# Lampiran

Lampiran 1. Hasil Evaluasi Optimasi Basis Krim

a. Organoleptik

| Formula | Parameter | | |
|---|---|---|---|
| | **Warna** | **Tekstur** | **Aroma** |
| **B1** | Putih | Kental | Tidak beraroma |
| **B2** | Putih | Kental | Tidak beraroma |
| **B3** | Putih | Kental | Tidak beraroma |
| **B4** | Putih | Kental | Tidak beraroma |
| **B5** | Putih | Kental | Tidak beraroma |

b. Homogenitas

| Replikasi | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| **1** | Homogen | Homogen | Homogen | Homogen | Homogen |
| **2** | Homogen | Homogen | Homogen | Homogen | Homogen |
| **3** | Homogen | Homogen | Homogen | Homogen | Homogen |

c. pH

| Replikasi | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| **1** | 6.38 | 6.42 | 6.31 | 6.76 | 6.43 |
| **2** | 6.37 | 6.33 | 6.31 | 6.73 | 6.60 |
| **3** | 6.38 | 6.20 | 6.42 | 6.67 | 6.55 |
| **Rata-rata±SD** | 6.38±0.01 | 6.32±0.11 | 6.35±0.06 | 6.72±0.05 | 6.53±0.09 |

d. Viskositas

| Replikasi | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| **1** | 15350 | 15943 | 16543 | 15734 | 16890 |
| **2** | 15483 | 15983 | 16700 | 15667 | 16800 |
| **3** | 15455 | 15743 | 16633 | 15751 | 16566 |
| **Rata-rata±SD** | 15429±70 | 15890±128 | 16625±78 | 15717±44 | 16752±167 |

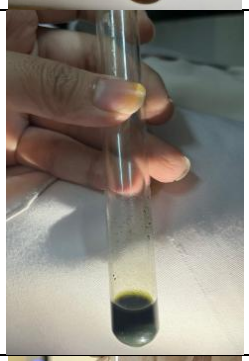
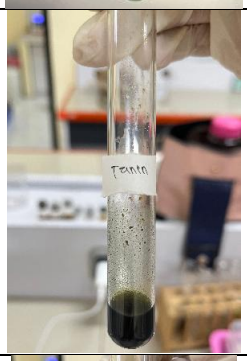
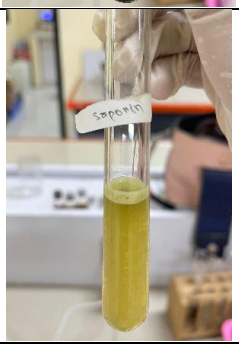
e. Daya Sebar (cm)

| Replikasi | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| **1** | 6.33 | 6.52 | 6.31 | 6.03 | 6.23 |
| **2** | 6.27 | 6.66 | 6.65 | 6.18 | 6.46 |
| **3** | 6.18 | 6.48 | 6.58 | 6.11 | 6.38 |
| **Rata-rata±SD** | 6.26±0.08 | 6.55±0.09 | 6.51±0.18 | 6.11±0.08 | 6.36±0.12 |

f. Daya Lekat

| Replikasi | B1 | B2 | B3 | B4 | B5 |
|---|---|---|---|---|---|
| **1** | 9.92 | 9.77 | 10.54 | 10.24 | 10.11 |
| **2** | 10.09 | 9.69 | 10.19 | 10.65 | 10.32 |
| **3** | 10.21 | 10.01 | 10.32 | 9.89 | 10.24 |
| **Rata-rata±SD** | 10.07±0.15 | 9.82±0.17 | 10.35±0.18 | 10.26±0.38 | 10.22±0.11 |

Lampiran 2. Hasil uji skrining fitokimia

| Gambar | Keterangan |
|---|---|
|  | (+) mengandung alkaloid yang ditandai dengan perubahan warna menjadi merah jingga |
|  | (+) mengandung steroid yang ditandai dengan perubahan warna menjadi hijau |
|  | (+) mengandung tanin yang ditandai dengan perubahan warna menjadi hijau kehitaman |
|  | (+) mengandung saponin yang ditandai dengan adanya busa yang stabil |

Lampiran 3. Hasil evaluasi *real time* pada suhu ruang

a. Hasil Uji Organoleptik

| **Uji Organoleptik** | | | | | |
|---|---|---|---|---|---|
| **Hari ke** | **Pengamatan** | **F0** | **F1** | **F2** | **F3** |
| **0** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **7** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **14** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **21** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **28** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |

b. Hasil Uji Homogenitas

| **Uji Homogenitas** | | | | |
|---|---|---|---|---|
| **Hari ke** | **Homogenitas** | | | |
| | **F0** | **F1** | **F2** | **F3** |
| **0** | Homogen | Homogen | Homogen | Homogen |
| **7** | Homogen | Homogen | Homogen | Homogen |
| **14** | Homogen | Homogen | Homogen | Homogen |
| **21** | Homogen | Homogen | Homogen | Homogen |
| **28** | Homogen | Homogen | Homogen | Homogen |

c. Hasil Uji pH

| **Formula** | **Hari Ke-** | **Batch** | | | **Rata-rata** | **SD** | **Rata-Rata ± SD** |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | | | |
| F0 | 0 | 6.74 | 5.37 | 6.68 | 6.26 | 0.77 | 6.26 ± 0.77 |
| | 7 | 6.42 | 6.88 | 6.37 | 6.56 | 0.28 | 6.56 ± 0.28 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 14 | 6.97 | 6.89 | 4.45 | 6.10 | 1.43 | 6.10 ± 1.43 |
| | 21 | 6.88 | 6.86 | 6.35 | 6.70 | 0.30 | 6.70 ± 0.30 |
| | 28 | 5.93 | 6.12 | 5.96 | 6.00 | 0.10 | 6.00 ± 0.10 |
| F1 | 0 | 6.67 | 6.00 | 6.79 | 6.49 | 0.43 | 6.49 ± 0.43 |
| | 7 | 6.55 | 6.45 | 6.49 | 6.50 | 0.05 | 6.50 ± 0.05 |
| | 14 | 6.54 | 6.50 | 6.43 | 6.49 | 0.06 | 6.49 ± 0.06 |
| | 21 | 6.55 | 6.49 | 6.44 | 6.49 | 0.06 | 6.49 ± 0.06 |
| | 28 | 6.08 | 5.89 | 5.88 | 5.95 | 0.11 | 6.95 ± 0.11 |
| F2 | 0 | 4.23 | 6.50 | 5.45 | 5.39 | 1.14 | 5.39 ± 1.14 |
| | 7 | 4.79 | 4.72 | 4.85 | 4.79 | 0.07 | 4.79 ± 0.07 |
| | 14 | 4.71 | 4.63 | 4.74 | 4.69 | 0.06 | 4.69 ± 0.06 |
| | 21 | 4.45 | 4.61 | 4.69 | 4.58 | 0.12 | 4.58 ± 0.12 |
| | 28 | 4.35 | 4.54 | 4.54 | 4.48 | 0.11 | 4.48 ± 0.11 |
| F3 | 0 | 4.96 | 6.85 | 5.25 | 5.69 | 1.02 | 5.69 ± 1.02 |
| | 7 | 5.31 | 5.33 | 5.25 | 5.30 | 0.04 | 5.30 ± 0.04 |
| | 14 | 5.26 | 5.19 | 5.15 | 5.20 | 0.06 | 5.20 ± 0.06 |
| | 21 | 5.24 | 5.14 | 5.14 | 5.17 | 0.06 | 5.17 ± 0.06 |
| | 28 | 5.21 | 4.40 | 4.45 | 4.69 | 0.45 | 4.69 ± 0.45 |

d. Hasil Uji Viskositas

| **Formula** | **Hari Ke-** | **Batch** | | | **Rata-rata** | **SD** | **Rata-Rata ± SD** |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | | |
| F0 | 0 | 16011 | 16220 | 16677 | 16303 | 340.61 | 16303 ± 340 |
| | 7 | 17666 | 16167 | 16088 | 16640 | 889.13 | 16640 ± 889 |
| | 14 | 16111 | 15728 | 16066 | 15968 | 209.35 | 15968 ± 209 |
| | 21 | 15716 | 14862 | 16050 | 15543 | 612.67 | 15543 ± 612 |
| | 28 | 16167 | 14580 | 15722 | 15490 | 818.61 | 15490 ± 818 |
| F1 | 0 | 17667 | 16692 | 17332 | 17230 | 495.39 | 17230 ± 495 |
| | 7 | 16043 | 16500 | 16942 | 16495 | 449.52 | 16495 ± 449 |
| | 14 | 15100 | 16361 | 16172 | 15878 | 680.08 | 15878 ± 680 |
| | 21 | 14418 | 16295 | 14278 | 14997 | 1126.28 | 14997 ± 1126 |
| | 28 | 16055 | 16555 | 14029 | 15546 | 1337.62 | 15546 ± 1337 |
| F2 | 0 | 14333 | 13667 | 8681 | 12227 | 3088.93 | 12227 ± 3088 |
| | 7 | 8278 | 7567 | 8635 | 8160 | 543.69 | 8160 ± 543 |
| | 14 | 6833 | 6700 | 8216 | 7250 | 839.51 | 7250 ± 839 |
| | 21 | 7564 | 4989 | 7822 | 6792 | 1566.48 | 6792 ± 1566 |
| | 28 | 7841 | 4885 | 6851 | 6526 | 1504.61 | 6526 ± 1504 |
| F3 | 0 | 16574 | 14953 | 18298 | 16608 | 1672.76 | 16608 ± 1672 |
| | 7 | 16518 | 15556 | 16177 | 16084 | 487.74 | 16084 ± 487 |
| | 14 | 16572 | 15350 | 15485 | 15802 | 669.96 | 15802 ± 669 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 21 | 15467 | 15005 | 13909 | 14794 | 800.21 | 14794 ± 800 |
| | 28 | 15444 | 15380 | 13751 | 14858 | 959.51 | 14858 ± 959 |

e. Hasil Uji Daya Sebar

| Formula | Hari Ke- | Batch | | | Rata-rata | SD | Rata-Rata ± SD |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | | |
| F0 | 0 | 6.17 | 6.23 | 6.34 | 6.25 | 0.09 | 6.25 ± 0.09 |
| | 7 | 5.95 | 6.33 | 6.43 | 6.24 | 0.25 | 6.24 ± 0.25 |
| | 14 | 6.25 | 6.39 | 6.32 | 6.32 | 0.07 | 6.32 ± 0.07 |
| | 21 | 6.45 | 6.45 | 6.44 | 6.45 | 0.01 | 6.45 ± 0.01 |
| | 28 | 6.48 | 6.48 | 6.50 | 6.49 | 0.01 | 6.49 ± 0.01 |
| F1 | 0 | 5.85 | 6.32 | 6.19 | 6.12 | 0.24 | 6.12 ± 0.24 |
| | 7 | 5.72 | 6.23 | 6.30 | 6.08 | 0.32 | 6.08 ± 0.32 |
| | 14 | 5.78 | 6.61 | 6.53 | 6.31 | 0.46 | 6.31 ± 0.46 |
| | 21 | 6.36 | 6.63 | 6.63 | 6.54 | 0.16 | 6.54 ± 0.16 |
| | 28 | 6.45 | 6.65 | 6.62 | 6.57 | 0.11 | 6.57 ± 0.11 |
| F2 | 0 | 5.76 | 6.58 | 5.63 | 5.99 | 0.52 | 5.99 ± 0.52 |
| | 7 | 6.28 | 6.58 | 6.08 | 6.31 | 0.25 | 6.31 ± 0.25 |
| | 14 | 6.48 | 6.84 | 5.64 | 6.32 | 0.62 | 6.32 ± 0.62 |
| | 21 | 6.74 | 6.84 | 6.22 | 6.60 | 0.33 | 6.60 ± 0.33 |
| | 28 | 6.84 | 6.82 | 6.24 | 6.63 | 0.34 | 6.63 ± 0.34 |
| F3 | 0 | 5.59 | 5.41 | 5.69 | 5.59 | 0.14 | 5.59 ± 0.14 |
| | 7 | 5.65 | 5.62 | 5.69 | 5.65 | 0.04 | 5.65 ± 0.04 |
| | 14 | 5.65 | 5.63 | 5.97 | 5.75 | 0.19 | 5.75 ± 0.19 |
| | 21 | 6.18 | 6.54 | 6.08 | 6.27 | 0.24 | 6.27 ± 0.24 |
| | 28 | 6.29 | 6.58 | 5.89 | 6.25 | 0.35 | 6.25 ± 0.35 |

f. Hasil Uji Daya lekat

| Formula | Hari Ke- | Batch | | | Rata-rata | SD | Rata-Rata ± SD |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | | |
| F0 | 0 | 11.15 | 10.94 | 11.08 | 11.06 | 0.11 | 11.06 ± 0.11 |
| | 7 | 11.04 | 10.79 | 11.04 | 10.96 | 0.14 | 10.96 ± 0.14 |
| | 14 | 10.83 | 10.79 | 10.17 | 10.60 | 0.37 | 10.60 ± 0.37 |
| | 21 | 10.41 | 9.46 | 9.78 | 9.88 | 0.48 | 9.88 ± 0.48 |
| | 28 | 9.32 | 9.10 | 9.49 | 9.30 | 0.20 | 9.30 ± 0.20 |
| F1 | 0 | 14.25 | 14.14 | 13.99 | 14.13 | 0.13 | 14.13 ± 0.13 |
| | 7 | 13.99 | 13.96 | 13.94 | 13.96 | 0.03 | 13.96 ± 0.03 |
| | 14 | 13.96 | 13.96 | 13.63 | 13.85 | 0.19 | 13.85 ± 0.19 |
| | 21 | 13.08 | 13.40 | 12.66 | 13.05 | 0.37 | 13.05 ± 0.37 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 28 | 12.94 | 13.07 | 12.39 | 12.80 | 0.36 | 12.80 ± 0.36 |
| F2 | 0 | 10.09 | 10.93 | 10.88 | 10.63 | 0.47 | 10.63 ± 0.47 |
| | 7 | 10.07 | 10.57 | 10.32 | 10.32 | 0.25 | 10.32 ± 0.25 |
| | 14 | 9.09 | 10.57 | 10.18 | 9.95 | 0.77 | 9.95 ± 0.77 |
| | 21 | 9.55 | 9.92 | 9.19 | 9.55 | 0.37 | 9.55 ± 0.37 |
| | 28 | 9.05 | 9.03 | 8.77 | 8.95 | 0.16 | 8.95 ± 0.16 |
| F3 | 0 | 14.17 | 14.04 | 14.02 | 14.08 | 0.08 | 14.08 ± 0.08 |
| | 7 | 14.02 | 13.53 | 13.24 | 13.60 | 0.39 | 13.60 ± 0.39 |
| | 14 | 13.85 | 13.53 | 12.88 | 13.42 | 0.49 | 13.42 ± 0.49 |
| | 21 | 13.40 | 12.89 | 12.11 | 12.80 | 0.65 | 12.80 ± 0.65 |
| | 28 | 11.66 | 11.26 | 11.39 | 11.44 | 0.20 | 11.44 ± 0.20 |

