            | 3,449       | 2,9     | 3,8     |

### Test of Homogeneity of Variances

Viskositas

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| ,600             | 4   | 15  | ,668 |

### ANOVA

Viskositas

|                | Sum of Squares | df | Mean Square | F     | Sig. |
|----------------|----------------|----|-------------|-------|------|
| Between Groups | ,900           | 4  | ,225        | 7,714 | ,001 |
| Within Groups  | ,437           | 15 | ,029        |       |      |
| Total          | 1,337          | 19 |             |       |      |

## Post Hoc Tests

### Multiple Comparisons

Dependent Variable: Viskositas  
Tukey HSD

| (I) Kelompok uji | (J) Kelompok uji | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|------------------|------------------|-----------------------|------------|------|-------------------------|-------------|
|                  |                  |                       |            |      | Lower Bound             | Upper Bound |
| FI               | FII              | -,1500                | ,1208      | ,728 | -,523                   | ,223        |
|                  | FIII             | -,4500*               | ,1208      | ,015 | -,823                   | -,077       |
|                  | K (-)            | ,1500                 | ,1208      | ,728 | -,223                   | ,523        |
|                  | K (+)            | -,3000                | ,1208      | ,147 | -,673                   | ,073        |
| FII              | FI               | ,1500                 | ,1208      | ,728 | -,223                   | ,523        |
|                  | FIII             | -,3000                | ,1208      | ,147 | -,673                   | ,073        |
|                  | K (-)            | ,3000                 | ,1208      | ,147 | -,073                   | ,673        |
|                  | K (+)            | -,1500                | ,1208      | ,728 | -,523                   | ,223        |
| FIII             | FI               | ,4500*                | ,1208      | ,015 | ,077                    | ,823        |
|                  | FII              | ,3000                 | ,1208      | ,147 | -,073                   | ,673        |
|                  | K (-)            | ,6000*                | ,1208      | ,001 | ,227                    | ,973        |
|                  | K (+)            | ,1500                 | ,1208      | ,728 | -,223                   | ,523        |
| K (-)            | FI               | -,1500                | ,1208      | ,728 | -,523                   | ,223        |
|                  | FII              | -,3000                | ,1208      | ,147 | -,673                   | ,073        |
|                  | FIII             | -,6000*               | ,1208      | ,001 | -,973                   | -,227       |
|                  | K (+)            | -,4500*               | ,1208      | ,015 | -,823                   | -,077       |
| K (+)            | FI               | ,3000                 | ,1208      | ,147 | -,073                   | ,673        |
|                  | FII              | ,1500                 | ,1208      | ,728 | -,223                   | ,523        |
|                  | FIII             | -,1500                | ,1208      | ,728 | -,523                   | ,223        |
|                  | K (-)            | ,4500*                | ,1208      | ,015 | ,077                    | ,823        |

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

### Viskositas

Tukey HSD<sup>a</sup>

| Kelompok uji | N | Subset for alpha = 0.05 |       |       |
|--------------|---|-------------------------|-------|-------|
|              |   | 1                       | 2     | 3     |
| K (-)        | 4 | 3,025                   |       |       |
| FI           | 4 | 3,175                   | 3,175 |       |
| FII          | 4 | 3,325                   | 3,325 | 3,325 |
| K (+)        | 4 |                         | 3,475 | 3,475 |
| FIII         | 4 |                         |       | 3,625 |
| Sig.         |   | ,147                    | ,147  | ,147  |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4,000.

## T-Test

**Paired Samples Statistics**

|                                   | Mean  | N | Std. Deviation | Std. Error Mean |
|-----------------------------------|-------|---|----------------|-----------------|
| Pair 1 Viskositas FI hari ke-0    | 3,175 | 4 | ,1708          | ,0854           |
| Viskositas FI hari ke-21          | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 2 Viskositas FII hari ke-0   | 3,325 | 4 | ,2217          | ,1109           |
| Viskositas FII hari ke-21         | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 3 Viskositas FIII hari ke-0  | 3,625 | 4 | ,1708          | ,0854           |
| Viskositas FIII hari ke-21        | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 4 Viskositas K (-) hari ke-0 | 3,025 | 4 | ,1258          | ,0629           |
| Viskositas K (-) hari ke-21       | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 5 Viskositas K (+) hari ke-0 | 3,475 | 4 | ,1500          | ,0750           |
| Viskositas K (+) hari ke-21       | 2,500 | 4 | 1,2910         | ,6455           |

**Paired Samples Correlations**

|   | N | Correlation | Sig. |
|---|---|-------------|------|
| Pair 1 Viskositas FI hari ke-0 & Viskositas FI hari ke-21       | 4 | -,680       | ,320 |
| Pair 2 Viskositas FII hari ke-0 & Viskositas FII hari ke-21     | 4 | -,757       | ,243 |
| Pair 3 Viskositas FIII hari ke-0 & Viskositas FIII hari ke-21   | 4 | -,832       | ,168 |
| Pair 4 Viskositas K (-) hari ke-0 & Viskositas K (-) hari ke-21 | 4 | -,513       | ,487 |
| Pair 5 Viskositas K (+) hari ke-0 & Viskositas K (+) hari ke-21 | 4 | -,947       | ,053 |

**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 Viskositas FI hari ke-0 - Viskositas FI hari ke-21       | ,6750              | 1,4127         | ,7064           | -1,5730                                   | 2,9230 | ,956  | 3  | ,410            |
| Pair 2 Viskositas FII hari ke-0 - Viskositas FII hari ke-21     | ,8250              | 1,4660         | ,7330           | -1,5077                                   | 3,1577 | 1,126 | 3  | ,342            |
| Pair 3 Viskositas FIII hari ke-0 - Viskositas FIII hari ke-21   | 1,1250             | 1,4361         | ,7181           | -1,1602                                   | 3,4102 | 1,567 | 3  | ,215            |
| Pair 4 Viskositas K (-) hari ke-0 - Viskositas K (-) hari ke-21 | ,5250              | 1,3598         | ,6799           | -1,6388                                   | 2,6888 | ,772  | 3  | ,496            |
| Pair 5 Viskositas K (+) hari ke-0 - Viskositas K (+) hari ke-21 | ,9750              | 1,4338         | ,7169           | -1,3065                                   | 3,2565 | 1,360 | 3  | ,267            |