Lampiran 4. Hasil evaluasi stabilitas *Cycling test*

a. Hasil Uji Organoleptis

| **Uji Organoleptik** | | | | | |
|---|---|---|---|---|---|
| **Siklus ke** | **Pengamatan** | **F0** | **F1** | **F2** | **F3** |
| **1** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **2** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **3** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **4** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **5** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |
| **6** | Warna | Putih | Krem | Hijau Tua | Hijau Muda |
| | Tekstur | Kental | Kental | Kental | Kental |
| | Aroma | Tidak Beraroma | Bau khas Aromatik | Bau khas Aromatik | Bau khas Aromatik |

b. Hasil Uji Homogenitas

| **Siklus ke-** | **Homogenitas** | | | |
|---|---|---|---|---|
| | **F0** | **F1** | **F2** | **F3** |
| 1 | Homogen | Homogen | Homogen | Homogen |
| 2 | Homogen | Homogen | Homogen | Homogen |
| 3 | Homogen | Homogen | Homogen | Homogen |
| 4 | Homogen | Homogen | Homogen | Homogen |
| 5 | Homogen | Homogen | Homogen | Homogen |
| 6 | Homogen | Homogen | Homogen | Homogen |

c. Hasil Uji pH

| Formula | Siklus | Batch | | | Rata-rata | SD | Rata-Rata ± SD |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | | |
| F0 | 1 | 7.15 | 7.11 | 6.86 | 7.04 | 0.16 | 7.04 ± 0.16 |
| | 2 | 5.91 | 5.77 | 4.31 | 5.33 | 0.89 | 5.33 ± 0.89 |
| | 3 | 7.22 | 7.52 | 4.78 | 6.51 | 1.50 | 6.51 ± 1.50 |
| | 4 | 6.29 | 6.42 | 4.96 | 5.89 | 0.81 | 5.89 ± 0.81 |
| | 5 | 6.78 | 7.15 | 4.93 | 6.29 | 1.19 | 6.29 ± 1.19 |
| | 6 | 6.74 | 7.04 | 4.92 | 6.23 | 1.15 | 6.23 ± 1.15 |
| F1 | 1 | 6.91 | 6.93 | 6.94 | 6.93 | 0.02 | 6.93 ± 0.02 |
| | 2 | 5.88 | 5.80 | 5.84 | 5.84 | 0.04 | 5.84 ± 0.04 |
| | 3 | 6.88 | 6.83 | 6.84 | 6.85 | 0.03 | 6.85 ± 0.03 |
| | 4 | 6.34 | 6.31 | 6.29 | 6.31 | 0.03 | 6.31 ± 0.03 |
| | 5 | 6.65 | 6.61 | 6.59 | 6.62 | 0.03 | 6.62 ± 0.03 |
| | 6 | 6.64 | 6.63 | 6.58 | 6.62 | 0.03 | 6.62 ± 0.03 |
| F2 | 1 | 5.40 | 5.61 | 5.86 | 5.62 | 0.23 | 5.62 ± 0.23 |
| | 2 | 4.40 | 4.47 | 4.34 | 4.40 | 0.07 | 4.40 ± 0.07 |
| | 3 | 4.75 | 5.24 | 5.00 | 5.00 | 0.25 | 5.00 ± 0.25 |
| | 4 | 4.74 | 4.86 | 4.62 | 4.74 | 0.12 | 4.74 ± 0.12 |
| | 5 | 4.92 | 5.05 | 4.84 | 4.94 | 0.11 | 4.94 ± 0.11 |
| | 6 | 4.91 | 5.05 | 4.83 | 4.93 | 0.11 | 4.93 ± 0.11 |
| F3 | 1 | 5.71 | 5.49 | 6.64 | 5.95 | 0.61 | 5.95 ± 0.61 |
| | 2 | 5.14 | 4.98 | 4.87 | 5.00 | 0.14 | 5.00 ± 0.14 |
| | 3 | 5.56 | 5.76 | 5.66 | 5.66 | 0.10 | 5.66 ± 0.10 |
| | 4 | 5.12 | 4.96 | 5.25 | 5.11 | 0.15 | 5.11 ± 0.15 |
| | 5 | 5.31 | 5.49 | 5.48 | 5.43 | 0.10 | 5.43 ± 0.10 |
| | 6 | 5.31 | 5.46 | 5.50 | 5.42 | 0.10 | 5.42 ± 0.10 |

d. Hasil Uji Viskositas

| Formula | Siklus | Batch | | | Rata-rata | SD | Rata-Rata ± SD |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | | |
| F0 | 1 | 16095 | 16217 | 16048 | 16120 | 87.23 | 16120 ± 87 |
| | 2 | 15111 | 16167 | 14461 | 15246 | 861.01 | 15246 ± 861 |
| | 3 | 14722 | 14378 | 14533 | 14544 | 172.28 | 14544 ± 172 |
| | 4 | 14428 | 14667 | 14607 | 14567 | 124.34 | 14567 ± 124 |
| | 5 | 13178 | 14247 | 14370 | 13932 | 655.59 | 13932 ± 655 |
| | 6 | 13278 | 13489 | 13784 | 13517 | 254.16 | 13517 ± 254 |
| F1 | 1 | 15922 | 15794 | 16344 | 16020 | 287.80 | 16020 ± 287 |
| | 2 | 17278 | 15333 | 16667 | 16426 | 994.64 | 16426 ± 994 |
| | 3 | 13495 | 12822 | 13811 | 13376 | 505.12 | 13376 ± 505 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4 | 13500 | 14333 | 14389 | 14074 | 497.89 | 14074 ± 497 |
| | 5 | 13022 | 14088 | 14187 | 13766 | 645.93 | 13766 ± 645 |
| | 6 | 12572 | 13146 | 13734 | 13151 | 581.01 | 13151 ± 581 |
| F2 | 1 | 12839 | 16078 | 16189 | 15035 | 1902.89 | 15035 ± 1902 |
| | 2 | 10500 | 8889 | 10155 | 9848 | 848.24 | 9848 ± 848 |
| | 3 | 8782 | 8351 | 9367 | 8833 | 509.94 | 8833 ± 509 |
| | 4 | 8444 | 8298 | 9217 | 8653 | 493.86 | 8653 ± 493 |
| | 5 | 8325 | 8088 | 8823 | 8412 | 375.14 | 8412 ± 375 |
| | 6 | 7967 | 8056 | 8085 | 8036 | 61.49 | 8036 ± 61 |
| F3 | 1 | 15489 | 16306 | 16194 | 15996 | 442.92 | 15996 ± 442 |
| | 2 | 15333 | 15169 | 15167 | 15223 | 95.27 | 15223 ± 95 |
| | 3 | 15500 | 14891 | 14946 | 15112 | 336.85 | 15112 ± 336 |
| | 4 | 14499 | 13866 | 14850 | 14405 | 498.69 | 14405 ± 498 |
| | 5 | 14383 | 13555 | 14849 | 14262 | 655.38 | 14262 ± 655 |
| | 6 | 14254 | 13212 | 13974 | 13813 | 539.26 | 13813 ± 539 |

e. Hasil Uji Daya Sebar

| **Formula** | **Siklus** | **Batch** | | | **Rata-rata** | **SD** | **Rata-Rata ± SD** |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | | | |
| F0 | 1 | 6.29 | 6.19 | 6.39 | 6.29 | 0.10 | 6.29 ± 0.10 |
| | 2 | 6.40 | 6.20 | 6.65 | 6.42 | 0.23 | 6.42 ± 0.23 |
| | 3 | 6.43 | 6.30 | 6.64 | 6.46 | 0.17 | 6.46 ± 0.17 |
| | 4 | 6.52 | 6.32 | 6.70 | 6.51 | 0.19 | 6.51 ± 0.19 |
| | 5 | 6.57 | 6.34 | 6.72 | 6.54 | 0.19 | 6.54 ± 0.19 |
| | 6 | 6.62 | 6.43 | 6.74 | 6.60 | 0.16 | 6.60 ± 0.16 |
| F1 | 1 | 5.71 | 5.49 | 5.43 | 5.54 | 0.15 | 5.54 ± 0.15 |
| | 2 | 5.77 | 5.53 | 5.43 | 5.58 | 0.17 | 5.58 ± 0.17 |
| | 3 | 5.95 | 6.21 | 5.96 | 6.04 | 0.15 | 6.04 ± 0.15 |
| | 4 | 6.13 | 6.28 | 6.01 | 6.14 | 0.14 | 6.14 ± 0.14 |
| | 5 | 6.04 | 6.32 | 6.20 | 6.19 | 0.14 | 6.19 ± 0.14 |
| | 6 | 6.38 | 6.44 | 6.28 | 6.37 | 0.08 | 6.37 ± 0.08 |
| F2 | 1 | 5.93 | 5.65 | 5.37 | 5.65 | 0.28 | 5.65 ± 0.28 |
| | 2 | 5.96 | 5.79 | 5.80 | 5.85 | 0.10 | 5.85 ± 0.10 |
| | 3 | 6.20 | 5.81 | 5.93 | 5.98 | 0.20 | 5.98 ± 0.20 |
| | 4 | 6.17 | 6.05 | 5.98 | 6.07 | 0.10 | 6.07 ± 0.10 |
| | 5 | 6.40 | 6.15 | 6.13 | 6.23 | 0.15 | 6.23 ± 0.15 |
| | 6 | 6.57 | 6.26 | 6.26 | 6.36 | 0.18 | 6.36 ± 0.18 |
| F3 | 1 | 5.42 | 5.71 | 5.29 | 5.47 | 0.22 | 5.47 ± 0.22 |
| | 2 | 5.40 | 5.60 | 5.50 | 5.50 | 0.10 | 5.50 ± 0.10 |
| | 3 | 6.18 | 6.16 | 5.74 | 6.03 | 0.25 | 6.03 ± 0.25 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4 | 6.27 | 6.28 | 6.21 | 6.25 | 0.04 | 6.25 ± 0.04 |
| | 5 | 6.32 | 6.38 | 6.38 | 6.36 | 0.03 | 6.36 ± 0.03 |
| | 6 | 6.49 | 6.42 | 6.47 | 6.46 | 0.04 | 6.46 ± 0.04 |

f. Hasil Uji Daya Lekat

| **Formula** | **Siklus** | **Batch** | | | **Rata-rata** | **SD** | **Rata-Rata ± SD** |
|---|---|---|---|---|---|---|---|
| | | **1** | **2** | **3** | | | |
| F0 | 1 | 11.05 | 10.09 | 10.88 | 10.67 | 0.51 | 10.67 ± 0.51 |
| | 2 | 11.05 | 10.07 | 10.32 | 10.48 | 0.51 | 10.48 ± 0.51 |
| | 3 | 10.18 | 9.90 | 10.18 | 10.09 | 0.16 | 10.09 ± 0.16 |
| | 4 | 9.79 | 9.55 | 9.19 | 9.51 | 0.30 | 9.51 ± 0.30 |
| | 5 | 9.51 | 9.05 | 8.77 | 9.11 | 0.37 | 9.11 ± 0.37 |
| | 6 | 8.86 | 8.55 | 8.62 | 8.68 | 0.16 | 8.68 ± 0.16 |
| F1 | 1 | 14.17 | 14.04 | 14.02 | 14.08 | 0.08 | 14.08 ± 0.08 |
| | 2 | 14.02 | 13.53 | 13.24 | 13.60 | 0.39 | 13.60 ± 0.39 |
| | 3 | 13.85 | 12.98 | 12.88 | 13.24 | 0.53 | 13.24 ± 0.53 |
| | 4 | 13.40 | 12.89 | 12.11 | 12.80 | 0.65 | 12.80 ± 0.63 |
| | 5 | 11.67 | 11.26 | 11.39 | 11.44 | 0.21 | 11.44 ± 0.21 |
| | 6 | 10.70 | 11.09 | 11.22 | 11.00 | 0.27 | 11.00 ± 0.27 |
| F2 | 1 | 10.94 | 11.15 | 10.93 | 11.01 | 0.12 | 11.01 ± 0.12 |
| | 2 | 10.79 | 11.04 | 10.57 | 10.80 | 0.24 | 10.80 ± 0.24 |
| | 3 | 9.83 | 10.83 | 10.28 | 10.31 | 0.50 | 10.31 ± 0.50 |
| | 4 | 9.46 | 10.41 | 9.92 | 9.93 | 0.48 | 9.93 ± 0.48 |
| | 5 | 9.10 | 9.32 | 9.03 | 9.15 | 0.15 | 9.15 ± 0.15 |
| | 6 | 8.90 | 8.52 | 8.61 | 8.68 | 0.20 | 8.68 ± 0.20 |
| F3 | 1 | 14.14 | 13.99 | 14.25 | 14.13 | 0.13 | 14.13 ± 0.13 |
| | 2 | 13.96 | 13.94 | 13.99 | 13.96 | 0.03 | 13.96 ± 0.03 |
| | 3 | 13.46 | 13.63 | 13.96 | 13.68 | 0.25 | 13.68 ± 0.25 |
| | 4 | 13.40 | 12.66 | 13.08 | 13.05 | 0.37 | 13.05 ± 0.37 |
| | 5 | 13.07 | 12.39 | 12.94 | 12.80 | 0.36 | 12.80 ± 0.36 |
| | 6 | 11.16 | 12.09 | 12.36 | 11.87 | 0.63 | 11.87 ± 0.63 |

Lampiran 5. Hasil perhitungan nilai SPF sebelum diformulasikan dalam sediaan krim

| Sampel | λ (nm) | Abs | | | EE x 1 | Abs x (EE x 1) | | | CF | SPF |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | 1 | 2 | 3 | | |
| F1 | 290 | 2.739 | 4.000 | 4.000 | 0.0150 | 0.0411 | 0.0600 | 0.0600 | 10 | |
| | 295 | 3.973 | 4.000 | 3.907 | 0.0817 | 0.3246 | 0.3268 | 0.3192 | | 39.3271 |
| | 300 | 4.000 | 4.000 | 4.000 | 0.2874 | 1.1496 | 1.1496 | 1.1496 | | |
| | 305 | 4.000 | 4.000 | 4.000 | 0.3278 | 1.3112 | 1.3112 | 1.3112 | | |
| | 310 | 3.748 | 4.000 | 3.961 | 0.1864 | 0.6986 | 0.7456 | 0.7383 | | 39.7286 |
| | 315 | 4.000 | 3.667 | 4.000 | 0.0839 | 0.3356 | 0.3077 | 0.3356 | | |
| | 320 | 4.000 | 4.000 | 4.000 | 0.0180 | 0.0720 | 0.0720 | 0.0720 | | 39.8593 |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.9327** | **3.9729** | **3.9859** | **Rata-rata** | **39.6383** |
| F2 | 290 | 4.000 | 3.104 | 4.000 | 0.0150 | 0.0600 | 0.0466 | 0.0600 | 10 | |
| | 295 | 3.680 | 4.000 | 4.000 | 0.0817 | 0.3007 | 0.3268 | 0.3268 | | 31.8328 |
| | 300 | 3.272 | 4.000 | 4.000 | 0.2874 | 0.9404 | 1.1496 | 1.1496 | | |
| | 305 | 3.118 | 4.000 | 4.000 | 0.3278 | 1.0221 | 1.3112 | 1.3112 | | |
| | 310 | 2.962 | 4.000 | 4.000 | 0.1864 | 0.5521 | 0.7456 | 0.7456 | | 39.8736 |
| | 315 | 3.066 | 4.000 | 4.000 | 0.0839 | 0.2572 | 0.3356 | 0.3356 | | |
| | 320 | 2.823 | 4.000 | 4.000 | 0.0180 | 0.0508 | 0.0720 | 0.0720 | | 40.0080 |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.1833** | **3.9874** | **4.0008** | **Rata-rata** | **37.2381** |
| F3 | 290 | 4.000 | 4.000 | 4.000 | 0.0150 | 0.0600 | 0.0600 | 0.0600 | 10 | |
| | 295 | 4.000 | 4.000 | 4.000 | 0.0817 | 0.3268 | 0.3268 | 0.3268 | | 39.8915 |
| | 300 | 4.000 | 3.671 | 4.000 | 0.2874 | 1.1496 | 1.0550 | 1.1496 | | |
| | 305 | 4.000 | 4.000 | 4.000 | 0.3278 | 1.3112 | 1.3112 | 1.3112 | | |
| | 310 | 3.960 | 4.000 | 3.962 | 0.1864 | 0.7381 | 0.7456 | 0.7385 | | 38.7229 |
| | 315 | 3.959 | 3.668 | 3.961 | 0.0839 | 0.3322 | 0.3077 | 0.3323 | | |
| | 320 | 3.958 | 3.661 | 3.952 | 0.0180 | 0.0712 | 0.0659 | 0.0711 | | 39.8958 |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.9891** | **3.8723** | **3.9896** | **Rata-rata** | **39.5034** |