**Lampiran 17. Hasil uji statistik daya sebar Kolmogorov-smirnov, One Way ANOVA, Post Hoc dan Paired samples t-test**

Daya sebar hari ke-0

| Formula | Replikasi | Beban    | Daya sebar (cm) |     |     |     | Rata-rata |
|---------|-----------|----------|-----------------|-----|-----|-----|-----------|
| I       | 1         | tb       | 5,2             | 5,2 | 5,3 | 5,4 | 5,3       |
|         |           | 50 gram  | 5,9             | 6,1 | 6,0 | 5,8 | 6,0       |
|         |           | 100 gram | 6,3             | 6,3 | 6,3 | 6,4 | 6,3       |
|         |           | 150 gram | 7,0             | 6,8 | 6,9 | 6,9 | 6,9       |
|         | 2         | tb       | 5,3             | 5,2 | 5,4 | 5,3 | 5,3       |
|         |           | 50 gram  | 5,8             | 5,8 | 5,7 | 5,7 | 5,8       |
|         |           | 100 gram | 6,2             | 6,4 | 6,3 | 6,4 | 6,3       |
|         |           | 150 gram | 6,9             | 7,0 | 7,0 | 6,9 | 7,0       |
|         | 3         | tb       | 5,3             | 5,2 | 5,2 | 5,2 | 5,2       |
|         |           | 50 gram  | 5,9             | 5,8 | 5,8 | 5,7 | 5,8       |
|         |           | 100 gram | 6,3             | 6,2 | 6,4 | 6,3 | 6,3       |
|         |           | 150 gram | 6,9             | 6,9 | 6,9 | 7,0 | 6,9       |
| II      | 1         | tb       | 5,4             | 5,4 | 5,3 | 5,4 | 5,4       |
|         |           | 50 gram  | 6,2             | 6,1 | 6,2 | 6,3 | 6,2       |
|         |           | 100 gram | 6,7             | 6,5 | 6,7 | 6,7 | 6,7       |
|         |           | 150 gram | 7,0             | 6,9 | 7,1 | 7,0 | 7,0       |
|         | 2         | tb       | 5,3             | 5,2 | 5,4 | 5,3 | 5,3       |
|         |           | 50 gram  | 6,4             | 6,2 | 6,2 | 6,3 | 6,3       |
|         |           | 100 gram | 6,6             | 6,5 | 6,5 | 6,6 | 6,6       |
|         |           | 150 gram | 7,1             | 7,1 | 7,0 | 6,9 | 7,0       |
|         | 3         | tb       | 5,3             | 5,2 | 5,3 | 5,2 | 5,3       |
|         |           | 50 gram  | 6,3             | 6,3 | 6,4 | 6,4 | 6,4       |
|         |           | 100 gram | 6,7             | 6,6 | 6,6 | 6,8 | 6,7       |
|         |           | 150 gram | 6,9             | 6,9 | 6,9 | 7,2 | 7,0       |
| III     | 1         | tb       | 5,4             | 5,3 | 5,2 | 5,4 | 5,3       |
|         |           | 50 gram  | 6,5             | 6,4 | 6,4 | 6,5 | 6,5       |
|         |           | 100 gram | 6,9             | 6,7 | 6,7 | 6,8 | 6,8       |
|         |           | 150 gram | 7,2             | 6,9 | 6,9 | 7,1 | 7,0       |
|         | 2         | tb       | 5,3             | 5,4 | 5,3 | 5,3 | 5,3       |
|         |           | 50 gram  | 6,4             | 6,5 | 6,5 | 6,6 | 6,5       |
|         |           | 100 gram | 6,8             | 6,7 | 6,6 | 6,8 | 6,7       |
|         |           | 150 gram | 7,1             | 6,9 | 7,0 | 7,0 | 7,0       |
|         | 3         | tb       | 5,4             | 5,2 | 5,2 | 5,3 | 5,3       |
|         |           | 50 gram  | 6,4             | 6,1 | 6,2 | 6,3 | 6,3       |

|       |   |          |     |     |     |     |     |
|-------|---|----------|-----|-----|-----|-----|-----|
|       |   | 100 gram | 6,8 | 6,5 | 6,7 | 6,8 | 6,7 |
|       |   | 150 gram | 7,2 | 6,9 | 7,0 | 7,1 | 7,1 |
| K (-) | 1 | tb       | 5,6 | 5,7 | 5,5 | 5,5 | 5,8 |
|       |   | 50 gram  | 6,2 | 6,1 | 6,3 | 6,2 | 6,2 |
|       |   | 100 gram | 6,7 | 6,5 | 6,5 | 6,6 | 6,6 |
|       |   | 150 gram | 7,3 | 6,8 | 6,7 | 7,0 | 6,9 |
|       | 2 | tb       | 5,5 | 5,4 | 5,5 | 5,3 | 5,4 |
|       |   | 50 gram  | 6,1 | 5,9 | 5,9 | 6,0 | 6,0 |
|       |   | 100 gram | 6,4 | 6,2 | 6,3 | 6,4 | 6,3 |
|       |   | 150 gram | 6,9 | 6,9 | 6,8 | 6,8 | 6,9 |
|       | 3 | tb       | 5,4 | 5,3 | 5,3 | 5,2 | 5,3 |
|       |   | 50 gram  | 6,3 | 6,2 | 6,3 | 6,4 | 6,3 |
|       |   | 100 gram | 6,6 | 6,6 | 6,7 | 6,5 | 6,6 |
|       |   | 150 gram | 6,9 | 7,1 | 7,2 | 7,0 | 7,1 |
| K (+) | 1 | tb       | 6,0 | 6,1 | 6,2 | 6,1 | 6,1 |
|       |   | 50 gram  | 6,5 | 6,4 | 6,4 | 6,6 | 6,5 |
|       |   | 100 gram | 6,8 | 6,7 | 6,8 | 6,9 | 6,8 |
|       |   | 150 gram | 7,1 | 7,0 | 7,1 | 7,2 | 7,1 |
|       | 2 | tb       | 5,9 | 5,8 | 5,8 | 5,9 | 5,9 |
|       |   | 50 gram  | 6,6 | 6,4 | 6,5 | 6,6 | 6,5 |
|       |   | 100 gram | 6,9 | 6,7 | 6,8 | 6,9 | 6,8 |
|       |   | 150 gram | 7,3 | 6,9 | 7,0 | 7,1 | 7,0 |
|       | 3 | tb       | 6,0 | 6,1 | 5,9 | 6,2 | 6,1 |
|       |   | 50 gram  | 6,4 | 6,3 | 6,3 | 6,5 | 6,4 |
|       |   | 100 gram | 6,7 | 6,8 | 6,7 | 6,9 | 6,8 |
|       |   | 150 gram | 6,9 | 7,1 | 7,0 | 7,2 | 7,0 |

Daya sebar hari ke-7

| Formula | Replikasi | Beban    | Daya sebar (cm) |     |     |     | Rata-rata |
|---------|-----------|----------|-----------------|-----|-----|-----|-----------|
| I       | 1         | tb       | 5,4             | 5,4 | 5,5 | 5,6 | 5,5       |
|         |           | 50 gram  | 5,9             | 6,2 | 6,0 | 6,2 | 6,1       |
|         |           | 100 gram | 6,5             | 6,6 | 6,5 | 6,7 | 6,6       |
|         |           | 150 gram | 7,0             | 6,9 | 6,9 | 7,0 | 6,9       |
|         | 2         | tb       | 5,3             | 5,5 | 5,4 | 5,6 | 5,5       |
|         |           | 50 gram  | 6,0             | 6,2 | 6,1 | 6,0 | 6,1       |
|         |           | 100 gram | 6,5             | 6,4 | 6,6 | 6,4 | 6,5       |
|         |           | 150 gram | 6,9             | 6,8 | 7,1 | 6,8 | 6,9       |
|         | 3         | tb       | 5,5             | 5,6 | 5,5 | 5,4 | 5,5       |
|         |           | 50 gram  | 6,4             | 6,5 | 6,4 | 6,3 | 6,4       |