Keterangan:
F1 = Ekstrak Tunggal
F2 = Bemotrizinol Tunggal
F3 = Kombinasi Ekstrak dan Bemotrizinol

Lampiran 6. Hasil perhitungan nilai SPF setelah diformulasikan dalam sediaan krim

| Sampel | λ (nm) | Abs | | | EE x 1 | Abs x (EE x 1) | | | CF | SPF |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | 1 | 2 | 3 | | |
| F1 | 290 | 3.188 | 3.172 | 3.091 | 0.0150 | 0.0478 | 0.0476 | 0.0464 | 10 | 31.6557 |
| | 295 | 3.183 | 3.169 | 3.046 | 0.0817 | 0.2601 | 0.2589 | 0.2489 | | |
| | 300 | 3.178 | 3.152 | 3.023 | 0.2874 | 0.9134 | 0.9059 | 0.8688 | | 31.4160 |
| | 305 | 3.167 | 3.138 | 3.021 | 0.3278 | 1.0381 | 1.0286 | 0.9903 | | |
| | 310 | 3.145 | 3.127 | 3.000 | 0.1864 | 0.5862 | 0.5829 | 0.5592 | | |
| | 315 | 3.142 | 3.122 | 2.687 | 0.0839 | 0.2636 | 0.2619 | 0.2254 | | 29.8619 |
| | 320 | 3.131 | 3.099 | 2.624 | 0.0180 | 0.0564 | 0.0558 | 0.0472 | | |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.1656** | **3.1416** | **2.9862** | **Rata-rata** | **30.9779** |
| F2 | 290 | 3.188 | 3.162 | 2.540 | 0.0150 | 0.0478 | 0.0474 | 0.0381 | 10 | 31.6557 |
| | 295 | 3.183 | 3.169 | 2.524 | 0.0817 | 0.2601 | 0.2589 | 0.2062 | | |
| | 300 | 3.178 | 3.152 | 2.411 | 0.2874 | 0.9134 | 0.9059 | 0.6929 | | 31.3306 |
| | 305 | 3.167 | 3.138 | 2.387 | 0.3278 | 1.0381 | 1.0286 | 0.7825 | | |
| | 310 | 3.145 | 3.127 | 2.221 | 0.1864 | 0.5862 | 0.5829 | 0.4140 | | |
| | 315 | 3.142 | 3.022 | 2.098 | 0.0839 | 0.2636 | 0.2535 | 0.1760 | | 23.4706 |
| | 320 | 3.131 | 3.099 | 2.075 | 0.0180 | 0.0564 | 0.0558 | 0.0374 | | |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.1656** | **3.1331** | **2.3471** | **Rata-rata** | **28.8190** |
| F3 | 290 | 3.802 | 3.619 | 3.565 | 0.0150 | 0.0570 | 0.0543 | 0.0535 | 10 | 36.0970 |
| | 295 | 3.791 | 3.619 | 3.586 | 0.0817 | 0.3097 | 0.2957 | 0.2930 | | |
| | 300 | 3.784 | 3.517 | 3.498 | 0.2874 | 1.0875 | 1.0108 | 1.0053 | | 35.1413 |
| | 305 | 3.631 | 3.509 | 3.483 | 0.3278 | 1.1902 | 1.1503 | 1.1417 | | |
| | 310 | 3.384 | 3.499 | 3.267 | 0.1864 | 0.6308 | 0.6522 | 0.6090 | | |
| | 315 | 3.284 | 3.471 | 3.162 | 0.0839 | 0.2755 | 0.2912 | 0.2653 | | 34.2439 |
| | 320 | 3.271 | 3.317 | 3.146 | 0.0180 | 0.0589 | 0.0597 | 0.0566 | | |
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | | | | | **3.6097** | **3.5141** | **3.4244** | **Rata-rata** | **35.1607** |
| SP | 290 | 4.000 | 4.000 | 4.000 | 0.0150 | 0.0600 | 0.0600 | 0.0600 | 10 | 40.0080 |
| | 295 | 4.000 | 4.000 | 4.000 | 0.0817 | 0.3268 | 0.3268 | 0.3268 | | |
| | 300 | 4.000 | 4.000 | 4.000 | 0.2874 | 1.1496 | 1.1496 | 1.1496 | | 40.0080 |
| | 305 | 4.000 | 4.000 | 4.000 | 0.3278 | 1.3112 | 1.3112 | 1.3112 | | |
| | 310 | 4.000 | 4.000 | 4.000 | 0.1864 | 0.7456 | 0.7456 | 0.7456 | | |
| | 315 | 4.000 | 4.000 | 4.000 | 0.0839 | 0.3356 | 0.3356 | 0.3356 | | 40.0080 |
| | 320 | 4.000 | 4.000 | 4.000 | 0.0180 | 0.0720 | 0.0720 | 0.0720 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | $SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$ | **4.0008** | **4.0008** | **4.0008** | **Rata-rata** | **40.0080** |

Keterangan:
F0 = Formula Basis krim (Tanpa zat aktif)
F1 = Formula Krim Bemotrizinol Tunggal
F2 = Formula Krim Ekstrak Tunggal
F3 = Formula Krim Kombinasi Ekstrak dan Bemotrizinol
SP = Sediaan pembanding yang ada dipasaran

Lampiran 7. Contoh uraian perhitungan SPF

Contoh : Formula 1

| λ (nm) | EE x 1 | Absorbansi | | |
|---|---|---|---|---|
| | | Replikasi 1 | Replikasi 2 | Replikasi 3 |
| 290 | 0,0150 | 1,161 | 1,152 | 1,150 |
| 295 | 0,0817 | 0,804 | 0,767 | 0,785 |
| 300 | 0,2874 | 0,573 | 0,571 | 0,552 |
| 305 | 0,3278 | 0,534 | 0,515 | 0,524 |
| 310 | 0,1864 | 0,529 | 0,515 | 0,520 |
| 315 | 0,0839 | 0,505 | 0,502 | 0,480 |
| 320 | 0,0180 | 0,483 | 0,453 | 0,448 |

$$spektrofotometri\ SPF = CF \times \sum_{290}^{320} EE\ \lambda \times 1 \times Abs$$

Replikasi 1

SPF = 10 x {(0,0150 x 1,161) + (0,0817 x 0,804) + (0,2874 x 0,573) + (0,3278 x 0,534) + (0,1864 x 0,529) + (0,0839 x 0,505) + (0,0180 x 0,483)}

= 10 x 3,1656 = 31,6557

Replikasi 2

SPF = 10 x {(0,0150 x 1,152) + (0,0817 x 0,767) + (0,2874 x 0,571) + (0,3278 x 0,515) + (0,1864 x 0,515) + (0,0839 x 0,502) + (0,0180 x 0,453)}

= 10 x 3,1416 = 31,4160

Replikasi 3

SPF = 10 x {(0,0150 x 1,150) + (0,0817 x 0,785) + (0,2874 x 0,552) + (0,3278 x 0,524) + (0,1864 x 0,520) + (0,0839 x 0,480) + (0,0180 x 0,448)}

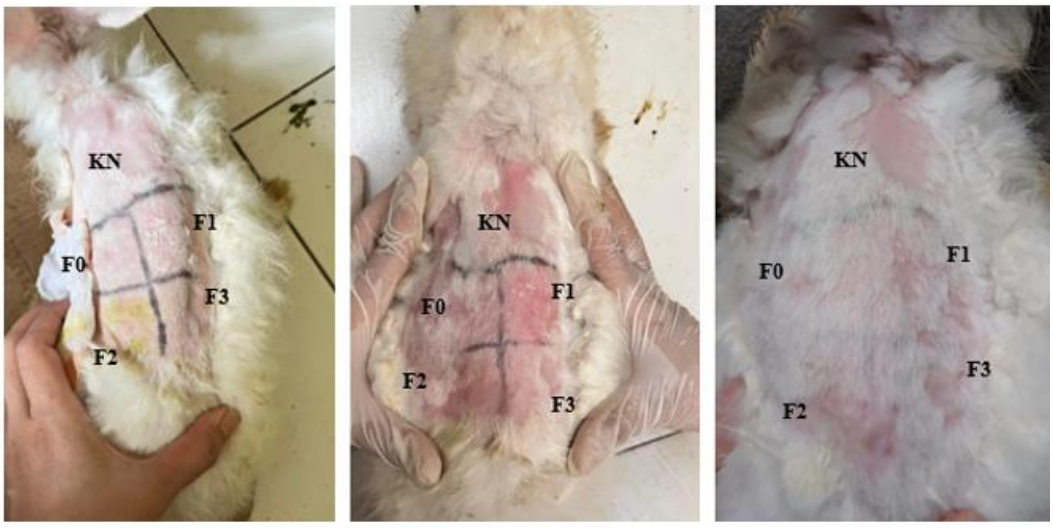
= 10 x 2.9862 = 29,8619

SPF F1 = $\frac{Replikasi\ 1 + Replikasi\ 2 + Replikasi\ 3}{3} = \frac{31,6557+31,4160+29,8619}{3}$ = 30,9779

Lampiran 8. Hasil Uji Iritasi

| Waktu | Efek Iritasi | Kelompok Uji | | | | |
|---|---|---|---|---|---|---|
| | | KN | F0 | F1 | F2 | F3 |
| Jam ke-24 | Eritema | 0 | 0 | 0 | 0 | 0 |
| | Udema | 0 | 0 | 0 | 0 | 0 |
| Jam ke-48 | Eritema | 0 | 0 | 2 | 1 | 0 |
| | Udema | 0 | 0 | 0 | 0 | 0 |
| Jam ke-72 | Eritema | 0 | 0 | 0 | 1 | 0 |
| | Udema | 0 | 0 | 0 | 0 | 0 |
| Jumlah eritema | | 0 | 0 | 2 | 2 | 0 |
| Jumlah udema | | 0 | 0 | 0 | 0 | 0 |

Keterangan:
KN = Kontrol normal (tanpa diberi perlakuan apapun)
F0 = Basis krim (tanpa penambahan zat aktif)
F1 = Formula 1 dengan konsentrasi 6% bemotrizinol
F2 = Formula 2 dengan konsentrasi 8% ekstrak pegagan
F3 = Formula 3 dengan kombinasi bemotrizinol 3% dan ekstrak pegagan 4%
Eritema = Kemerahan pada kulit
Udema = Bengkak pada kulit




Jam ke-24 Jam ke-48 Jam ke-72

Jumlah pengamatan = jumlah kelinci x waktu pengamatan

Jumlah pengamatan = 1x3 = 3

F0

A = $\frac{0}{3} = 0$

B = $\frac{0}{3} = 0$

C = Jumlah hewan 1

Indeks iritasi primer = $\frac{0-0}{1} = 0$

F1

A = $\frac{2}{3} = 0{,}67$

B = $\frac{0}{3} = 0$

C = Jumlah hewan 1

Indeks iritasi primer = $\frac{0{,}67-0}{1} = 0{,}67$

F2

A = $\frac{2}{3} = 0{,}67$

B = $\frac{0}{3} = 0$

C = Jumlah hewan 1

Indeks iritasi primer = $\frac{0{,}67-0}{1} = 0{,}67$

F3

A = $\frac{0}{3} = 0$

B = $\frac{0}{3} = 0$

C = Jumlah hewan 1

Indeks iritasi primer = $\frac{0-0}{1} = 0$

Keterangan;

A = Jumlah skor eritema dan udema seluruh titik pengamatan sampel pada jam ke-24, 48 dan 72 dibagi jumlah pengamatan

B = Jumlah skor eritema dan udema seluruh titik pengamatan sampel pada jam ke-24, 48, dan 72 dibagi jumlah pengamatan

C = Jumlah kelinci

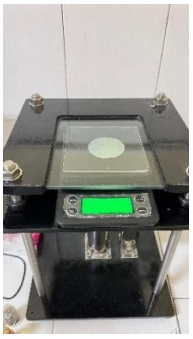
Lampiran 9. Dokumentasi Kegiatan

a. Evaluasi Sediaan

Uji pH

Uji Homogenitas

Uji Daya Sebar



Uji Daya Lekat


Uji Viskositas

Sediaan *Real time*

Sediaan *Cycling test*

Lampiran 10. Hasil analisis statistic pengukuran pH *real time*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Hari | Statistic | df | Sig. | Statistic | df | Sig. |
| pH_F0 | 0 | .371 | 3 | . | .783 | 3 | .074 |
| | 7 | .353 | 3 | . | .823 | 3 | .170 |
| | 14 | .375 | 3 | . | .774 | 3 | .053 |
| | 21 | .373 | 3 | . | .778 | 3 | .064 |
| | 28 | .331 | 3 | . | .865 | 3 | .281 |
| pH_F3 | 0 | .333 | 3 | . | .862 | 3 | .273 |
| | 7 | .292 | 3 | . | .923 | 3 | .463 |
| | 14 | .238 | 3 | . | .976 | 3 | .702 |
| | 21 | .356 | 3 | . | .818 | 3 | .157 |
| | 28 | .366 | 3 | . | .796 | 3 | .105 |
| pH_F2 | 0 | .187 | 3 | . | .998 | 3 | .917 |
| | 7 | .187 | 3 | . | .998 | 3 | .915 |
| | 14 | .282 | 3 | . | .936 | 3 | .510 |
| | 21 | .253 | 3 | . | .964 | 3 | .637 |
| | 28 | .351 | 3 | . | .828 | 3 | .183 |
| pH_F1 | 0 | .333 | 3 | . | .861 | 3 | .270 |
| | 7 | .219 | 3 | . | .987 | 3 | .780 |
| | 14 | .238 | 3 | . | .976 | 3 | .702 |
| | 21 | .191 | 3 | . | .997 | 3 | .900 |
| | 28 | .369 | 3 | . | .787 | 3 | .085 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| pH_F0 | Based on Mean | 8.121 | 4 | 10 | .003 |
| | Based on Median | .566 | 4 | 10 | .693 |
| | Based on Median and with adjusted df | .566 | 4 | 3.438 | .705 |
| | Based on trimmed mean | 6.489 | 4 | 10 | .008 |
| pH_F1 | Based on Mean | 8.619 | 4 | 10 | .003 |

| | | | | | |
|---|---|---|---|---|---|
| | Based on Median | 1.040 | 4 | 10 | .434 |
| | Based on Median and with adjusted df | 1.040 | 4 | 2.465 | .525 |
| | Based on trimmed mean | 7.389 | 4 | 10 | .005 |
| pH_F2 | Based on Mean | 3.867 | 4 | 10 | .038 |
| | Based on Median | 3.250 | 4 | 10 | .059 |
| | Based on Median and with adjusted df | 3.250 | 4 | 2.168 | .234 |
| | Based on trimmed mean | 3.832 | 4 | 10 | .039 |
| pH_F3 | Based on Mean | 9.911 | 4 | 10 | .002 |
| | Based on Median | 1.123 | 4 | 10 | .399 |
| | Based on Median and with adjusted df | 1.123 | 4 | 2.970 | .482 |
| | Based on trimmed mean | 8.400 | 4 | 10 | .003 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| pH_F0 | Between Groups | 1.045 | 4 | .261 | .461 | .000 |
| | Within Groups | 5.662 | 10 | .566 | | |
| | Total | 6.706 | 14 | | | |
| pH_F1 | Between Groups | .704 | 4 | .176 | 4.346 | .027 |
| | Within Groups | .405 | 10 | .041 | | |
| | Total | 1.110 | 14 | | | |
| pH_F2 | Between Groups | 1.555 | 4 | .389 | 1.468 | .023 |
| | Within Groups | 2.648 | 10 | .265 | | |
| | Total | 4.203 | 14 | | | |
| pH_F3 | Between Groups | 1.531 | 4 | .383 | 1.530 | .001 |
| | Within Groups | 2.501 | 10 | .250 | | |
| | Total | 4.032 | 14 | | | |