|       |   |          |     |     |     |     |     |
|-------|---|----------|-----|-----|-----|-----|-----|
|       |   | 100 gram | 6,7 | 6,8 | 6,6 | 6,7 | 6,7 |
|       |   | 150 gram | 7,1 | 7,0 | 6,9 | 7,1 | 7,0 |
| II    | 1 | tb       | 5,6 | 5,5 | 5,7 | 5,6 | 5,6 |
|       |   | 50 gram  | 6,5 | 6,4 | 6,6 | 6,7 | 6,6 |
|       |   | 100 gram | 6,8 | 6,7 | 6,9 | 6,9 | 6,8 |
|       |   | 150 gram | 7,1 | 7,0 | 7,3 | 7,2 | 7,1 |
|       | 2 | tb       | 5,5 | 5,4 | 5,6 | 5,5 | 5,5 |
|       |   | 50 gram  | 6,3 | 6,3 | 6,5 | 6,4 | 6,4 |
|       |   | 100 gram | 6,7 | 6,7 | 6,8 | 6,6 | 6,7 |
|       |   | 150 gram | 6,9 | 7,1 | 7,0 | 6,8 | 7,0 |
|       | 3 | tb       | 5,6 | 5,5 | 5,4 | 5,6 | 5,5 |
|       |   | 50 gram  | 6,1 | 6,2 | 6,0 | 6,1 | 6,1 |
|       |   | 100 gram | 6,4 | 6,6 | 6,4 | 6,5 | 6,5 |
|       |   | 150 gram | 6,8 | 6,9 | 6,8 | 6,8 | 6,8 |
| III   | 1 | tb       | 5,6 | 5,7 | 5,6 | 5,5 | 5,6 |
|       |   | 50 gram  | 6,1 | 6,2 | 6,1 | 6,3 | 6,2 |
|       |   | 100 gram | 6,6 | 6,5 | 6,5 | 6,7 | 6,6 |
|       |   | 150 gram | 6,9 | 7,1 | 7,0 | 7,1 | 7,0 |
|       | 2 | tb       | 5,5 | 5,4 | 5,7 | 5,6 | 5,6 |
|       |   | 50 gram  | 6,2 | 6,1 | 6,3 | 6,2 | 6,2 |
|       |   | 100 gram | 6,8 | 6,5 | 6,8 | 6,7 | 6,7 |
|       |   | 150 gram | 7,3 | 6,9 | 7,0 | 6,8 | 7,0 |
|       | 3 | tb       | 5,4 | 5,5 | 5,6 | 5,7 | 5,6 |
|       |   | 50 gram  | 5,9 | 6,1 | 6,3 | 6,2 | 6,1 |
|       |   | 100 gram | 6,3 | 6,5 | 6,6 | 6,5 | 6,5 |
|       |   | 150 gram | 6,8 | 6,9 | 7,0 | 7,1 | 6,9 |
| K (-) | 1 | tb       | 5,7 | 5,7 | 5,6 | 5,8 | 5,7 |
|       |   | 50 gram  | 6,5 | 6,6 | 6,3 | 6,4 | 6,5 |
|       |   | 100 gram | 6,8 | 6,9 | 6,6 | 6,6 | 6,8 |
|       |   | 150 gram | 7,3 | 7,2 | 6,9 | 7,0 | 7,1 |
|       | 2 | tb       | 5,8 | 5,6 | 5,6 | 5,7 | 5,7 |
|       |   | 50 gram  | 6,3 | 6,2 | 6,0 | 6,4 | 6,2 |
|       |   | 100 gram | 6,6 | 6,5 | 6,4 | 6,6 | 6,5 |
|       |   | 150 gram | 6,9 | 7,1 | 6,8 | 7,0 | 6,9 |
|       | 3 | tb       | 5,8 | 5,7 | 5,7 | 5,6 | 5,7 |
|       |   | 50 gram  | 6,4 | 6,2 | 6,3 | 6,3 | 6,3 |
|       |   | 100 gram | 6,7 | 6,7 | 6,5 | 6,6 | 6,6 |
|       |   | 150 gram | 7,2 | 7,0 | 6,8 | 6,9 | 6,9 |
| K (+) | 1 | tb       | 6,0 | 6,3 | 6,2 | 6,1 | 6,2 |

|  |   |          |     |     |     |     |     |
|--|---|----------|-----|-----|-----|-----|-----|
|  |   | 50 gram  | 6,5 | 6,4 | 6,4 | 6,6 | 6,5 |
|  |   | 100 gram | 6,8 | 6,9 | 6,8 | 6,9 | 6,9 |
|  |   | 150 gram | 7,1 | 7,0 | 7,1 | 7,2 | 7,1 |
|  | 2 | tb       | 6,0 | 5,8 | 5,8 | 6,0 | 5,9 |
|  |   | 50 gram  | 6,6 | 6,4 | 6,5 | 6,6 | 6,5 |
|  |   | 100 gram | 6,8 | 6,7 | 6,8 | 6,9 | 6,9 |
|  |   | 150 gram | 7,3 | 6,9 | 7,0 | 7,1 | 7,0 |
|  | 3 | tb       | 6,0 | 6,1 | 5,9 | 6,2 | 6,1 |
|  |   | 50 gram  | 6,4 | 6,3 | 6,3 | 6,5 | 6,4 |
|  |   | 100 gram | 6,7 | 6,8 | 6,7 | 6,9 | 6,8 |
|  |   | 150 gram | 6,9 | 7,1 | 7,0 | 7,2 | 7,0 |

Daya sebar hari ke-14

| Formula | Replikasi | Beban    | Daya sebar (cm) |     |     |     | Rata-rata |
|---------|-----------|----------|-----------------|-----|-----|-----|-----------|
| I       | 1         | tb       | 5,5             | 5,6 | 5,5 | 5,7 | 5,6       |
|         |           | 50 gram  | 5,9             | 6,2 | 6,0 | 6,2 | 6,1       |
|         |           | 100 gram | 6,4             | 6,5 | 6,5 | 6,7 | 6,6       |
|         |           | 150 gram | 7,0             | 6,9 | 6,9 | 7,0 | 6,9       |
|         | 2         | tb       | 5,3             | 5,5 | 5,4 | 5,6 | 5,5       |
|         |           | 50 gram  | 6,0             | 6,2 | 6,1 | 6,0 | 6,1       |
|         |           | 100 gram | 6,6             | 6,5 | 6,6 | 6,5 | 6,6       |
|         |           | 150 gram | 6,9             | 6,8 | 7,1 | 6,8 | 6,9       |
|         | 3         | tb       | 5,7             | 5,6 | 5,5 | 5,5 | 5,6       |
|         |           | 50 gram  | 6,4             | 6,2 | 6,3 | 6,3 | 6,3       |
|         |           | 100 gram | 6,7             | 6,6 | 6,7 | 6,6 | 6,7       |
|         |           | 150 gram | 7,1             | 7,0 | 6,9 | 7,1 | 7,0       |
| II      | 1         | tb       | 5,6             | 5,5 | 5,7 | 5,6 | 5,6       |
|         |           | 50 gram  | 6,5             | 6,4 | 6,6 | 6,7 | 6,6       |
|         |           | 100 gram | 6,8             | 6,7 | 6,9 | 6,9 | 6,8       |
|         |           | 150 gram | 7,1             | 7,0 | 7,3 | 7,2 | 7,1       |
|         | 2         | tb       | 5,5             | 5,5 | 5,7 | 5,5 | 5,6       |
|         |           | 50 gram  | 6,3             | 6,3 | 6,5 | 6,4 | 6,4       |
|         |           | 100 gram | 6,7             | 6,7 | 6,8 | 6,6 | 6,7       |
|         |           | 150 gram | 6,9             | 7,1 | 7,0 | 6,8 | 7,0       |
|         | 3         | tb       | 5,6             | 5,5 | 5,4 | 5,6 | 5,5       |
|         |           | 50 gram  | 6,1             | 6,2 | 6,0 | 6,1 | 6,1       |
|         |           | 100 gram | 6,4             | 6,6 | 6,4 | 6,5 | 6,5       |
|         |           | 150 gram | 6,8             | 6,9 | 6,9 | 7,1 | 6,9       |
| III     | 1         | tb       | 5,6             | 5,4 | 5,6 | 5,8 | 5,6       |

|       |   |          |     |     |     |     |     |
|-------|---|----------|-----|-----|-----|-----|-----|
|       |   | 50 gram  | 6,1 | 6,2 | 6,1 | 6,3 | 6,2 |
|       |   | 100 gram | 6,6 | 6,8 | 6,6 | 6,7 | 6,7 |
|       |   | 150 gram | 6,9 | 7,1 | 6,9 | 7,1 | 6,9 |
|       | 2 | tb       | 5,5 | 5,4 | 5,7 | 5,6 | 5,6 |
|       |   | 50 gram  | 6,2 | 6,1 | 6,3 | 6,2 | 6,2 |
|       |   | 100 gram | 6,8 | 6,5 | 6,8 | 6,7 | 6,7 |
|       |   | 150 gram | 7,3 | 6,9 | 7,0 | 6,8 | 7,0 |
|       | 3 | tb       | 5,4 | 5,5 | 5,6 | 5,7 | 5,6 |
|       |   | 50 gram  | 5,9 | 6,1 | 6,3 | 6,2 | 6,1 |
|       |   | 100 gram | 6,3 | 6,5 | 6,6 | 6,5 | 6,5 |
|       |   | 150 gram | 6,8 | 6,9 | 7,0 | 7,1 | 6,9 |
| K (-) | 1 | tb       | 5,7 | 5,8 | 5,6 | 5,8 | 5,8 |
|       |   | 50 gram  | 6,2 | 6,3 | 6,3 | 6,4 | 6,3 |
|       |   | 100 gram | 6,8 | 6,9 | 6,6 | 6,6 | 6,8 |
|       |   | 150 gram | 7,3 | 7,2 | 6,9 | 7,0 | 7,1 |
|       | 2 | tb       | 5,8 | 5,5 | 5,6 | 5,8 | 5,7 |
|       |   | 50 gram  | 6,3 | 6,2 | 6,0 | 6,4 | 6,2 |
|       |   | 100 gram | 6,6 | 6,7 | 6,4 | 6,8 | 6,6 |
|       |   | 150 gram | 6,9 | 7,1 | 6,8 | 7,0 | 6,9 |
|       | 3 | tb       | 5,8 | 5,7 | 5,7 | 5,8 | 5,8 |
|       |   | 50 gram  | 6,4 | 6,2 | 6,3 | 6,3 | 6,3 |
|       |   | 100 gram | 6,7 | 6,7 | 6,8 | 6,6 | 6,7 |
|       |   | 150 gram | 7,2 | 7,0 | 7,2 | 6,9 | 7,1 |
| K (+) | 1 | tb       | 6,0 | 6,3 | 6,2 | 6,1 | 6,2 |
|       |   | 50 gram  | 6,3 | 6,5 | 6,6 | 6,3 | 6,4 |
|       |   | 100 gram | 6,8 | 6,9 | 6,8 | 6,9 | 6,9 |
|       |   | 150 gram | 7,1 | 7,0 | 7,1 | 7,2 | 7,1 |
|       | 2 | tb       | 6,0 | 6,0 | 5,8 | 6,0 | 5,9 |
|       |   | 50 gram  | 6,3 | 6,4 | 6,2 | 6,3 | 6,3 |
|       |   | 100 gram | 6,6 | 6,6 | 6,7 | 6,7 | 6,7 |
|       |   | 150 gram | 7,0 | 6,9 | 7,0 | 6,9 | 6,9 |
|       | 3 | tb       | 6,0 | 6,1 | 5,9 | 6,2 | 6,1 |
|       |   | 50 gram  | 6,2 | 6,4 | 6,2 | 6,5 | 6,3 |
|       |   | 100 gram | 6,5 | 6,7 | 6,7 | 6,8 | 6,7 |
|       |   | 150 gram | 6,9 | 6,9 | 6,9 | 7,1 | 6,9 |

Daya sebar hari ke-21

| Formula | Replikasi | Beban   | Daya sebar (cm) |     |     |     | Rata-rata |
|---------|-----------|---------|-----------------|-----|-----|-----|-----------|
| I       | 1         | tb      | 5,8             | 5,8 | 5,7 | 5,6 | 5,7       |
|         |           | 50 gram | 6,4             | 6,4 | 6,3 | 6,5 | 6,4       |

|       |   |          |     |     |     |     |     |
|-------|---|----------|-----|-----|-----|-----|-----|
|       |   | 100 gram | 6,8 | 6,7 | 6,8 | 6,9 | 6,8 |
|       |   | 150 gram | 7,3 | 7,0 | 7,0 | 7,3 | 7,1 |
|       | 2 | tb       | 5,5 | 5,5 | 5,7 | 5,6 | 5,6 |
|       |   | 50 gram  | 6,5 | 6,4 | 6,6 | 6,3 | 6,5 |
|       |   | 100 gram | 6,9 | 6,7 | 7,0 | 6,7 | 6,8 |
|       |   | 150 gram | 7,1 | 6,9 | 7,2 | 6,9 | 7,0 |
|       | 3 | tb       | 5,6 | 5,7 | 5,7 | 5,7 | 5,7 |
|       |   | 50 gram  | 6,5 | 6,6 | 6,6 | 6,7 | 6,6 |
|       |   | 100 gram | 6,7 | 6,9 | 7,0 | 7,1 | 6,9 |
|       |   | 150 gram | 6,9 | 7,3 | 7,2 | 7,3 | 7,1 |
| II    | 1 | tb       | 5,8 | 5,7 | 5,8 | 5,6 | 5,7 |
|       |   | 50 gram  | 6,5 | 6,4 | 6,5 | 6,6 | 6,5 |
|       |   | 100 gram | 6,8 | 6,8 | 6,9 | 6,8 | 6,8 |
|       |   | 150 gram | 7,0 | 7,1 | 7,2 | 6,9 | 7,1 |
|       | 2 | tb       | 5,8 | 5,8 | 5,8 | 5,7 | 5,8 |
|       |   | 50 gram  | 6,4 | 6,5 | 6,7 | 6,4 | 6,5 |
|       |   | 100 gram | 6,6 | 6,8 | 6,9 | 6,7 | 6,7 |
|       |   | 150 gram | 6,9 | 7,0 | 7,1 | 6,9 | 6,9 |
|       | 3 | tb       | 5,8 | 5,7 | 5,9 | 5,8 | 5,8 |
|       |   | 50 gram  | 6,6 | 6,5 | 6,7 | 6,5 | 6,6 |
|       |   | 100 gram | 6,9 | 6,8 | 7,0 | 6,7 | 6,9 |
|       |   | 150 gram | 7,2 | 7,0 | 7,3 | 6,8 | 7,0 |
| III   | 1 | tb       | 5,7 | 5,6 | 5,5 | 5,7 | 5,6 |
|       |   | 50 gram  | 6,1 | 6,2 | 6,3 | 6,4 | 6,3 |
|       |   | 100 gram | 6,5 | 6,7 | 6,8 | 6,2 | 6,6 |
|       |   | 150 gram | 6,8 | 6,9 | 7,0 | 6,8 | 6,9 |
|       | 2 | tb       | 5,5 | 5,5 | 5,6 | 5,4 | 5,5 |
|       |   | 50 gram  | 6,2 | 6,2 | 6,4 | 6,3 | 6,3 |
|       |   | 100 gram | 6,5 | 6,7 | 6,5 | 6,7 | 6,6 |
|       |   | 150 gram | 7,0 | 6,9 | 6,8 | 7,1 | 7,0 |
|       | 3 | tb       | 5,4 | 5,6 | 5,5 | 5,5 | 5,5 |
|       |   | 50 gram  | 6,3 | 6,4 | 6,5 | 6,2 | 6,4 |
|       |   | 100 gram | 6,7 | 6,8 | 6,5 | 6,7 | 6,7 |
|       |   | 150 gram | 7,0 | 7,1 | 6,9 | 6,9 | 7,0 |
| K (-) | 1 | tb       | 5,9 | 5,8 | 5,9 | 5,9 | 5,9 |
|       |   | 50 gram  | 6,5 | 6,6 | 6,3 | 6,4 | 6,5 |
|       |   | 100 gram | 6,8 | 6,9 | 6,6 | 6,6 | 6,8 |
|       |   | 150 gram | 7,3 | 7,2 | 6,9 | 7,0 | 7,1 |
|       | 2 | tb       | 5,8 | 5,7 | 5,9 | 5,8 | 5,8 |