Post-Hoc

**Multiple Comparisons**

Games-Howell

| | | | Sig. | 95% Confidence Interval |
|---|---|---|---|---|

| Dependent Variable | (I) Hari | (J) Hari | Mean Difference (I-J) | Std. Error | | Lower Bound | Upper Bound |
|---|---|---|---|---|---|---|---|
| pH_F0 | 0 | 7 | -.29333 | .47556 | .961 | -3.1934 | 2.6068 |
| | | 14 | .16000 | .94007 | 1.000 | -4.7380 | 5.0580 |
| | | 21 | -.43333 | .47947 | .879 | -3.2883 | 2.4216 |
| | | 28 | .26000 | .45088 | .967 | -3.0779 | 3.5979 |
| | 7 | 0 | .29333 | .47556 | .961 | -2.6068 | 3.1934 |
| | | 14 | .45333 | .84277 | .974 | -5.5227 | 6.4293 |
| | | 21 | -.14000 | .23753 | .970 | -1.1984 | .9184 |
| | | 28 | .55333 | .17269 | .202 | -.4996 | 1.6062 |
| | 14 | 0 | -.16000 | .94007 | 1.000 | -5.0580 | 4.7380 |
| | | 7 | -.45333 | .84277 | .974 | -6.4293 | 5.5227 |
| | | 21 | -.59333 | .84498 | .940 | -6.5223 | 5.3356 |
| | | 28 | .10000 | .82909 | 1.000 | -6.2057 | 6.4057 |
| | 21 | 0 | .43333 | .47947 | .879 | -2.4216 | 3.2883 |
| | | 7 | .14000 | .23753 | .970 | -.9184 | 1.1984 |
| | | 14 | .59333 | .84498 | .940 | -5.3356 | 6.5223 |
| | | 28 | .69333 | .18318 | .149 | -.4489 | 1.8356 |
| | 28 | 0 | -.26000 | .45088 | .967 | -3.5979 | 3.0779 |
| | | 7 | -.55333 | .17269 | .202 | -1.6062 | .4996 |
| | | 14 | -.10000 | .82909 | 1.000 | -6.4057 | 6.2057 |
| | | 21 | -.69333 | .18318 | .149 | -1.8356 | .4489 |
| pH_F1 | 0 | 7 | -.01000 | .24750 | 1.000 | -1.8558 | 1.8358 |
| | | 14 | -.00333 | .24788 | 1.000 | -1.8396 | 1.8329 |
| | | 21 | -.00667 | .24784 | 1.000 | -1.8440 | 1.8307 |
| | | 28 | .53667 | .25425 | .428 | -1.1653 | 2.2386 |
| | 7 | 0 | .01000 | .24750 | 1.000 | -1.8358 | 1.8558 |
| | | 14 | .00667 | .04333 | 1.000 | -.1870 | .2003 |
| | | 21 | .00333 | .04308 | 1.000 | -.1890 | .1956 |
| | | 28 | .54667* | .07126 | .023 | .1450 | .9484 |
| | 14 | 0 | .00333 | .24788 | 1.000 | -1.8329 | 1.8396 |
| | | 7 | -.00667 | .04333 | 1.000 | -.2003 | .1870 |
| | | 21 | -.00333 | .04522 | 1.000 | -.2044 | .1977 |
| | | 28 | .54000* | .07257 | .021 | .1475 | .9325 |
| | 21 | 0 | .00667 | .24784 | 1.000 | -1.8307 | 1.8440 |
| | | 7 | -.00333 | .04308 | 1.000 | -.1956 | .1890 |
| | | 14 | .00333 | .04522 | 1.000 | -.1977 | .2044 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 28 | .54333* | .07242 | .021 | .1499 | .9368 |
| | 28 | 0 | -.53667 | .25425 | .428 | -2.2386 | 1.1653 |
| | | 7 | -.54667* | .07126 | .023 | -.9484 | -.1450 |
| | | 14 | -.54000* | .07257 | .021 | -.9325 | -.1475 |
| | | 21 | -.54333* | .07242 | .021 | -.9368 | -.1499 |
| pH_F2 | 0 | 7 | .60667 | .65698 | .869 | -4.4105 | 5.6238 |
| | | 14 | .70000 | .65673 | .816 | -4.3241 | 5.7241 |
| | | 21 | .81000 | .65969 | .751 | -4.1357 | 5.7557 |
| | | 28 | .92333 | .65867 | .681 | -4.0488 | 5.8955 |
| | 7 | 0 | -.60667 | .65698 | .869 | -5.6238 | 4.4105 |
| | | 14 | .09333 | .04989 | .450 | -.1305 | .3172 |
| | | 21 | .20333 | .07993 | .280 | -.2157 | .6224 |
| | | 28 | .31667 | .07102 | .066 | -.0330 | .6663 |
| | 14 | 0 | -.70000 | .65673 | .816 | -5.7241 | 4.3241 |
| | | 7 | -.09333 | .04989 | .450 | -.3172 | .1305 |
| | | 21 | .11000 | .07782 | .663 | -.3214 | .5414 |
| | | 28 | .22333 | .06864 | .164 | -.1332 | .5798 |
| | 21 | 0 | -.81000 | .65969 | .751 | -5.7557 | 4.1357 |
| | | 7 | -.20333 | .07993 | .280 | -.6224 | .2157 |
| | | 14 | -.11000 | .07782 | .663 | -.5414 | .3214 |
| | | 28 | .11333 | .09280 | .745 | -.3045 | .5311 |
| | 28 | 0 | -.92333 | .65867 | .681 | -5.8955 | 4.0488 |
| | | 7 | -.31667 | .07102 | .066 | -.6663 | .0330 |
| | | 14 | -.22333 | .06864 | .164 | -.5798 | .1332 |
| | | 21 | -.11333 | .09280 | .745 | -.5311 | .3045 |
| pH_F3 | 0 | 7 | .39000 | .58815 | .949 | -4.1180 | 4.8980 |
| | | 14 | .48667 | .58854 | .902 | -4.0108 | 4.9841 |
| | | 21 | .51667 | .58871 | .885 | -3.9762 | 5.0095 |
| | | 28 | 1.00000 | .64345 | .604 | -2.6295 | 4.6295 |
| | 7 | 0 | -.39000 | .58815 | .949 | -4.8980 | 4.1180 |
| | | 14 | .09667 | .04014 | .286 | -.0894 | .2827 |
| | | 21 | .12667 | .04256 | .182 | -.0760 | .3293 |
| | | 28 | .61000 | .26316 | .391 | -1.3767 | 2.5967 |
| | 14 | 0 | -.48667 | .58854 | .902 | -4.9841 | 4.0108 |
| | | 7 | -.09667 | .04014 | .286 | -.2827 | .0894 |
| | | 21 | .03000 | .04761 | .962 | -.1825 | .2425 |
| | | 28 | .51333 | .26403 | .489 | -1.4512 | 2.4779 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 21 | 0 | -.51667 | .58871 | .885 | -5.0095 | 3.9762 |
| | | 7 | -.12667 | .04256 | .182 | -.3293 | .0760 |
| | | 14 | -.03000 | .04761 | .962 | -.2425 | .1825 |
| | | 28 | .48333 | .26441 | .525 | -1.4718 | 2.4385 |
| | 28 | 0 | -1.00000 | .64345 | .604 | -4.6295 | 2.6295 |
| | | 7 | -.61000 | .26316 | .391 | -2.5967 | 1.3767 |
| | | 14 | -.51333 | .26403 | .489 | -2.4779 | 1.4512 |
| | | 21 | -.48333 | .26441 | .525 | -2.4385 | 1.4718 |

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

Lampiran 11. Hasil analisis statistik uji viskositas *real time*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Hari | Statistic | df | Sig. | Statistic | df | Sig. |
| Viskositas_F0 | 0 | .263 | 3 | . | .956 | 3 | .596 |
| | 7 | .369 | 3 | . | .787 | 3 | .085 |
| | 14 | .346 | 3 | . | .837 | 3 | .206 |
| | 21 | .278 | 3 | . | .940 | 3 | .527 |
| | 28 | .278 | 3 | . | .940 | 3 | .526 |
| Viskositas_F3 | 0 | .177 | 3 | . | 1.000 | 3 | .966 |
| | 7 | .243 | 3 | . | .973 | 3 | .682 |
| | 14 | .349 | 3 | . | .832 | 3 | .193 |
| | 21 | .271 | 3 | . | .948 | 3 | .559 |
| | 28 | .373 | 3 | . | .778 | 3 | .064 |
| Viskositas_F1 | 0 | .248 | 3 | . | .968 | 3 | .659 |
| | 7 | .176 | 3 | . | 1.000 | 3 | .982 |
| | 14 | .334 | 3 | . | .860 | 3 | .266 |
| | 21 | .363 | 3 | . | .802 | 3 | .119 |
| | 28 | .315 | 3 | . | .892 | 3 | .359 |
| Viskositas_F2 | 0 | .346 | 3 | . | .837 | 3 | .206 |
| | 7 | .253 | 3 | . | .965 | 3 | .639 |
| | 14 | .357 | 3 | . | .815 | 3 | .151 |
| | 21 | .356 | 3 | . | .818 | 3 | .157 |
| | 28 | .252 | 3 | . | .965 | 3 | .640 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Viskositas_F0 | Based on Mean | 2.500 | 4 | 10 | .109 |
| | Based on Median | .372 | 4 | 10 | .823 |
| | Based on Median and with adjusted df | .372 | 4 | 5.279 | .820 |
| | Based on trimmed mean | 2.200 | 4 | 10 | .142 |
| Viskositas_F1 | Based on Mean | 2.555 | 4 | 10 | .104 |
| | Based on Median | .309 | 4 | 10 | .865 |
| | Based on Median and with adjusted df | .309 | 4 | 5.718 | .862 |
| | Based on trimmed mean | 2.216 | 4 | 10 | .140 |
| Viskositas_F2 | Based on Mean | 4.197 | 4 | 10 | .030 |
| | Based on Median | .485 | 4 | 10 | .747 |
| | Based on Median and with adjusted df | .485 | 4 | 4.110 | .750 |
| | Based on trimmed mean | 3.591 | 4 | 10 | .046 |
| Viskositas_F3 | Based on Mean | 1.058 | 4 | 10 | .426 |
| | Based on Median | .572 | 4 | 10 | .689 |
| | Based on Median and with adjusted df | .572 | 4 | 7.060 | .692 |
| | Based on trimmed mean | 1.027 | 4 | 10 | .440 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Viskositas_F0 | Between Groups | 2914787.600 | 4 | 728696.900 | 1.825 | .001 |
| | Within Groups | 3991781.333 | 10 | 399178.133 | | |
| | Total | 6906568.933 | 14 | | | |
| Viskositas_F1 | Between Groups | 8943750.933 | 4 | 2235937.733 | 2.818 | .004 |
| | Within Groups | 7935420.000 | 10 | 793542.000 | | |
| | Total | 16879170.933 | 14 | | | |
| Viskositas_F2 | Between Groups | 65723502.400 | 4 | 16430875.600 | 5.384 | .014 |
| | Within Groups | 30519118.000 | 10 | 3051911.800 | | |
| | Total | 96242620.400 | 14 | | | |
| Viskositas_F3 | Between Groups | 7462705.600 | 4 | 1865676.400 | 1.849 | .000 |
| | Within Groups | 10091765.333 | 10 | 1009176.533 | | |
| | Total | 17554470.933 | 14 | | | |

Post-Hoc

**Multiple Comparisons**

Games-Howell

| Dependent Variable | (I) Hari | (J) Hari | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| Viskositas_F0 | 0 | 7 | -337.667 | 549.718 | .962 | -3626.28 | 2950.95 |
| | | 14 | 334.333 | 230.825 | .641 | -808.05 | 1476.72 |
| | | 21 | 760.000 | 404.715 | .467 | -1324.47 | 2844.47 |
| | | 28 | 813.000 | 511.905 | .592 | -2155.12 | 3781.12 |
| | 7 | 0 | 337.667 | 549.718 | .962 | -2950.95 | 3626.28 |
| | | 14 | 672.000 | 527.377 | .730 | -2950.40 | 4294.40 |
| | | 21 | 1097.667 | 623.411 | .502 | -1864.09 | 4059.42 |
| | | 28 | 1150.667 | 697.778 | .542 | -1962.36 | 4263.69 |
| | 14 | 0 | -334.333 | 230.825 | .641 | -1476.72 | 808.05 |
| | | 7 | -672.000 | 527.377 | .730 | -4294.40 | 2950.40 |
| | | 21 | 425.667 | 373.807 | .785 | -1901.47 | 2752.80 |
| | | 28 | 478.667 | 487.836 | .849 | -2813.29 | 3770.62 |
| | 21 | 0 | -760.000 | 404.715 | .467 | -2844.47 | 1324.47 |
| | | 7 | -1097.667 | 623.411 | .502 | -4059.42 | 1864.09 |
| | | 14 | -425.667 | 373.807 | .785 | -2752.80 | 1901.47 |
| | | 28 | 53.000 | 590.338 | 1.000 | -2682.66 | 2788.66 |
| | 28 | 0 | -813.000 | 511.905 | .592 | -3781.12 | 2155.12 |
| | | 7 | -1150.667 | 697.778 | .542 | -4263.69 | 1962.36 |
| | | 14 | -478.667 | 487.836 | .849 | -3770.62 | 2813.29 |
| | | 21 | -53.000 | 590.338 | 1.000 | -2788.66 | 2682.66 |
| Viskositas_F1 | 0 | 7 | 735.333 | 386.211 | .436 | -990.01 | 2460.67 |
| | | 14 | 1352.667 | 485.768 | .208 | -915.69 | 3621.02 |
| | | 21 | 2233.333 | 710.378 | .196 | -1796.04 | 6262.71 |
| | | 28 | 1684.000 | 823.536 | .434 | -3303.26 | 6671.26 |
| | 7 | 0 | -735.333 | 386.211 | .436 | -2460.67 | 990.01 |
| | | 14 | 617.333 | 470.664 | .704 | -1650.59 | 2885.25 |
| | | 21 | 1498.000 | 700.136 | .402 | -2626.93 | 5622.93 |
| | | 28 | 948.667 | 814.718 | .774 | -4150.95 | 6048.29 |
| | 14 | 0 | -1352.667 | 485.768 | .208 | -3621.02 | 915.69 |
| | | 7 | -617.333 | 470.664 | .704 | -2885.25 | 1650.59 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 21 | 880.667 | 759.607 | .774 | -2904.54 | 4665.87 |
| | | 28 | 331.333 | 866.358 | .993 | -4298.69 | 4961.36 |
| | 21 | 0 | -2233.333 | 710.378 | .196 | -6262.71 | 1796.04 |
| | | 7 | -1498.000 | 700.136 | .402 | -5622.93 | 2626.93 |
| | | 14 | -880.667 | 759.607 | .774 | -4665.87 | 2904.54 |
| | | 28 | -549.333 | 1009.576 | .977 | -5105.80 | 4007.14 |
| | 28 | 0 | -1684.000 | 823.536 | .434 | -6671.26 | 3303.26 |
| | | 7 | -948.667 | 814.718 | .774 | -6048.29 | 4150.95 |
| | | 14 | -331.333 | 866.358 | .993 | -4961.36 | 4298.69 |
| | | 21 | 549.333 | 1009.576 | .977 | -4007.14 | 5105.80 |
| Viskositas_F2 | 0 | 7 | 4067.000 | 1810.808 | .402 | -8966.60 | 17100.60 |
| | | 14 | 4977.333 | 1848.084 | .295 | -7314.31 | 17268.97 |
| | | 21 | 5435.333 | 1999.610 | .250 | -5262.42 | 16133.08 |
| | | 28 | 5701.333 | 1983.712 | .226 | -5090.49 | 16493.16 |
| | 7 | 0 | -4067.000 | 1810.808 | .402 | -17100.60 | 8966.60 |
| | | 14 | 910.333 | 577.457 | .583 | -1892.48 | 3713.14 |
| | | 21 | 1368.333 | 957.331 | .661 | -4560.67 | 7297.33 |
| | | 28 | 1634.333 | 923.664 | .527 | -4007.99 | 7276.65 |
| | 14 | 0 | -4977.333 | 1848.084 | .295 | -17268.97 | 7314.31 |
| | | 7 | -910.333 | 577.457 | .583 | -3713.14 | 1892.48 |
| | | 21 | 458.000 | 1026.096 | .988 | -4907.15 | 5823.15 |
| | | 28 | 724.000 | 994.759 | .937 | -4391.90 | 5839.90 |
| | 21 | 0 | -5435.333 | 1999.610 | .250 | -16133.08 | 5262.42 |
| | | 7 | -1368.333 | 957.331 | .661 | -7297.33 | 4560.67 |
| | | 14 | -458.000 | 1026.096 | .988 | -5823.15 | 4907.15 |
| | | 28 | 266.000 | 1254.022 | .999 | -5313.58 | 5845.58 |
| | 28 | 0 | -5701.333 | 1983.712 | .226 | -16493.16 | 5090.49 |
| | | 7 | -1634.333 | 923.664 | .527 | -7276.65 | 4007.99 |
| | | 14 | -724.000 | 994.759 | .937 | -5839.90 | 4391.90 |
| | | 21 | -266.000 | 1254.022 | .999 | -5845.58 | 5313.58 |
| Viskositas_F3 | 0 | 7 | 524.667 | 1005.988 | .977 | -6044.64 | 7093.97 |
| | | 14 | 806.000 | 1040.350 | .921 | -5315.26 | 6927.26 |
| | | 21 | 1814.667 | 1070.588 | .544 | -4053.30 | 7682.63 |
| | | 28 | 1750.000 | 1113.374 | .588 | -3912.04 | 7412.04 |
| | 7 | 0 | -524.667 | 1005.988 | .977 | -7093.97 | 6044.64 |
| | | 14 | 281.333 | 478.449 | .969 | -1953.21 | 2515.88 |
| | | 21 | 1290.000 | 541.058 | .306 | -1396.38 | 3976.38 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 28 | 1225.333 | 621.439 | .440 | -2096.05 | 4546.72 |
| | 14 | 0 | -806.000 | 1040.350 | .921 | -6927.26 | 5315.26 |
| | | 7 | -281.333 | 478.449 | .969 | -2515.88 | 1953.21 |
| | | 21 | 1008.667 | 602.546 | .533 | -1713.48 | 3730.82 |
| | | 28 | 944.000 | 675.650 | .663 | -2252.23 | 4140.23 |
| | 21 | 0 | -1814.667 | 1070.588 | .544 | -7682.63 | 4053.30 |
| | | 7 | -1290.000 | 541.058 | .306 | -3976.38 | 1396.38 |
| | | 14 | -1008.667 | 602.546 | .533 | -3730.82 | 1713.48 |
| | | 28 | -64.667 | 721.342 | 1.000 | -3325.79 | 3196.45 |
| | 28 | 0 | -1750.000 | 1113.374 | .588 | -7412.04 | 3912.04 |
| | | 7 | -1225.333 | 621.439 | .440 | -4546.72 | 2096.05 |
| | | 14 | -944.000 | 675.650 | .663 | -4140.23 | 2252.23 |
| | | 21 | 64.667 | 721.342 | 1.000 | -3196.45 | 3325.79 |

Lampiran 12. Hasil analisis statistic pengukuran daya sebar *real time*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Hari | Statistic | df | Sig. | Statistic | df | Sig. |
| Dayasebar_F0 | 0 | .243 | 3 | . | .972 | 3 | .679 |
| | 7 | .310 | 3 | . | .898 | 3 | .380 |
| | 14 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | 21 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | 28 | .253 | 3 | . | .964 | 3 | .637 |
| Dayasebar_F1 | 0 | .280 | 3 | . | .938 | 3 | .518 |
| | 7 | .345 | 3 | . | .839 | 3 | .212 |
| | 14 | .354 | 3 | . | .822 | 3 | .167 |
| | 21 | .374 | 3 | . | .778 | 3 | .062 |
| | 28 | .334 | 3 | . | .860 | 3 | .266 |
| Dayasebar_F3 | 0 | .241 | 3 | . | .974 | 3 | .688 |
| | 7 | .204 | 3 | . | .993 | 3 | .843 |
| | 14 | .367 | 3 | . | .794 | 3 | .100 |
| | 21 | .307 | 3 | . | .904 | 3 | .398 |
| | 28 | .209 | 3 | . | .992 | 3 | .825 |
| Dayasebar_F2 | 0 | .339 | 3 | . | .850 | 3 | .242 |
| | 7 | .219 | 3 | . | .987 | 3 | .780 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 14 | .269 | 3 | . | .949 | 3 | .567 |
| | 21 | .330 | 3 | . | .867 | 3 | .288 |
| | 28 | .375 | 3 | . | .775 | 3 | .056 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Dayasebar_F0 | Based on Mean | 6.663 | 4 | 10 | .007 |
| | Based on Median | 1.329 | 4 | 10 | .325 |
| | Based on Median and with adjusted df | 1.329 | 4 | 2.506 | .445 |
| | Based on trimmed mean | 6.019 | 4 | 10 | .010 |
| Dayasebar_F1 | Based on Mean | 3.323 | 4 | 10 | .056 |
| | Based on Median | .347 | 4 | 10 | .840 |
| | Based on Median and with adjusted df | .347 | 4 | 5.180 | .836 |
| | Based on trimmed mean | 2.800 | 4 | 10 | .085 |
| Dayasebar_F2 | Based on Mean | 1.281 | 4 | 10 | .340 |
| | Based on Median | .245 | 4 | 10 | .906 |
| | Based on Median and with adjusted df | .245 | 4 | 7.694 | .904 |
| | Based on trimmed mean | 1.147 | 4 | 10 | .389 |
| Dayasebar_F3 | Based on Mean | 2.042 | 4 | 10 | .164 |
| | Based on Median | .740 | 4 | 10 | .586 |
| | Based on Median and with adjusted df | .740 | 4 | 6.760 | .595 |
| | Based on trimmed mean | 1.929 | 4 | 10 | .182 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dayasebar_F0 | Between Groups | .156 | 4 | .039 | 2.547 | .005 |
| | Within Groups | .154 | 10 | .015 | | |
| | Total | .310 | 14 | | | |
| Dayasebar_F1 | Between Groups | .622 | 4 | .155 | 1.924 | .003 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Within Groups | .808 | 10 | .081 | | |
| | Total | 1.429 | 14 | | | |
| Dayasebar_F2 | Between Groups | .817 | 4 | .204 | 1.093 | .000 |
| | Within Groups | 1.870 | 10 | .187 | | |
| | Total | 2.687 | 14 | | | |
| Dayasebar_F3 | Between Groups | 1.368 | 4 | .342 | 7.235 | .005 |
| | Within Groups | .473 | 10 | .047 | | |
| | Total | 1.840 | 14 | | | |

Post-Hoc

**Multiple Comparisons**

Games-Howell

| Dependent Variable | (I) Hari | (J) Hari | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| Dayasebar_F0 | 0 | 7 | .01000 | .15445 | 1.000 | -.9527 | .9727 |
| | | 14 | -.07333 | .06412 | .781 | -.3647 | .2180 |
| | | 21 | -.20333 | .05011 | .159 | -.5775 | .1708 |
| | | 28 | -.23667 | .05055 | .117 | -.6002 | .1269 |
| | 7 | 0 | -.01000 | .15445 | 1.000 | -.9727 | .9527 |
| | | 14 | -.08333 | .15169 | .973 | -1.0880 | .9213 |
| | | 21 | -.21333 | .14633 | .660 | -1.3352 | .9085 |
| | | 28 | -.24667 | .14648 | .576 | -1.3644 | .8710 |
| | 14 | 0 | .07333 | .06412 | .781 | -.2180 | .3647 |
| | | 7 | .08333 | .15169 | .973 | -.9213 | 1.0880 |
| | | 21 | -.13000 | .04082 | .238 | -.4303 | .1703 |
| | | 28 | -.16333 | .04137 | .155 | -.4516 | .1249 |
| | 21 | 0 | .20333 | .05011 | .159 | -.1708 | .5775 |
| | | 7 | .21333 | .14633 | .660 | -.9085 | 1.3352 |
| | | 14 | .13000 | .04082 | .238 | -.1703 | .4303 |
| | | 28 | -.03333 | .01054 | .160 | -.0843 | .0176 |
| | 28 | 0 | .23667 | .05055 | .117 | -.1269 | .6002 |
| | | 7 | .24667 | .14648 | .576 | -.8710 | 1.3644 |
| | | 14 | .16333 | .04137 | .155 | -.1249 | .4516 |
| | | 21 | .03333 | .01054 | .160 | -.0176 | .0843 |
| Dayasebar_F1 | 0 | 7 | .03667 | .23031 | 1.000 | -1.0239 | 1.0972 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 14 | -.18667 | .29918 | .961 | -1.7581 | 1.3848 |
| | | 21 | -.41667 | .16566 | .273 | -1.2286 | .3952 |
| | | 28 | -.45333 | .15333 | .221 | -1.3194 | .4128 |
| | 7 | 0 | -.03667 | .23031 | 1.000 | -1.0972 | 1.0239 |
| | | 14 | -.22333 | .32139 | .946 | -1.7485 | 1.3018 |
| | | 21 | -.45333 | .20303 | .364 | -1.5613 | .6546 |
| | | 28 | -.49000 | .19310 | .314 | -1.6933 | .7133 |
| | 14 | 0 | .18667 | .29918 | .961 | -1.3848 | 1.7581 |
| | | 7 | .22333 | .32139 | .946 | -1.3018 | 1.7485 |
| | | 21 | -.23000 | .27873 | .905 | -1.9776 | 1.5176 |
| | | 28 | -.26667 | .27158 | .848 | -2.1319 | 1.5985 |
| | 21 | 0 | .41667 | .16566 | .273 | -.3952 | 1.2286 |
| | | 7 | .45333 | .20303 | .364 | -.6546 | 1.5613 |
| | | 14 | .23000 | .27873 | .905 | -1.5176 | 1.9776 |
| | | 28 | -.03667 | .10812 | .996 | -.5466 | .4733 |
| | 28 | 0 | .45333 | .15333 | .221 | -.4128 | 1.3194 |
| | | 7 | .49000 | .19310 | .314 | -.7133 | 1.6933 |
| | | 14 | .26667 | .27158 | .848 | -1.5985 | 2.1319 |
| | | 21 | .03667 | .10812 | .996 | -.4733 | .5466 |
| Dayasebar_F2 | 0 | 7 | -.32333 | .33097 | .852 | -2.1216 | 1.4750 |
| | | 14 | -.33000 | .46350 | .943 | -2.4243 | 1.7643 |
| | | 21 | -.61000 | .35407 | .520 | -2.3299 | 1.1099 |
| | | 28 | -.64333 | .35657 | .486 | -2.3609 | 1.0743 |
| | 7 | 0 | .32333 | .33097 | .852 | -1.4750 | 2.1216 |
| | | 14 | -.00667 | .38407 | 1.000 | -2.2491 | 2.2358 |
| | | 21 | -.28667 | .24092 | .760 | -1.4001 | .8268 |
| | | 28 | -.32000 | .24459 | .704 | -1.4576 | .8176 |
| | 14 | 0 | .33000 | .46350 | .943 | -1.7643 | 2.4243 |
| | | 7 | .00667 | .38407 | 1.000 | -2.2358 | 2.2491 |
| | | 21 | -.28000 | .40415 | .946 | -2.3857 | 1.8257 |
| | | 28 | -.31333 | .40634 | .924 | -2.4101 | 1.7834 |
| | 21 | 0 | .61000 | .35407 | .520 | -1.1099 | 2.3299 |
| | | 7 | .28667 | .24092 | .760 | -.8268 | 1.4001 |
| | | 14 | .28000 | .40415 | .946 | -1.8257 | 2.3857 |
| | | 28 | -.03333 | .27504 | 1.000 | -1.2564 | 1.1897 |
| | 28 | 0 | .64333 | .35657 | .486 | -1.0743 | 2.3609 |
| | | 7 | .32000 | .24459 | .704 | -.8176 | 1.4576 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 14 | .31333 | .40634 | .924 | -1.7834 | 2.4101 |
| | | 21 | .03333 | .27504 | 1.000 | -1.1897 | 1.2564 |
| Dayasebar_F3 | 0 | 7 | -.09000 | .08439 | .815 | -.6637 | .4837 |
| | | 14 | -.18667 | .13728 | .680 | -.8239 | .4506 |
| | | 21 | -.70333 | .16193 | .075 | -1.5196 | .1129 |
| | | 28 | -.69000 | .21615 | .195 | -1.9510 | .5710 |
| | 7 | 0 | .09000 | .08439 | .815 | -.4837 | .6637 |
| | | 14 | -.09667 | .11200 | .891 | -.8982 | .7048 |
| | | 21 | -.61333 | .14115 | .138 | -1.6502 | .4235 |
| | | 28 | -.60000 | .20105 | .268 | -2.1116 | .9116 |
| | 14 | 0 | .18667 | .13728 | .680 | -.4506 | .8239 |
| | | 7 | .09667 | .11200 | .891 | -.7048 | .8982 |
| | | 21 | -.51667 | .17789 | .183 | -1.3302 | .2969 |
| | | 28 | -.50333 | .22835 | .362 | -1.6840 | .6774 |
| | 21 | 0 | .70333 | .16193 | .075 | -.1129 | 1.5196 |
| | | 7 | .61333 | .14115 | .138 | -.4235 | 1.6502 |
| | | 14 | .51667 | .17789 | .183 | -.2969 | 1.3302 |
| | | 28 | .01333 | .24397 | 1.000 | -1.1408 | 1.1674 |
| | 28 | 0 | .69000 | .21615 | .195 | -.5710 | 1.9510 |
| | | 7 | .60000 | .20105 | .268 | -.9116 | 2.1116 |
| | | 14 | .50333 | .22835 | .362 | -.6774 | 1.6840 |
| | | 21 | -.01333 | .24397 | 1.000 | -1.1674 | 1.1408 |