|       |   |          |     |     |     |     |     |
|-------|---|----------|-----|-----|-----|-----|-----|
|       |   | 50 gram  | 6,3 | 6,2 | 6,0 | 6,4 | 6,2 |
|       |   | 100 gram | 6,6 | 6,7 | 6,8 | 6,7 | 6,7 |
|       |   | 150 gram | 6,9 | 7,1 | 7,1 | 7,0 | 7,0 |
|       | 3 | tb       | 5,9 | 5,8 | 5,9 | 5,9 | 5,9 |
|       |   | 50 gram  | 6,4 | 6,2 | 6,3 | 6,3 | 6,3 |
|       |   | 100 gram | 6,7 | 6,7 | 6,8 | 6,8 | 6,8 |
|       |   | 150 gram | 7,2 | 7,0 | 6,8 | 6,9 | 6,9 |
| K (+) | 1 | tb       | 6,2 | 6,3 | 6,2 | 6,2 | 6,2 |
|       |   | 50 gram  | 6,5 | 6,6 | 6,5 | 6,6 | 6,6 |
|       |   | 100 gram | 6,8 | 6,9 | 6,8 | 6,9 | 6,9 |
|       |   | 150 gram | 7,1 | 7,0 | 7,1 | 7,2 | 7,1 |
|       | 2 | tb       | 6,0 | 6,1 | 6,1 | 6,0 | 6,1 |
|       |   | 50 gram  | 6,6 | 6,4 | 6,5 | 6,6 | 6,5 |
|       |   | 100 gram | 6,8 | 6,7 | 6,8 | 6,9 | 6,9 |
|       |   | 150 gram | 7,3 | 6,9 | 7,0 | 7,1 | 7,0 |
|       | 3 | tb       | 6,2 | 6,1 | 6,2 | 6,2 | 6,2 |
|       |   | 50 gram  | 6,6 | 6,5 | 6,4 | 6,5 | 6,5 |
|       |   | 100 gram | 6,7 | 6,8 | 6,7 | 6,9 | 6,8 |
|       |   | 150 gram | 6,9 | 7,1 | 7,0 | 7,2 | 7,0 |

## b) Rata-rata uji daya sebar

| Formula | Beban    | Diameter daya sebar (cm) $\pm$ SD |           |            |            |
|---------|----------|-----------------------------------|-----------|------------|------------|
|         |          | Hari ke-0                         | Hari ke-7 | Hari ke-14 | Hari ke-21 |
| I       | tb       | 5,3                               | 5,5       | 5,6        | 5,7        |
|         | 50 gram  | 5,9                               | 6,2       | 6,2        | 6,5        |
|         | 100 gram | 6,3                               | 6,6       | 6,7        | 6,8        |
|         | 150 gram | 6,9                               | 6,9       | 7,0        | 7,0        |
| II      | tb       | 5,3                               | 5,5       | 5,6        | 5,8        |
|         | 50 gram  | 6,3                               | 6,4       | 6,2        | 6,5        |
|         | 100 gram | 6,7                               | 6,7       | 6,6        | 6,8        |
|         | 150 gram | 6,9                               | 7,0       | 7,0        | 7,0        |
| III     | tb       | 5,3                               | 5,6       | 5,6        | 5,5        |
|         | 50 gram  | 6,4                               | 6,4       | 6,2        | 6,3        |
|         | 100 gram | 6,7                               | 6,8       | 6,6        | 6,6        |
|         | 150 gram | 7,0                               | 7,0       | 6,9        | 7,0        |
| K (-)   | tb       | 5,5                               | 5,7       | 5,8        | 5,9        |
|         | 50 gram  | 6,2                               | 6,3       | 6,2        | 6,3        |
|         | 100 gram | 6,5                               | 6,6       | 6,7        | 6,8        |

|       |          |     |     |     |     |
|-------|----------|-----|-----|-----|-----|
|       | 150 gram | 6,9 | 7,0 | 7,0 | 7,0 |
| K (+) | tb       | 6,0 | 6,1 | 6,0 | 6,2 |
|       | 50 gram  | 6,5 | 6,5 | 6,3 | 6,5 |
|       | 100 gram | 6,8 | 6,9 | 6,7 | 6,9 |
|       | 150 gram | 7,0 | 7,0 | 6,9 | 7,0 |

| Formula     | Nilai daya sebar (cm) $\pm$ SD |           |            |            |
|-------------|--------------------------------|-----------|------------|------------|
|             | Hari ke-0                      | Hari ke-7 | Hari ke-14 | Hari ke-21 |
| Formula I   | 6,1                            | 6,3       | 6,3        | 6,5        |
| Formula II  | 6,3                            | 6,3       | 6,4        | 6,5        |
| Formula III | 6,4                            | 6,5       | 6,3        | 6,4        |
| Kontrol (-) | 6,3                            | 6,4       | 6,4        | 6,5        |
| Kontrol (+) | 6,6                            | 6,6       | 6,5        | 6,7        |

## NPar Tests

### Descriptive Statistics

|              | N  | Mean  | Std. Deviation | Minimum | Maximum |
|--------------|----|-------|----------------|---------|---------|
| Daya Sebar   | 20 | 6,420 | ,1281          | 6,2     | 6,7     |
| Kelompok uji | 20 | 3,000 | 1,4510         | 1,0     | 5,0     |

### One-Sample Kolmogorov-Smirnov Test

|                                  |                | Daya Sebar        | Kelompok uji        |
|----------------------------------|----------------|-------------------|---------------------|
| N                                |                | 20                | 20                  |
| Normal Parameters <sup>a,b</sup> | Mean           | 6,420             | 3,000               |
|                                  | Std. Deviation | ,1281             | 1,4510              |
| Most Extreme Differences         | Absolute       | ,175              | ,155                |
|                                  | Positive       | ,175              | ,155                |
|                                  | Negative       | -,134             | -,155               |
| Test Statistic                   |                | ,175              | ,155                |
| Asymp. Sig. (2-tailed)           |                | ,108 <sup>c</sup> | ,200 <sup>c,d</sup> |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

## Oneway

### Descriptives

Daya Sebar

|       | N  | Mean  | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|-------|----|-------|----------------|------------|----------------------------------|-------------|---------|---------|
|       |    |       |                |            | Lower Bound                      | Upper Bound |         |         |
| F I   | 4  | 6,400 | ,0816          | ,0408      | 6,270                            | 6,530       | 6,3     | 6,5     |
| F II  | 4  | 6,375 | ,0957          | ,0479      | 6,223                            | 6,527       | 6,3     | 6,5     |
| F III | 4  | 6,325 | ,1258          | ,0629      | 6,125                            | 6,525       | 6,2     | 6,5     |
| K (-) | 4  | 6,400 | ,0816          | ,0408      | 6,270                            | 6,530       | 6,3     | 6,5     |
| K (+) | 4  | 6,600 | ,0816          | ,0408      | 6,470                            | 6,730       | 6,5     | 6,7     |
| Total | 20 | 6,420 | ,1281          | ,0287      | 6,360                            | 6,480       | 6,2     | 6,7     |

### Test of Homogeneity of Variances

Daya Sebar

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| ,361             | 4   | 15  | ,832 |

### ANOVA

Daya Sebar

|                | Sum of Squares | df | Mean Square | F     | Sig. |
|----------------|----------------|----|-------------|-------|------|
| Between Groups | ,177           | 4  | ,044        | 4,917 | ,010 |
| Within Groups  | ,135           | 15 | ,009        |       |      |
| Total          | ,312           | 19 |             |       |      |