Lampiran 13. Hasil analisis statistic pengukuran daya lekat *real time*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Hari | Statistic | df | Sig. | Statistic | df | Sig. |
| Dayalekat_F0 | 0 | .253 | 3 | . | .964 | 3 | .637 |
| | 7 | .373 | 3 | . | .780 | 3 | .067 |
| | 14 | .366 | 3 | . | .795 | 3 | .103 |
| | 21 | .251 | 3 | . | .966 | 3 | .644 |
| | 28 | .201 | 3 | . | .995 | 3 | .859 |
| Dayalekat_F1 | 0 | .216 | 3 | . | .989 | 3 | .797 |
| | 7 | .253 | 3 | . | .964 | 3 | .637 |
| | 14 | .238 | 3 | . | .976 | 3 | .702 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 21 | .202 | 3 | . | .994 | 3 | .851 |
| | 28 | .318 | 3 | . | .887 | 3 | .346 |
| Dayalekat_F3 | 0 | .340 | 3 | . | .848 | 3 | .235 |
| | 7 | .234 | 3 | . | .979 | 3 | .719 |
| | 14 | .255 | 3 | . | .963 | 3 | .630 |
| | 21 | .222 | 3 | . | .986 | 3 | .770 |
| | 28 | .257 | 3 | . | .961 | 3 | .619 |
| Dayalekat_F2 | 0 | .366 | 3 | . | .794 | 3 | .101 |
| | 7 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | 14 | .286 | 3 | . | .931 | 3 | .491 |
| | 21 | .176 | 3 | . | 1.000 | 3 | .985 |
| | 28 | .362 | 3 | . | .803 | 3 | .122 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Dayalekat_F0 | Based on Mean | 2.687 | 4 | 10 | .093 |
| | Based on Median | .628 | 4 | 10 | .653 |
| | Based on Median and with adjusted df | .628 | 4 | 5.278 | .662 |
| | Based on trimmed mean | 2.459 | 4 | 10 | .113 |
| Dayalekat_F1 | Based on Mean | 2.781 | 4 | 10 | .086 |
| | Based on Median | .987 | 4 | 10 | .457 |
| | Based on Median and with adjusted df | .987 | 4 | 4.746 | .494 |
| | Based on trimmed mean | 2.627 | 4 | 10 | .098 |
| Dayalekat_F2 | Based on Mean | 2.551 | 4 | 10 | .105 |
| | Based on Median | .585 | 4 | 10 | .681 |
| | Based on Median and with adjusted df | .585 | 4 | 5.134 | .688 |
| | Based on trimmed mean | 2.338 | 4 | 10 | .126 |
| Dayalekat_F3 | Based on Mean | 1.913 | 4 | 10 | .185 |
| | Based on Median | .984 | 4 | 10 | .459 |
| | Based on Median and with adjusted df | .984 | 4 | 6.026 | .482 |
| | Based on trimmed mean | 1.844 | 4 | 10 | .197 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dayalekat_F0 | Between Groups | 6.711 | 4 | 1.678 | 19.055 | .000 |
| | Within Groups | .881 | 10 | .088 | | |
| | Total | 7.592 | 14 | | | |
| Dayalekat_F1 | Between Groups | 4.130 | 4 | 1.032 | 16.408 | .000 |
| | Within Groups | .629 | 10 | .063 | | |
| | Total | 4.759 | 14 | | | |
| Dayalekat_F2 | Between Groups | 5.211 | 4 | 1.303 | 6.321 | .008 |
| | Within Groups | 2.061 | 10 | .206 | | |
| | Total | 7.273 | 14 | | | |
| Dayalekat_F3 | Between Groups | 12.462 | 4 | 3.115 | 17.902 | .000 |
| | Within Groups | 1.740 | 10 | .174 | | |
| | Total | 14.202 | 14 | | | |

Post-Hoc

**Multiple Comparisons**

Bonferroni

| Dependent Variable | (I) Hari | (J) Hari | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| `Dayalekat_F0 | 0 | 7 | .10333 | .24229 | 1.000 | -.7644 | .9711 |
| | | 14 | .46000 | .24229 | .868 | -.4077 | 1.3277 |
| | | 21 | 1.17333* | .24229 | .007 | .3056 | 2.0411 |
| | | 28 | 1.75333* | .24229 | .000 | .8856 | 2.6211 |
| | 7 | 0 | -.10333 | .24229 | 1.000 | -.9711 | .7644 |
| | | 14 | .35667 | .24229 | 1.000 | -.5111 | 1.2244 |
| | | 21 | 1.07000* | .24229 | .013 | .2023 | 1.9377 |
| | | 28 | 1.65000* | .24229 | .000 | .7823 | 2.5177 |
| | 14 | 0 | -.46000 | .24229 | .868 | -1.3277 | .4077 |
| | | 7 | -.35667 | .24229 | 1.000 | -1.2244 | .5111 |
| | | 21 | .71333 | .24229 | .147 | -.1544 | 1.5811 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 28 | 1.29333* | .24229 | .003 | .4256 | 2.1611 |
| | 21 | 0 | -1.17333* | .24229 | .007 | -2.0411 | -.3056 |
| | | 7 | -1.07000* | .24229 | .013 | -1.9377 | -.2023 |
| | | 14 | -.71333 | .24229 | .147 | -1.5811 | .1544 |
| | | 28 | .58000 | .24229 | .377 | -.2877 | 1.4477 |
| | 28 | 0 | -1.75333* | .24229 | .000 | -2.6211 | -.8856 |
| | | 7 | -1.65000* | .24229 | .000 | -2.5177 | -.7823 |
| | | 14 | -1.29333* | .24229 | .003 | -2.1611 | -.4256 |
| | | 21 | -.58000 | .24229 | .377 | -1.4477 | .2877 |
| Dayalekat_F1 | 0 | 7 | .15000 | .20481 | 1.000 | -.5835 | .8835 |
| | | 14 | .34333 | .20481 | 1.000 | -.3902 | 1.0768 |
| | | 21 | 1.07667* | .20481 | .004 | .3432 | 1.8102 |
| | | 28 | 1.32333* | .20481 | .001 | .5898 | 2.0568 |
| | 7 | 0 | -.15000 | .20481 | 1.000 | -.8835 | .5835 |
| | | 14 | .19333 | .20481 | 1.000 | -.5402 | .9268 |
| | | 21 | .92667* | .20481 | .011 | .1932 | 1.6602 |
| | | 28 | 1.17333* | .20481 | .002 | .4398 | 1.9068 |
| | 14 | 0 | -.34333 | .20481 | 1.000 | -1.0768 | .3902 |
| | | 7 | -.19333 | .20481 | 1.000 | -.9268 | .5402 |
| | | 21 | .73333 | .20481 | .050 | -.0002 | 1.4668 |
| | | 28 | .98000* | .20481 | .007 | .2465 | 1.7135 |
| | 21 | 0 | -1.07667* | .20481 | .004 | -1.8102 | -.3432 |
| | | 7 | -.92667* | .20481 | .011 | -1.6602 | -.1932 |
| | | 14 | -.73333 | .20481 | .050 | -1.4668 | .0002 |
| | | 28 | .24667 | .20481 | 1.000 | -.4868 | .9802 |
| | 28 | 0 | -1.32333* | .20481 | .001 | -2.0568 | -.5898 |
| | | 7 | -1.17333* | .20481 | .002 | -1.9068 | -.4398 |
| | | 14 | -.98000* | .20481 | .007 | -1.7135 | -.2465 |
| | | 21 | -.24667 | .20481 | 1.000 | -.9802 | .4868 |
| Dayalekat_F2 | 0 | 7 | .31333 | .37069 | 1.000 | -1.0143 | 1.6409 |
| | | 14 | .68667 | .37069 | .937 | -.6409 | 2.0143 |
| | | 21 | 1.08000 | .37069 | .155 | -.2476 | 2.4076 |
| | | 28 | 1.68333* | .37069 | .011 | .3557 | 3.0109 |
| | 7 | 0 | -.31333 | .37069 | 1.000 | -1.6409 | 1.0143 |
| | | 14 | .37333 | .37069 | 1.000 | -.9543 | 1.7009 |
| | | 21 | .76667 | .37069 | .655 | -.5609 | 2.0943 |
| | | 28 | 1.37000* | .37069 | .041 | .0424 | 2.6976 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 14 | 0 | -.68667 | .37069 | .937 | -2.0143 | .6409 |
| | | 7 | -.37333 | .37069 | 1.000 | -1.7009 | .9543 |
| | | 21 | .39333 | .37069 | 1.000 | -.9343 | 1.7209 |
| | | 28 | .99667 | .37069 | .228 | -.3309 | 2.3243 |
| | 21 | 0 | -1.08000 | .37069 | .155 | -2.4076 | .2476 |
| | | 7 | -.76667 | .37069 | .655 | -2.0943 | .5609 |
| | | 14 | -.39333 | .37069 | 1.000 | -1.7209 | .9343 |
| | | 28 | .60333 | .37069 | 1.000 | -.7243 | 1.9309 |
| | 28 | 0 | -1.68333* | .37069 | .011 | -3.0109 | -.3557 |
| | | 7 | -1.37000* | .37069 | .041 | -2.6976 | -.0424 |
| | | 14 | -.99667 | .37069 | .228 | -2.3243 | .3309 |
| | | 21 | -.60333 | .37069 | 1.000 | -1.9309 | .7243 |
| Dayalekat_F3 | 0 | 7 | .48000 | .34061 | 1.000 | -.7399 | 1.6999 |
| | | 14 | .65667 | .34061 | .827 | -.5632 | 1.8765 |
| | | 21 | 1.27667* | .34061 | .038 | .0568 | 2.4965 |
| | | 28 | 2.64000* | .34061 | .000 | 1.4201 | 3.8599 |
| | 7 | 0 | -.48000 | .34061 | 1.000 | -1.6999 | .7399 |
| | | 14 | .17667 | .34061 | 1.000 | -1.0432 | 1.3965 |
| | | 21 | .79667 | .34061 | .414 | -.4232 | 2.0165 |
| | | 28 | 2.16000* | .34061 | .001 | .9401 | 3.3799 |
| | 14 | 0 | -.65667 | .34061 | .827 | -1.8765 | .5632 |
| | | 7 | -.17667 | .34061 | 1.000 | -1.3965 | 1.0432 |
| | | 21 | .62000 | .34061 | .987 | -.5999 | 1.8399 |
| | | 28 | 1.98333* | .34061 | .002 | .7635 | 3.2032 |
| | 21 | 0 | -1.27667 | .34061 | .038 | -2.4965 | -.0568 |
| | | 7 | -.79667 | .34061 | .414 | -2.0165 | .4232 |
| | | 14 | -.62000 | .34061 | .987 | -1.8399 | .5999 |
| | | 28 | 1.36333* | .34061 | .025 | .1435 | 2.5832 |
| | 28 | 0 | -2.64000* | .34061 | .000 | -3.8599 | -1.4201 |
| | | 7 | -2.16000* | .34061 | .001 | -3.3799 | -.9401 |
| | | 14 | -1.98333* | .34061 | .002 | -3.2032 | -.7635 |
| | | 21 | -1.36333* | .34061 | .025 | -2.5832 | -.1435 |

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

Lampiran 14. Hasil analisis statistic pengukuran pH *cycling test*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Siklus | Statistic | df | Sig. | Statistic | df | Sig. |
| pH_F0 | Siklus 1 | .339 | 3 | . | .851 | 3 | .244 |
| | Siklus 2 | .357 | 3 | . | .815 | 3 | .151 |
| | Siklus 3 | .349 | 3 | . | .831 | 3 | .191 |
| | Siklus 4 | .356 | 3 | . | .816 | 3 | .154 |
| | Siklus 5 | .328 | 3 | . | .871 | 3 | .298 |
| | Siklus 6 | .337 | 3 | . | .854 | 3 | .250 |
| pH_F1 | Siklus 1 | .253 | 3 | . | .964 | 3 | .637 |
| | Siklus 2 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 3 | .314 | 3 | . | .893 | 3 | .363 |
| | Siklus 4 | .253 | 3 | . | .964 | 3 | .637 |
| | Siklus 5 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 6 | .219 | 3 | . | .987 | 3 | .780 |
| pH_F2 | Siklus 1 | .190 | 3 | . | .997 | 3 | .904 |
| | Siklus 2 | .187 | 3 | . | .998 | 3 | .915 |
| | Siklus 3 | .176 | 3 | . | 1.000 | 3 | .977 |
| | Siklus 4 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 5 | .229 | 3 | . | .981 | 3 | .739 |
| | Siklus 6 | .238 | 3 | . | .976 | 3 | .702 |
| pH_F3 | Siklus 1 | .318 | 3 | . | .887 | 3 | .346 |
| | Siklus 2 | .216 | 3 | . | .989 | 3 | .797 |
| | Siklus 3 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 4 | .194 | 3 | . | .996 | 3 | .886 |
| | Siklus 5 | .368 | 3 | . | .792 | 3 | .094 |
| | Siklus 6 | .310 | 3 | . | .900 | 3 | .384 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| pH_F0 | Based on Mean | 2.404 | 5 | 11 | .105 |
| | Based on Median | .251 | 5 | 11 | .930 |

| | | | | | |
|---|---|---|---|---|---|
| | Based on Median and with adjusted df | .251 | 5 | 8.357 | .928 |
| | Based on trimmed mean | 2.018 | 5 | 11 | .154 |
| pH_F1 | Based on Mean | .866 | 5 | 11 | .533 |
| | Based on Median | .486 | 5 | 11 | .780 |
| | Based on Median and with adjusted df | .486 | 5 | 7.758 | .778 |
| | Based on trimmed mean | .841 | 5 | 11 | .548 |
| pH_F2 | Based on Mean | .870 | 5 | 11 | .531 |
| | Based on Median | .787 | 5 | 11 | .580 |
| | Based on Median and with adjusted df | .787 | 5 | 5.371 | .598 |
| | Based on trimmed mean | .866 | 5 | 11 | .534 |
| pH_F3 | Based on Mean | .240 | 5 | 11 | .936 |
| | Based on Median | .187 | 5 | 11 | .962 |
| | Based on Median and with adjusted df | .187 | 5 | 9.227 | .961 |
| | Based on trimmed mean | .236 | 5 | 11 | .938 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| pH_F0 | Between Groups | 4.587 | 5 | .917 | .785 | .001 |
| | Within Groups | 12.856 | 11 | 1.169 | | |
| | Total | 17.443 | 16 | | | |
| pH_F1 | Between Groups | 2.215 | 5 | .443 | 599.262 | .000 |
| | Within Groups | .008 | 11 | .001 | | |
| | Total | 2.224 | 16 | | | |
| pH_F2 | Between Groups | 1.579 | 5 | .316 | 15.330 | .000 |
| | Within Groups | .227 | 11 | .021 | | |
| | Total | 1.806 | 16 | | | |
| pH_F3 | Between Groups | .994 | 5 | .199 | 13.348 | .000 |
| | Within Groups | .164 | 11 | .015 | | |
| | Total | 1.158 | 16 | | | |