## Post Hoc Tests

### Multiple Comparisons

Dependent Variable: Daya Sebar  
Tukey HSD

| (I) Kelompok uji | (J) Kelompok uji | Mean Difference (I-J) | Std. Error | Sig.  | 95% Confidence Interval |             |
|------------------|------------------|-----------------------|------------|-------|-------------------------|-------------|
|                  |                  |                       |            |       | Lower Bound             | Upper Bound |
| F I              | F II             | ,0250                 | ,0671      | ,995  | -,182                   | ,232        |
|                  | F III            | ,0750                 | ,0671      | ,795  | -,132                   | ,282        |
|                  | K (-)            | ,0000                 | ,0671      | 1,000 | -,207                   | ,207        |
|                  | K (+)            | -,2000                | ,0671      | ,061  | -,407                   | ,007        |
| F II             | F I              | -,0250                | ,0671      | ,995  | -,232                   | ,182        |
|                  | F III            | ,0500                 | ,0671      | ,942  | -,157                   | ,257        |
|                  | K (-)            | -,0250                | ,0671      | ,995  | -,232                   | ,182        |
|                  | K (+)            | -,2250*               | ,0671      | ,030  | -,432                   | -,018       |
| F III            | F I              | -,0750                | ,0671      | ,795  | -,282                   | ,132        |
|                  | F II             | -,0500                | ,0671      | ,942  | -,257                   | ,157        |
|                  | K (-)            | -,0750                | ,0671      | ,795  | -,282                   | ,132        |
|                  | K (+)            | -,2750*               | ,0671      | ,007  | -,482                   | -,068       |
| K (-)            | F I              | ,0000                 | ,0671      | 1,000 | -,207                   | ,207        |
|                  | F II             | ,0250                 | ,0671      | ,995  | -,182                   | ,232        |
|                  | F III            | ,0750                 | ,0671      | ,795  | -,132                   | ,282        |
|                  | K (+)            | -,2000                | ,0671      | ,061  | -,407                   | ,007        |
| K (+)            | F I              | ,2000                 | ,0671      | ,061  | -,007                   | ,407        |
|                  | F II             | ,2250*                | ,0671      | ,030  | ,018                    | ,432        |
|                  | F III            | ,2750*                | ,0671      | ,007  | ,068                    | ,482        |
|                  | K (-)            | ,2000                 | ,0671      | ,061  | -,007                   | ,407        |

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

### Daya Sebar

Tukey HSD<sup>a</sup>

| Kelompok uji | N | Subset for alpha = 0.05 |       |
|--------------|---|-------------------------|-------|
|              |   | 1                       | 2     |
| F III        | 4 | 6,325                   |       |
| F II         | 4 | 6,375                   |       |
| F I          | 4 | 6,400                   | 6,400 |
| K (-)        | 4 | 6,400                   | 6,400 |
| K (+)        | 4 |                         | 6,600 |
| Sig.         |   | ,795                    | ,061  |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4,000.



## T-Test

Paired Samples Statistics

|        |                             | Mean  | N | Std. Deviation | Std. Error Mean |
|--------|-----------------------------|-------|---|----------------|-----------------|
| Pair 1 | Daya sebar FI hari ke-0     | 6,400 | 4 | ,0816          | ,0408           |
|        | Daya sebar FI hari ke-21    | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 2 | Daya sebar FII hari ke-0    | 6,375 | 4 | ,0957          | ,0479           |
|        | Daya sebar FI hari ke-21    | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 3 | Daya sebar FIII hari ke-0   | 6,325 | 4 | ,1258          | ,0629           |
|        | Daya sebar FIII hari ke-21  | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 4 | Daya sebar K (-) hari ke-0  | 6,400 | 4 | ,0816          | ,0408           |
|        | Daya sebar K (-) hari ke-21 | 2,500 | 4 | 1,2910         | ,6455           |
| Pair 5 | Daya sebar K (+) hari ke-0  | 6,600 | 4 | ,0816          | ,0408           |
|        | Daya sebar K (+) hari ke-21 | 2,500 | 4 | 1,2910         | ,6455           |

Paired Samples Correlations

|        |   | N | Correlation | Sig. |
|--------|---|---|-------------|------|
| Pair 1 | Daya sebar FI hari ke-0 &<br>Daya sebar FI hari ke-21       | 4 | -,316       | ,684 |
|        | Daya sebar FII hari ke-0 &<br>Daya sebar FI hari ke-21      | 4 | ,944        | ,056 |
| Pair 3 | Daya sebar FIII hari ke-0 &<br>Daya sebar FIII hari ke-21   | 4 | ,923        | ,077 |
|        | Daya sebar K (-) hari ke-0 &<br>Daya sebar K (-) hari ke-21 | 4 | ,949        | ,051 |
| Pair 5 | Daya sebar K (+) hari ke-0 &<br>Daya sebar K (+) hari ke-21 | 4 | ,316        | ,684 |

Paired Samples Test

|  | Paired Differences |                   |                    |   |        | t     | df | Sig.<br>(2-<br>tailed) |
|--|--------------------|-------------------|--------------------|---|--------|-------|----|------------------------|
|  | Mean               | Std.<br>Deviation | Std. Error<br>Mean | 95% Confidence<br>Interval of the<br>Difference |        |       |    |                        |
|  |                    |                   |                    | Lower   | Upper  |       |    |                        |
| Pair 1 Daya sebar FI hari ke-0 -<br>Daya sebar FI hari ke-21       | 3,9000             | 1,3191            | ,6595              | 1,8010  | 5,9990 | 5,913 | 3  | ,010                   |
| Pair 2 Daya sebar FII hari ke-0 -<br>Daya sebar FI hari ke-21      | 3,8750             | 1,2010            | ,6005              | 1,9639  | 5,7861 | 6,453 | 3  | ,008                   |
| Pair 3 Daya sebar FIII hari ke-0 -<br>Daya sebar FIII hari ke-21   | 3,8250             | 1,1758            | ,5879              | 1,9540  | 5,6960 | 6,506 | 3  | ,007                   |
| Pair 4 Daya sebar K (-) hari ke-0 -<br>Daya sebar K (-) hari ke-21 | 3,9000             | 1,2138            | ,6069              | 1,9686  | 5,8314 | 6,426 | 3  | ,008                   |
| Pair 5 Daya sebar K (+) hari ke-0 -<br>Daya sebar K (+) hari ke-21 | 4,1000             | 1,2675            | ,6338              | 2,0831  | 6,1169 | 6,469 | 3  | ,007                   |

**Lampiran 18. Hasil uji statistik daya lekat Kolmogorov-smirnov, One Way ANOVA, Post Hoc dan Paired samples t-test**

a) Hasil uji daya lekat hari ke-0 sampai hari ke-21

| Formula | Replikasi | Hari ke-0 | Hari ke-7 | Hari ke-14 | Hari ke-21 |
|---------|-----------|-----------|-----------|------------|------------|
| I       | 1         | 1,16      | 1,09      | 1,86       | 0,85       |
|         | 2         | 1,15      | 1,09      | 1,88       | 0,86       |
|         | 3         | 1,15      | 1,10      | 1,90       | 0,85       |
| II      | 1         | 1,54      | 1,55      | 1,36       | 1,31       |
|         | 2         | 1,57      | 1,55      | 1,35       | 1,30       |
|         | 3         | 1,55      | 1,56      | 1,35       | 1,30       |
| III     | 1         | 1,58      | 1,49      | 1,40       | 1,35       |
|         | 2         | 1,58      | 1,50      | 1,41       | 1,34       |
|         | 3         | 1,57      | 1,49      | 1,40       | 1,35       |
| K (-)   | 1         | 1,13      | 1,10      | 1,00       | 0,98       |
|         | 2         | 1,13      | 1,06      | 1,02       | 0,97       |
|         | 3         | 1,12      | 1,08      | 1,04       | 0,98       |
| K (+)   | 1         | 1,60      | 1,61      | 1,52       | 1,49       |
|         | 2         | 1,61      | 1,60      | 1,53       | 1,49       |
|         | 3         | 1,61      | 1,61      | 1,52       | 1,48       |

b) Rata-rata uji daya lekat

| Formula     | Beban (gram) | Nilai daya lekat (detik) $\pm$ SD |                 |                 |                 |
|-------------|--------------|-----------------------------------|-----------------|-----------------|-----------------|
|             |              | Hari ke-0                         | Hari ke-7       | Hari ke-14      | Hari ke-21      |
| Formula I   | 1000         | 1,15 $\pm$ 0,01                   | 1,09 $\pm$ 0,01 | 0,88 $\pm$ 0,02 | 0,85 $\pm$ 0,01 |
| Formula II  | 1000         | 1,55 $\pm$ 0,01                   | 1,55 $\pm$ 0,01 | 1,35 $\pm$ 0,01 | 1,30 $\pm$ 0,01 |
| Formula III | 1000         | 1,58 $\pm$ 0,01                   | 1,49 $\pm$ 0,01 | 1,40 $\pm$ 0,01 | 1,35 $\pm$ 0,01 |
| Kontrol (-) | 1000         | 1,13 $\pm$ 0,01                   | 1,08 $\pm$ 0,02 | 1,02 $\pm$ 0,02 | 0,98 $\pm$ 0,01 |
| Kontrol (+) | 1000         | 1,61 $\pm$ 0,01                   | 1,61 $\pm$ 0,01 | 1,52 $\pm$ 0,01 | 1,49 $\pm$ 0,01 |

## NPar Tests

### Descriptive Statistics

|              | N  | Mean   | Std. Deviation | Minimum | Maximum |
|--------------|----|--------|----------------|---------|---------|
| Daya lekat   | 20 | 1,2990 | ,25493         | ,85     | 1,61    |
| Kelompok uji | 20 | 3,0000 | 1,45095        | 1,00    | 5,00    |

### One-Sample Kolmogorov-Smirnov Test

|                                  |                | Daya lekat        | Kelompok uji        |
|----------------------------------|----------------|-------------------|---------------------|
| N                                |                | 20                | 20                  |
| Normal Parameters <sup>a,b</sup> | Mean           | 1,2990            | 3,0000              |
|                                  | Std. Deviation | ,25493            | 1,45095             |
| Most Extreme Differences         | Absolute       | ,173              | ,155                |
|                                  | Positive       | ,121              | ,155                |
|                                  | Negative       | -,173             | -,155               |
| Test Statistic                   |                | ,173              | ,155                |
| Asymp. Sig. (2-tailed)           |                | ,118 <sup>c</sup> | ,200 <sup>c,d</sup> |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

## Oneway

### Descriptives

Daya lekat

|       | N  | Mean   | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|-------|----|--------|----------------|------------|----------------------------------|-------------|---------|---------|
|       |    |        |                |            | Lower Bound                      | Upper Bound |         |         |
| FI    | 4  | ,9925  | ,14975         | ,07487     | ,7542                            | 1,2308      | ,85     | 1,15    |
| FII   | 4  | 1,4375 | ,13150         | ,06575     | 1,2283                           | 1,6467      | 1,30    | 1,55    |
| FIII  | 4  | 1,4550 | ,10149         | ,05074     | 1,2935                           | 1,6165      | 1,35    | 1,58    |
| K (-) | 4  | 1,0525 | ,06602         | ,03301     | ,9475                            | 1,1575      | ,98     | 1,13    |
| K (+) | 4  | 1,5575 | ,06185         | ,03092     | 1,4591                           | 1,6559      | 1,49    | 1,61    |
| Total | 20 | 1,2990 | ,25493         | ,05700     | 1,1797                           | 1,4183      | ,85     | 1,61    |

### Test of Homogeneity of Variances

Daya lekat

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 6,239            | 4   | 15  | ,004 |

### ANOVA

Daya lekat

|                | Sum of Squares | df | Mean Square | F      | Sig. |
|----------------|----------------|----|-------------|--------|------|
| Between Groups | 1,060          | 4  | ,265        | 22,770 | ,000 |
| Within Groups  | ,175           | 15 | ,012        |        |      |
| Total          | 1,235          | 19 |             |        |      |

## Post Hoc Tests

### Multiple Comparisons

Dependent Variable: Daya lekat  
Tukey HSD

| (I) Kelompok uji | (J) Kelompok uji | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|------------------|------------------|-----------------------|------------|------|-------------------------|-------------|
|                  |                  |                       |            |      | Lower Bound             | Upper Bound |
| FI               | FII              | -,44500*              | ,07629     | ,000 | -,6806                  | -,2094      |
|                  | FIII             | -,46250*              | ,07629     | ,000 | -,6981                  | -,2269      |
|                  | K (-)            | -,06000               | ,07629     | ,931 | -,2956                  | ,1756       |
|                  | K (+)            | -,56500*              | ,07629     | ,000 | -,8006                  | -,3294      |
| FII              | FI               | ,44500*               | ,07629     | ,000 | ,2094                   | ,6806       |
|                  | FIII             | -,01750               | ,07629     | ,999 | -,2531                  | ,2181       |
|                  | K (-)            | ,38500*               | ,07629     | ,001 | ,1494                   | ,6206       |
|                  | K (+)            | -,12000               | ,07629     | ,535 | -,3556                  | ,1156       |
| FIII             | FI               | ,46250*               | ,07629     | ,000 | ,2269                   | ,6981       |
|                  | FII              | ,01750                | ,07629     | ,999 | -,2181                  | ,2531       |
|                  | K (-)            | ,40250*               | ,07629     | ,001 | ,1669                   | ,6381       |
|                  | K (+)            | -,10250               | ,07629     | ,670 | -,3381                  | ,1331       |
| K (-)            | FI               | ,06000                | ,07629     | ,931 | -,1756                  | ,2956       |
|                  | FII              | -,38500*              | ,07629     | ,001 | -,6206                  | -,1494      |
|                  | FIII             | -,40250*              | ,07629     | ,001 | -,6381                  | -,1669      |
|                  | K (+)            | -,50500*              | ,07629     | ,000 | -,7406                  | -,2694      |
| K (+)            | FI               | ,56500*               | ,07629     | ,000 | ,3294                   | ,8006       |
|                  | FII              | ,12000                | ,07629     | ,535 | -,1156                  | ,3556       |
|                  | FIII             | ,10250                | ,07629     | ,670 | -,1331                  | ,3381       |
|                  | K (-)            | ,50500*               | ,07629     | ,000 | ,2694                   | ,7406       |

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

Daya lekat

Tukey HSD<sup>a</sup>

| Kelompok uji | N | Subset for alpha = 0.05 |        |
|--------------|---|-------------------------|--------|
|              |   | 1                       | 2      |
| FI           | 4 | ,9925                   |        |
| K (-)        | 4 | 1,0525                  |        |
| FII          | 4 |                         | 1,4375 |
| FIII         | 4 |                         | 1,4550 |
| K (+)        | 4 |                         | 1,5575 |
| Sig.         |   | ,931                    | ,535   |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 4,000.