Post-Hoc

**Multiple Comparisons**

Bonferroni

| Dependent Variable | (I) Siklus | (J) Siklus | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| pH_F0 | Siklus 1 | Siklus 2 | 1.80000 | .98687 | 1.000 | -1.8793 | 5.4793 |
| | | Siklus 3 | .62333 | .98687 | 1.000 | -3.0560 | 4.3027 |
| | | Siklus 4 | 1.24000 | .98687 | 1.000 | -2.4393 | 4.9193 |
| | | Siklus 5 | .84333 | .98687 | 1.000 | -2.8360 | 4.5227 |
| | | Siklus 6 | .89667 | .98687 | 1.000 | -2.7827 | 4.5760 |
| | Siklus 2 | Siklus 1 | -1.80000 | .98687 | 1.000 | -5.4793 | 1.8793 |
| | | Siklus 3 | -1.17667 | .88268 | 1.000 | -4.4676 | 2.1142 |
| | | Siklus 4 | -.56000 | .88268 | 1.000 | -3.8509 | 2.7309 |
| | | Siklus 5 | -.95667 | .88268 | 1.000 | -4.2476 | 2.3342 |
| | | Siklus 6 | -.90333 | .88268 | 1.000 | -4.1942 | 2.3876 |
| | Siklus 3 | Siklus 1 | -.62333 | .98687 | 1.000 | -4.3027 | 3.0560 |
| | | Siklus 2 | 1.17667 | .88268 | 1.000 | -2.1142 | 4.4676 |
| | | Siklus 4 | .61667 | .88268 | 1.000 | -2.6742 | 3.9076 |
| | | Siklus 5 | .22000 | .88268 | 1.000 | -3.0709 | 3.5109 |
| | | Siklus 6 | .27333 | .88268 | 1.000 | -3.0176 | 3.5642 |
| | Siklus 4 | Siklus 1 | -1.24000 | .98687 | 1.000 | -4.9193 | 2.4393 |
| | | Siklus 2 | .56000 | .88268 | 1.000 | -2.7309 | 3.8509 |
| | | Siklus 3 | -.61667 | .88268 | 1.000 | -3.9076 | 2.6742 |
| | | Siklus 5 | -.39667 | .88268 | 1.000 | -3.6876 | 2.8942 |
| | | Siklus 6 | -.34333 | .88268 | 1.000 | -3.6342 | 2.9476 |
| | Siklus 5 | Siklus 1 | -.84333 | .98687 | 1.000 | -4.5227 | 2.8360 |
| | | Siklus 2 | .95667 | .88268 | 1.000 | -2.3342 | 4.2476 |
| | | Siklus 3 | -.22000 | .88268 | 1.000 | -3.5109 | 3.0709 |
| | | Siklus 4 | .39667 | .88268 | 1.000 | -2.8942 | 3.6876 |
| | | Siklus 6 | .05333 | .88268 | 1.000 | -3.2376 | 3.3442 |
| | Siklus 6 | Siklus 1 | -.89667 | .98687 | 1.000 | -4.5760 | 2.7827 |
| | | Siklus 2 | .90333 | .88268 | 1.000 | -2.3876 | 4.1942 |
| | | Siklus 3 | -.27333 | .88268 | 1.000 | -3.5642 | 3.0176 |
| | | Siklus 4 | .34333 | .88268 | 1.000 | -2.9476 | 3.6342 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 5 | -.05333 | .88268 | 1.000 | -3.3442 | 3.2376 |
| pH_F1 | Siklus 1 | Siklus 2 | 1.08000* | .02482 | .000 | .9875 | 1.1725 |
| | | Siklus 3 | .07000 | .02482 | .250 | -.0225 | .1625 |
| | | Siklus 4 | .60667* | .02482 | .000 | .5141 | .6992 |
| | | Siklus 5 | .30333* | .02482 | .000 | .2108 | .3959 |
| | | Siklus 6 | .30000* | .02482 | .000 | .2075 | .3925 |
| | Siklus 2 | Siklus 1 | -1.08000* | .02482 | .000 | -1.1725 | -.9875 |
| | | Siklus 3 | -1.01000* | .02220 | .000 | -1.0928 | -.9272 |
| | | Siklus 4 | -.47333* | .02220 | .000 | -.5561 | -.3906 |
| | | Siklus 5 | -.77667* | .02220 | .000 | -.8594 | -.6939 |
| | | Siklus 6 | -.78000* | .02220 | .000 | -.8628 | -.6972 |
| | Siklus 3 | Siklus 1 | -.07000 | .02482 | .250 | -.1625 | .0225 |
| | | Siklus 2 | 1.01000* | .02220 | .000 | .9272 | 1.0928 |
| | | Siklus 4 | .53667* | .02220 | .000 | .4539 | .6194 |
| | | Siklus 5 | .23333* | .02220 | .000 | .1506 | .3161 |
| | | Siklus 6 | .23000* | .02220 | .000 | .1472 | .3128 |
| | Siklus 4 | Siklus 1 | -.60667* | .02482 | .000 | -.6992 | -.5141 |
| | | Siklus 2 | .47333* | .02220 | .000 | .3906 | .5561 |
| | | Siklus 3 | -.53667* | .02220 | .000 | -.6194 | -.4539 |
| | | Siklus 5 | -.30333* | .02220 | .000 | -.3861 | -.2206 |
| | | Siklus 6 | -.30667* | .02220 | .000 | -.3894 | -.2239 |
| | Siklus 5 | Siklus 1 | -.30333* | .02482 | .000 | -.3959 | -.2108 |
| | | Siklus 2 | .77667* | .02220 | .000 | .6939 | .8594 |
| | | Siklus 3 | -.23333* | .02220 | .000 | -.3161 | -.1506 |
| | | Siklus 4 | .30333* | .02220 | .000 | .2206 | .3861 |
| | | Siklus 6 | -.00333 | .02220 | 1.000 | -.0861 | .0794 |
| | Siklus 6 | Siklus 1 | -.30000* | .02482 | .000 | -.3925 | -.2075 |
| | | Siklus 2 | .78000* | .02220 | .000 | .6972 | .8628 |
| | | Siklus 3 | -.23000* | .02220 | .000 | -.3128 | -.1472 |
| | | Siklus 4 | .30667* | .02220 | .000 | .2239 | .3894 |
| | | Siklus 5 | .00333 | .02220 | 1.000 | -.0794 | .0861 |
| pH_F2 | Siklus 1 | Siklus 2 | 1.10167* | .13104 | .000 | .6131 | 1.5902 |
| | | Siklus 3 | .50833* | .13104 | .038 | .0198 | .9969 |
| | | Siklus 4 | .76500* | .13104 | .002 | .2765 | 1.2535 |
| | | Siklus 5 | .56833* | .13104 | .018 | .0798 | 1.0569 |
| | | Siklus 6 | .57500* | .13104 | .016 | .0865 | 1.0635 |
| | Siklus 2 | Siklus 1 | -1.10167* | .13104 | .000 | -1.5902 | -.6131 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 3 | -.59333* | .11720 | .005 | -1.0303 | -.1564 |
| | | Siklus 4 | -.33667* | .11720 | .228 | -.7736 | .1003 |
| | | Siklus 5 | -.53333* | .11720 | .012 | -.9703 | -.0964 |
| | | Siklus 6 | -.52667* | .11720 | .014 | -.9636 | -.0897 |
| | Siklus 3 | Siklus 1 | -.50833* | .13104 | .038 | -.9969 | -.0198 |
| | | Siklus 2 | .59333* | .11720 | .005 | .1564 | 1.0303 |
| | | Siklus 4 | .25667 | .11720 | .765 | -.1803 | .6936 |
| | | Siklus 5 | .06000 | .11720 | 1.000 | -.3770 | .4970 |
| | | Siklus 6 | .06667 | .11720 | 1.000 | -.3703 | .5036 |
| | Siklus 4 | Siklus 1 | -.76500* | .13104 | .002 | -1.2535 | -.2765 |
| | | Siklus 2 | .33667 | .11720 | .228 | -.1003 | .7736 |
| | | Siklus 3 | -.25667 | .11720 | .765 | -.6936 | .1803 |
| | | Siklus 5 | -.19667 | .11720 | 1.000 | -.6336 | .2403 |
| | | Siklus 6 | -.19000 | .11720 | 1.000 | -.6270 | .2470 |
| | Siklus 5 | Siklus 1 | -.56833* | .13104 | .018 | -1.0569 | -.0798 |
| | | Siklus 2 | .53333* | .11720 | .012 | .0964 | .9703 |
| | | Siklus 3 | -.06000 | .11720 | 1.000 | -.4970 | .3770 |
| | | Siklus 4 | .19667 | .11720 | 1.000 | -.2403 | .6336 |
| | | Siklus 6 | .00667 | .11720 | 1.000 | -.4303 | .4436 |
| | Siklus 6 | Siklus 1 | -.57500* | .13104 | .016 | -1.0635 | -.0865 |
| | | Siklus 2 | .52667* | .11720 | .014 | .0897 | .9636 |
| | | Siklus 3 | -.06667 | .11720 | 1.000 | -.5036 | .3703 |
| | | Siklus 4 | .19000 | .11720 | 1.000 | -.2470 | .6270 |
| | | Siklus 5 | -.00667 | .11720 | 1.000 | -.4436 | .4303 |
| pH_F3 | Siklus 1 | Siklus 2 | .60333* | .11140 | .003 | .1880 | 1.0187 |
| | | Siklus 3 | -.06000 | .11140 | 1.000 | -.4753 | .3553 |
| | | Siklus 4 | .49000* | .11140 | .016 | .0747 | .9053 |
| | | Siklus 5 | .17333 | .11140 | 1.000 | -.2420 | .5887 |
| | | Siklus 6 | .17667 | .11140 | 1.000 | -.2387 | .5920 |
| | Siklus 2 | Siklus 1 | -.60333* | .11140 | .003 | -1.0187 | -.1880 |
| | | Siklus 3 | -.66333* | .09964 | .001 | -1.0348 | -.2919 |
| | | Siklus 4 | -.11333 | .09964 | 1.000 | -.4848 | .2581 |
| | | Siklus 5 | -.43000* | .09964 | .018 | -.8015 | -.0585 |
| | | Siklus 6 | -.42667* | .09964 | .019 | -.7981 | -.0552 |
| | Siklus 3 | Siklus 1 | .06000 | .11140 | 1.000 | -.3553 | .4753 |
| | | Siklus 2 | .66333* | .09964 | .001 | .2919 | 1.0348 |
| | | Siklus 4 | .55000* | .09964 | .003 | .1785 | .9215 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 5 | .23333 | .09964 | .586 | -.1381 | .6048 |
| | | Siklus 6 | .23667 | .09964 | .552 | -.1348 | .6081 |
| | Siklus 4 | Siklus 1 | -.49000* | .11140 | .016 | -.9053 | -.0747 |
| | | Siklus 2 | .11333 | .09964 | 1.000 | -.2581 | .4848 |
| | | Siklus 3 | -.55000* | .09964 | .003 | -.9215 | -.1785 |
| | | Siklus 5 | -.31667 | .09964 | .132 | -.6881 | .0548 |
| | | Siklus 6 | -.31333 | .09964 | .140 | -.6848 | .0581 |
| | Siklus 5 | Siklus 1 | -.17333 | .11140 | 1.000 | -.5887 | .2420 |
| | | Siklus 2 | .43000* | .09964 | .018 | .0585 | .8015 |
| | | Siklus 3 | -.23333 | .09964 | .586 | -.6048 | .1381 |
| | | Siklus 4 | .31667 | .09964 | .132 | -.0548 | .6881 |
| | | Siklus 6 | .00333 | .09964 | 1.000 | -.3681 | .3748 |
| | Siklus 6 | Siklus 1 | -.17667 | .11140 | 1.000 | -.5920 | .2387 |
| | | Siklus 2 | .42667* | .09964 | .019 | .0552 | .7981 |
| | | Siklus 3 | -.23667 | .09964 | .552 | -.6081 | .1348 |
| | | Siklus 4 | .31333 | .09964 | .140 | -.0581 | .6848 |
| | | Siklus 5 | -.00333 | .09964 | 1.000 | -.3748 | .3681 |

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

Lampiran 15. Hasil analisis statistic pengukuran viskositas *cycling test*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Siklus | Statistic | df | Sig. | Statistic | df | Sig. |
| Viskositas_F0 | Siklus 1 | .279 | 3 | . | .938 | 3 | .521 |
| | Siklus 2 | .229 | 3 | . | .981 | 3 | .739 |
| | Siklus 3 | .193 | 3 | . | .997 | 3 | .891 |
| | Siklus 4 | .292 | 3 | . | .924 | 3 | .465 |
| | Siklus 5 | .351 | 3 | . | .826 | 3 | .179 |
| | Siklus 6 | .211 | 3 | . | .991 | 3 | .818 |
| Viskositas_F1 | Siklus 1 | .300 | 3 | . | .913 | 3 | .428 |
| | Siklus 2 | .262 | 3 | . | .956 | 3 | .596 |
| | Siklus 3 | .324 | 3 | . | .877 | 3 | .314 |
| | Siklus 4 | .365 | 3 | . | .797 | 3 | .107 |
| | Siklus 5 | .358 | 3 | . | .813 | 3 | .147 |
| | Siklus 6 | .176 | 3 | . | 1.000 | 3 | .987 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Viskositas_F2 | Siklus 1 | .375 | 3 | . | .775 | 3 | .056 |
| | Siklus 2 | .308 | 3 | . | .902 | 3 | .391 |
| | Siklus 3 | .297 | 3 | . | .917 | 3 | .441 |
| | Siklus 4 | .331 | 3 | . | .866 | 3 | .283 |
| | Siklus 5 | .258 | 3 | . | .960 | 3 | .614 |
| | Siklus 6 | .294 | 3 | . | .921 | 3 | .455 |
| Viskositas_F3 | Siklus 1 | .339 | 3 | . | .851 | 3 | .242 |
| | Siklus 2 | .371 | 3 | . | .785 | 3 | .079 |
| | Siklus 3 | .192 | 3 | . | .997 | 3 | .897 |
| | Siklus 4 | .241 | 3 | . | .973 | 3 | .687 |
| | Siklus 5 | .240 | 3 | . | .975 | 3 | .694 |
| | Siklus 6 | .284 | 3 | . | .933 | 3 | .502 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Viskositas_F0 | Based on Mean | 3.878 | 5 | 12 | .025 |
| | Based on Median | 1.140 | 5 | 12 | .392 |
| | Based on Median and with adjusted df | 1.140 | 5 | 4.544 | .452 |
| | Based on trimmed mean | 3.617 | 5 | 12 | .032 |
| Viskositas_F1 | Based on Mean | 4.422 | 5 | 12 | .016 |
| | Based on Median | .722 | 5 | 12 | .620 |
| | Based on Median and with adjusted df | .722 | 5 | 3.837 | .643 |
| | Based on trimmed mean | 3.919 | 5 | 12 | .024 |
| Viskositas_F2 | Based on Mean | 6.177 | 5 | 12 | .005 |
| | Based on Median | .558 | 5 | 12 | .730 |
| | Based on Median and with adjusted df | .558 | 5 | 3.460 | .734 |
| | Based on trimmed mean | 5.149 | 5 | 12 | .009 |
| Viskositas_F3 | Based on Mean | 1.463 | 5 | 12 | .272 |
| | Based on Median | .506 | 5 | 12 | .767 |

| | | | | | |
|---|---|---|---|---|---|
| | Based on Median and with adjusted df | .506 | 5 | 8.768 | .766 |
| | Based on trimmed mean | 1.376 | 5 | 12 | .300 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Viskositas_F0 | Between Groups | 13002257.778 | 5 | 2600451.556 | 12.109 | .000 |
| | Within Groups | 2576968.667 | 12 | 214747.389 | | |
| | Total | 15579226.444 | 17 | | | |
| Viskositas_F1 | Between Groups | 25480542.944 | 5 | 5096108.589 | 4.860 | .012 |
| | Within Groups | 12582533.333 | 12 | 1048544.444 | | |
| | Total | 38063076.278 | 17 | | | |
| Viskositas_F2 | Between Groups | 102742158.944 | 5 | 20548431.789 | 21.952 | .000 |
| | Within Groups | 11232946.667 | 12 | 936078.889 | | |
| | Total | 113975105.611 | 17 | | | |
| Viskositas_F3 | Between Groups | 9524688.000 | 5 | 1904937.600 | 9.017 | .001 |
| | Within Groups | 2535226.000 | 12 | 211268.833 | | |
| | Total | 12059914.000 | 17 | | | |