**Lampiran 19. Hasil uji statistik daya hambat Kolmogorov-smirnov, One Way ANOVA, dan Post Hoc**

| Formula | Replikasi 1 | Replikasi 2 | Replikasi 3 | Rata-rata ± SD |
|---------|-------------|-------------|-------------|----------------|
| I       | 13          | 13          | 14          | 13,33 ± 0,57   |
| II      | 17          | 16          | 16          | 16,33 ± 0,57   |
| III     | 19          | 18          | 19          | 18,67 ± 0,57   |
| K (-)   | 9           | 9           | 8           | 8,67 ± 0,57    |
| K (+)   | 21          | 19          | 20          | 20,00 ± 1,00   |

### NPar Tests

#### Descriptive Statistics

|              | N  | Mean  | Std. Deviation | Minimum | Maximum |
|--------------|----|-------|----------------|---------|---------|
| Daya hambat  | 15 | 15,40 | 4,239          | 8       | 21      |
| Kelompok uji | 15 | 3,00  | 1,464          | 1       | 5       |

#### One-Sample Kolmogorov-Smirnov Test

|                                  |                | Daya hambat         | Kelompok uji        |
|----------------------------------|----------------|---------------------|---------------------|
| N                                |                | 15                  | 15                  |
| Normal Parameters <sup>a,b</sup> | Mean           | 15,40               | 3,00                |
|                                  | Std. Deviation | 4,239               | 1,464               |
| Most Extreme Differences         | Absolute       | ,156                | ,153                |
|                                  | Positive       | ,134                | ,153                |
|                                  | Negative       | -,156               | -,153               |
| Test Statistic                   |                | ,156                | ,153                |
| Asymp. Sig. (2-tailed)           |                | ,200 <sup>c,d</sup> | ,200 <sup>c,d</sup> |

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

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

### Oneway

#### Descriptives

Daya hambat

|       | N  | Mean  | Std. Deviation | Std. Error | 95% Confidence Interval for Mean |             | Minimum | Maximum |
|-------|----|-------|----------------|------------|----------------------------------|-------------|---------|---------|
|       |    |       |                |            | Lower Bound                      | Upper Bound |         |         |
| FI    | 3  | 13,33 | ,577           | ,333       | 11,90                            | 14,77       | 13      | 14      |
| FII   | 3  | 16,33 | ,577           | ,333       | 14,90                            | 17,77       | 16      | 17      |
| FIII  | 3  | 18,67 | ,577           | ,333       | 17,23                            | 20,10       | 18      | 19      |
| K (-) | 3  | 8,67  | ,577           | ,333       | 7,23                             | 10,10       | 8       | 9       |
| K (+) | 3  | 20,00 | 1,000          | ,577       | 17,52                            | 22,48       | 19      | 21      |
| Total | 15 | 15,40 | 4,239          | 1,095      | 13,05                            | 17,75       | 8       | 21      |

#### Test of Homogeneity of Variances

Daya hambat

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| ,308             | 4   | 10  | ,866 |

## ANOVA

Daya hambat

|                | Sum of Squares | df | Mean Square | F       | Sig. |
|----------------|----------------|----|-------------|---------|------|
| Between Groups | 246,933        | 4  | 61,733      | 132,286 | ,000 |
| Within Groups  | 4,667          | 10 | ,467        |         |      |
| Total          | 251,600        | 14 |             |         |      |

## Post Hoc Tests

## Multiple Comparisons

Dependent Variable: Daya hambat

Tukey HSD

| (I) Kelompok uji | (J) Kelompok uji | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval |             |
|------------------|------------------|-----------------------|------------|------|-------------------------|-------------|
|                  |                  |                       |            |      | Lower Bound             | Upper Bound |
| FI               | FII              | -3,000*               | ,558       | ,002 | -4,84                   | -1,16       |
|                  | FIII             | -5,333*               | ,558       | ,000 | -7,17                   | -3,50       |
|                  | K (-)            | 4,667*                | ,558       | ,000 | 2,83                    | 6,50        |
|                  | K (+)            | -6,667*               | ,558       | ,000 | -8,50                   | -4,83       |
| FII              | FI               | 3,000*                | ,558       | ,002 | 1,16                    | 4,84        |
|                  | FIII             | -2,333*               | ,558       | ,013 | -4,17                   | -,50        |
|                  | K (-)            | 7,667*                | ,558       | ,000 | 5,83                    | 9,50        |
|                  | K (+)            | -3,667*               | ,558       | ,000 | -5,50                   | -1,83       |
| FIII             | FI               | 5,333*                | ,558       | ,000 | 3,50                    | 7,17        |
|                  | FII              | 2,333*                | ,558       | ,013 | ,50                     | 4,17        |
|                  | K (-)            | 10,000*               | ,558       | ,000 | 8,16                    | 11,84       |
|                  | K (+)            | -1,333                | ,558       | ,195 | -3,17                   | ,50         |
| K (-)            | FI               | -4,667*               | ,558       | ,000 | -6,50                   | -2,83       |
|                  | FII              | -7,667*               | ,558       | ,000 | -9,50                   | -5,83       |
|                  | FIII             | -10,000*              | ,558       | ,000 | -11,84                  | -8,16       |
|                  | K (+)            | -11,333*              | ,558       | ,000 | -13,17                  | -9,50       |
| K (+)            | FI               | 6,667*                | ,558       | ,000 | 4,83                    | 8,50        |
|                  | FII              | 3,667*                | ,558       | ,000 | 1,83                    | 5,50        |
|                  | FIII             | 1,333                 | ,558       | ,195 | -,50                    | 3,17        |
|                  | K (-)            | 11,333*               | ,558       | ,000 | 9,50                    | 13,17       |

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

Daya hambat

Tukey HSD<sup>a</sup>

| Kelompok uji | N | Subset for alpha = 0.05 |       |       |       |
|--------------|---|-------------------------|-------|-------|-------|
|              |   | 1                       | 2     | 3     | 4     |
| K (-)        | 3 | 8,67                    |       |       |       |
| FI           | 3 |                         | 13,33 |       |       |
| FII          | 3 |                         |       | 16,33 |       |
| FIII         | 3 |                         |       |       | 18,67 |
| K (+)        | 3 |                         |       |       | 20,00 |
| Sig.         |   | 1,000                   | 1,000 | 1,000 | ,195  |

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

**Lampiran 20. Hasil uji statistik stabilitas pH Paired Samples T-Test**

**T-Test**

**Paired Samples Statistics**

|        |                      | Mean   | N | Std. Deviation | Std. Error Mean |
|--------|----------------------|--------|---|----------------|-----------------|
| Pair 1 | Sebelum Cycling Test | 6.3775 | 4 | .11500         | .05750          |
|        | Sesudah Cycling Test | 6.1550 | 4 | .08813         | .04406          |

**Paired Samples Correlations**

|        |   | N | Correlation | Sig. |
|--------|---|---|-------------|------|
| Pair 1 | Sebelum Cycling Test & Sesudah Cycling Test | 4 | .880        | .120 |

**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 Cycling Test - Sesudah Cycling Test | .22250             | .05620         | .02810          | .13307                                    | .31193 | 7.918 | 3               | .004  |

## Lampiran 21. Hasil uji statistik stabilitas viskositas Paired Samples T-Test

### T-Test

**Paired Samples Statistics**

|        |                      | Mean    | N | Std. Deviation | Std. Error Mean |
|--------|----------------------|---------|---|----------------|-----------------|
| Pair 1 | Sebelum cycling test | 48.0000 | 4 | 28.03569       | 14.01785        |
|        | sesudah cycling test | 53.0000 | 4 | .81650         | .40825          |

**Paired Samples Correlations**

|        |   | N | Correlation | Sig. |
|--------|---|---|-------------|------|
| Pair 1 | Sebelum cycling test & sesudah cycling test | 4 | .845        | .155 |

**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 cycling test - sesudah cycling test | -5.00000           | 27.34959       | 13.67479        | -48.51930                                 | 38.51930 | -.366 | 3  | .739            |