Post-Hoc

**Multiple Comparisons**

Games-Howell

| Dependent Variable | (I) Siklus | (J) Siklus | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| Viskositas_F0 | Siklus 1 | Siklus 2 | 873.667 | 499.651 | .611 | -3176.18 | 4923.52 |
| | | Siklus 3 | 1575.667* | 111.489 | .004 | 936.09 | 2215.24 |
| | | Siklus 4 | 1552.667* | 87.691 | .001 | 1110.11 | 1995.22 |
| | | Siklus 5 | 2188.333 | 381.838 | .095 | -856.43 | 5233.09 |
| | | Siklus 6 | 2603.000* | 155.141 | .006 | 1566.49 | 3639.51 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Siklus 2 | Siklus 1 | -873.667 | 499.651 | .611 | -4923.52 | 3176.18 |
| | | Siklus 3 | 702.000 | 506.960 | .745 | -3158.45 | 4562.45 |
| | | Siklus 4 | 679.000 | 502.263 | .758 | -3299.02 | 4657.02 |
| | | Siklus 5 | 1314.667 | 624.803 | .432 | -1762.86 | 4392.19 |
| | | Siklus 6 | 1729.333 | 518.312 | .230 | -1898.97 | 5357.64 |
| | Siklus 3 | Siklus 1 | -1575.667* | 111.489 | .004 | -2215.24 | -936.09 |
| | | Siklus 2 | -702.000 | 506.960 | .745 | -4562.45 | 3158.45 |
| | | Siklus 4 | -23.000 | 122.666 | 1.000 | -636.54 | 590.54 |
| | | Siklus 5 | 612.667 | 391.353 | .672 | -2211.40 | 3436.74 |
| | | Siklus 6 | 1027.333* | 177.273 | .034 | 122.30 | 1932.37 |
| | Siklus 4 | Siklus 1 | -1552.667* | 87.691 | .001 | -1995.22 | -1110.11 |
| | | Siklus 2 | -679.000 | 502.263 | .758 | -4657.02 | 3299.02 |
| | | Siklus 3 | 23.000 | 122.666 | 1.000 | -590.54 | 636.54 |
| | | Siklus 5 | 635.667 | 385.250 | .643 | -2321.73 | 3593.06 |
| | | Siklus 6 | 1050.333* | 163.358 | .038 | 99.43 | 2001.23 |
| | Siklus 5 | Siklus 1 | -2188.333 | 381.838 | .095 | -5233.09 | 856.43 |
| | | Siklus 2 | -1314.667 | 624.803 | .432 | -4392.19 | 1762.86 |
| | | Siklus 3 | -612.667 | 391.353 | .672 | -3436.74 | 2211.40 |
| | | Siklus 4 | -635.667 | 385.250 | .643 | -3593.06 | 2321.73 |
| | | Siklus 6 | 414.667 | 405.951 | .883 | -2181.90 | 3011.24 |
| | Siklus 6 | Siklus 1 | -2603.000* | 155.141 | .006 | -3639.51 | -1566.49 |
| | | Siklus 2 | -1729.333 | 518.312 | .230 | -5357.64 | 1898.97 |
| | | Siklus 3 | -1027.333* | 177.273 | .034 | -1932.37 | -122.30 |
| | | Siklus 4 | -1050.333* | 163.358 | .038 | -2001.23 | -99.43 |
| | | Siklus 5 | -414.667 | 405.951 | .883 | -3011.24 | 2181.90 |
| Viskositas_F1 | Siklus 1 | Siklus 2 | -406.000 | 597.814 | .970 | -4614.18 | 3802.18 |
| | | Siklus 3 | 1692.000 | 1197.115 | .734 | -7813.94 | 11197.94 |
| | | Siklus 4 | 1946.000* | 332.024 | .040 | 144.41 | 3747.59 |
| | | Siklus 5 | 2254.333 | 408.272 | .063 | -217.09 | 4725.76 |
| | | Siklus 6 | 2869.333* | 374.346 | .023 | 701.74 | 5036.93 |
| | Siklus 2 | Siklus 1 | 406.000 | 597.814 | .970 | -3802.18 | 4614.18 |
| | | Siklus 3 | 2098.000 | 1317.288 | .652 | -5602.13 | 9798.13 |
| | | Siklus 4 | 2352.000 | 642.186 | .155 | -1349.95 | 6053.95 |
| | | Siklus 5 | 2660.333 | 684.726 | .113 | -889.39 | 6210.06 |
| | | Siklus 6 | 3275.333 | 665.055 | .065 | -317.85 | 6868.52 |
| | Siklus 3 | Siklus 1 | -1692.000 | 1197.115 | .734 | -11197.94 | 7813.94 |
| | | Siklus 2 | -2098.000 | 1317.288 | .652 | -9798.13 | 5602.13 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 4 | 254.000 | 1219.879 | 1.000 | -8711.30 | 9219.30 |
| | | Siklus 5 | 562.333 | 1242.800 | .994 | -7976.54 | 9101.20 |
| | | Siklus 6 | 1177.333 | 1232.071 | .903 | -7548.23 | 9902.90 |
| | Siklus 4 | Siklus 1 | -1946.000* | 332.024 | .040 | -3747.59 | -144.41 |
| | | Siklus 2 | -2352.000 | 642.186 | .155 | -6053.95 | 1349.95 |
| | | Siklus 3 | -254.000 | 1219.879 | 1.000 | -9219.30 | 8711.30 |
| | | Siklus 5 | 308.333 | 470.858 | .978 | -2003.51 | 2620.17 |
| | | Siklus 6 | 923.333 | 441.765 | .433 | -1198.06 | 3044.72 |
| | Siklus 5 | Siklus 1 | -2254.333 | 408.272 | .063 | -4725.76 | 217.09 |
| | | Siklus 2 | -2660.333 | 684.726 | .113 | -6210.06 | 889.39 |
| | | Siklus 3 | -562.333 | 1242.800 | .994 | -9101.20 | 7976.54 |
| | | Siklus 4 | -308.333 | 470.858 | .978 | -2620.17 | 2003.51 |
| | | Siklus 6 | 615.000 | 501.600 | .809 | -1777.88 | 3007.88 |
| | Siklus 6 | Siklus 1 | -2869.333* | 374.346 | .023 | -5036.93 | -701.74 |
| | | Siklus 2 | -3275.333 | 665.055 | .065 | -6868.52 | 317.85 |
| | | Siklus 3 | -1177.333 | 1232.071 | .903 | -9902.90 | 7548.23 |
| | | Siklus 4 | -923.333 | 441.765 | .433 | -3044.72 | 1198.06 |
| | | Siklus 5 | -615.000 | 501.600 | .809 | -3007.88 | 1777.88 |
| Viskositas_F2 | Siklus 1 | Siklus 2 | 5187.333 | 1202.845 | .114 | -2092.51 | 12467.18 |
| | | Siklus 3 | 5939.333 | 1225.907 | .079 | -1160.62 | 13039.29 |
| | | Siklus 4 | 6382.333 | 1135.032 | .085 | -1832.64 | 14597.31 |
| | | Siklus 5 | 6623.333 | 1119.780 | .084 | -1923.37 | 15170.04 |
| | | Siklus 6 | 6999.333 | 1099.207 | .082 | -2099.10 | 16097.76 |
| | Siklus 2 | Siklus 1 | -5187.333 | 1202.845 | .114 | -12467.18 | 2092.51 |
| | | Siklus 3 | 752.000 | 731.908 | .887 | -2739.18 | 4243.18 |
| | | Siklus 4 | 1195.000 | 566.692 | .446 | -1870.87 | 4260.87 |
| | | Siklus 5 | 1436.000 | 535.490 | .311 | -1815.43 | 4687.43 |
| | | Siklus 6 | 1812.000 | 491.019 | .218 | -2213.11 | 5837.11 |
| | Siklus 3 | Siklus 1 | -5939.333 | 1225.907 | .079 | -13039.29 | 1160.62 |
| | | Siklus 2 | -752.000 | 731.908 | .887 | -4243.18 | 2739.18 |
| | | Siklus 4 | 443.000 | 614.126 | .966 | -3028.47 | 3914.47 |
| | | Siklus 5 | 684.000 | 585.458 | .829 | -3022.72 | 4390.72 |
| | | Siklus 6 | 1060.000 | 545.079 | .546 | -3418.43 | 5538.43 |
| | Siklus 4 | Siklus 1 | -6382.333 | 1135.032 | .085 | -14597.31 | 1832.64 |
| | | Siklus 2 | -1195.000 | 566.692 | .446 | -4260.87 | 1870.87 |
| | | Siklus 3 | -443.000 | 614.126 | .966 | -3914.47 | 3028.47 |
| | | Siklus 5 | 241.000 | 358.066 | .976 | -1523.80 | 2005.80 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 6 | 617.000 | 287.334 | .484 | -1685.17 | 2919.17 |
| | Siklus 5 | Siklus 1 | -6623.333 | 1119.780 | .084 | -15170.04 | 1923.37 |
| | | Siklus 2 | -1436.000 | 535.490 | .311 | -4687.43 | 1815.43 |
| | | Siklus 3 | -684.000 | 585.458 | .829 | -4390.72 | 3022.72 |
| | | Siklus 4 | -241.000 | 358.066 | .976 | -2005.80 | 1523.80 |
| | | Siklus 6 | 376.000 | 219.480 | .621 | -1340.44 | 2092.44 |
| | Siklus 6 | Siklus 1 | -6999.333 | 1099.207 | .082 | -16097.76 | 2099.10 |
| | | Siklus 2 | -1812.000 | 491.019 | .218 | -5837.11 | 2213.11 |
| | | Siklus 3 | -1060.000 | 545.079 | .546 | -5538.43 | 3418.43 |
| | | Siklus 4 | -617.000 | 287.334 | .484 | -2919.17 | 1685.17 |
| | | Siklus 5 | -376.000 | 219.480 | .621 | -2092.44 | 1340.44 |
| Viskositas_F3 | Siklus 1 | Siklus 2 | 775.333 | 261.789 | .296 | -1187.53 | 2738.20 |
| | | Siklus 3 | 810.333 | 310.466 | .290 | -766.28 | 2386.95 |
| | | Siklus 4 | 1591.333 | 385.083 | .079 | -248.45 | 3431.12 |
| | | Siklus 5 | 1734.000 | 456.693 | .118 | -599.99 | 4067.99 |
| | | Siklus 6 | 2183.000* | 402.897 | .034 | 233.38 | 4132.62 |
| | Siklus 2 | Siklus 1 | -775.333 | 261.789 | .296 | -2738.20 | 1187.53 |
| | | Siklus 3 | 35.000 | 184.766 | 1.000 | -1229.82 | 1299.82 |
| | | Siklus 4 | 816.000 | 293.323 | .331 | -1427.10 | 3059.10 |
| | | Siklus 5 | 958.667 | 382.515 | .392 | -2063.93 | 3981.26 |
| | | Siklus 6 | 1407.667 | 316.347 | .148 | -1038.30 | 3853.64 |
| | Siklus 3 | Siklus 1 | -810.333 | 310.466 | .290 | -2386.95 | 766.28 |
| | | Siklus 2 | -35.000 | 184.766 | 1.000 | -1299.82 | 1229.82 |
| | | Siklus 4 | 781.000 | 337.482 | .377 | -1009.21 | 2571.21 |
| | | Siklus 5 | 923.667 | 417.341 | .426 | -1557.55 | 3404.89 |
| | | Siklus 6 | 1372.667 | 357.674 | .129 | -585.77 | 3331.10 |
| | Siklus 4 | Siklus 1 | -1591.333 | 385.083 | .079 | -3431.12 | 248.45 |
| | | Siklus 2 | -816.000 | 293.323 | .331 | -3059.10 | 1427.10 |
| | | Siklus 3 | -781.000 | 337.482 | .377 | -2571.21 | 1009.21 |
| | | Siklus 5 | 142.667 | 475.472 | .999 | -2199.72 | 2485.05 |
| | | Siklus 6 | 591.667 | 424.065 | .733 | -1425.88 | 2609.21 |
| | Siklus 5 | Siklus 1 | -1734.000 | 456.693 | .118 | -4067.99 | 599.99 |
| | | Siklus 2 | -958.667 | 382.515 | .392 | -3981.26 | 2063.93 |
| | | Siklus 3 | -923.667 | 417.341 | .426 | -3404.89 | 1557.55 |
| | | Siklus 4 | -142.667 | 475.472 | .999 | -2485.05 | 2199.72 |
| | | Siklus 6 | 449.000 | 490.010 | .923 | -1921.31 | 2819.31 |
| | Siklus 6 | Siklus 1 | -2183.000* | 402.897 | .034 | -4132.62 | -233.38 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Siklus 2 | -1407.667 | 316.347 | .148 | -3853.64 | 1038.30 |
| | Siklus 3 | -1372.667 | 357.674 | .129 | -3331.10 | 585.77 |
| | Siklus 4 | -591.667 | 424.065 | .733 | -2609.21 | 1425.88 |
| | Siklus 5 | -449.000 | 490.010 | .923 | -2819.31 | 1921.31 |

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

Lampiran 16. Hasil analisis statistic pengukuran daya sebar *cycling test*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Siklus | Statistic | df | Sig. | Statistic | df | Sig. |
| Dayasebar_F0 | Siklus 1 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 2 | .196 | 3 | . | .996 | 3 | .878 |
| | Siklus 3 | .228 | 3 | . | .982 | 3 | .742 |
| | Siklus 4 | .181 | 3 | . | .999 | 3 | .942 |
| | Siklus 5 | .222 | 3 | . | .985 | 3 | .769 |
| | Siklus 6 | .226 | 3 | . | .983 | 3 | .752 |
| Dayasebar_F2 | Siklus 1 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 2 | .367 | 3 | . | .794 | 3 | .100 |
| | Siklus 3 | .265 | 3 | . | .953 | 3 | .583 |
| | Siklus 4 | .236 | 3 | . | .977 | 3 | .712 |
| | Siklus 5 | .362 | 3 | . | .805 | 3 | .127 |
| | Siklus 6 | .347 | 3 | . | .834 | 3 | .200 |
| Dayasebar_F3 | Siklus 1 | .265 | 3 | . | .954 | 3 | .587 |
| | Siklus 2 | .175 | 3 | . | 1.000 | 3 | 1.000 |
| | Siklus 3 | .371 | 3 | . | .784 | 3 | .077 |
| | Siklus 4 | .337 | 3 | . | .855 | 3 | .253 |
| | Siklus 5 | .253 | 3 | . | .964 | 3 | .637 |
| | Siklus 6 | .276 | 3 | . | .942 | 3 | .537 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dayasebar_F1 | Siklus 1 | .308 | 3 | . | .902 | 3 | .391 |
| | Siklus 2 | .272 | 3 | . | .947 | 3 | .554 |
| | Siklus 3 | .373 | 3 | . | .779 | 3 | .065 |
| | Siklus 4 | .196 | 3 | . | .996 | 3 | .878 |
| | Siklus 5 | .259 | 3 | . | .959 | 3 | .612 |
| | Siklus 6 | .232 | 3 | . | .980 | 3 | .726 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Dayasebar_F0 | Based on Mean | .318 | 5 | 12 | .893 |
| | Based on Median | .213 | 5 | 12 | .950 |
| | Based on Median and with adjusted df | .213 | 5 | 10.437 | .949 |
| | Based on trimmed mean | .311 | 5 | 12 | .897 |
| Dayasebar_F1 | Based on Mean | .484 | 5 | 12 | .782 |
| | Based on Median | .105 | 5 | 12 | .989 |
| | Based on Median and with adjusted df | .105 | 5 | 9.416 | .989 |
| | Based on trimmed mean | .441 | 5 | 12 | .812 |
| Dayasebar_F2 | Based on Mean | .870 | 5 | 12 | .529 |
| | Based on Median | .406 | 5 | 12 | .836 |
| | Based on Median and with adjusted df | .406 | 5 | 9.472 | .834 |
| | Based on trimmed mean | .835 | 5 | 12 | .550 |
| Dayasebar_F3 | Based on Mean | 4.975 | 5 | 12 | .011 |
| | Based on Median | .769 | 5 | 12 | .590 |
| | Based on Median and with adjusted df | .769 | 5 | 3.784 | .620 |
| | Based on trimmed mean | 4.413 | 5 | 12 | .016 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dayasebar_F0 | Between Groups | .176 | 5 | .035 | 1.128 | .007 |
| | Within Groups | .375 | 12 | .031 | | |
| | Total | .551 | 17 | | | |
| Dayasebar_F1 | Between Groups | 1.737 | 5 | .347 | 17.481 | .000 |
| | Within Groups | .238 | 12 | .020 | | |
| | Total | 1.975 | 17 | | | |
| Dayasebar_F2 | Between Groups | .964 | 5 | .193 | 5.900 | .006 |
| | Within Groups | .392 | 12 | .033 | | |
| | Total | 1.355 | 17 | | | |
| Dayasebar_F3 | Between Groups | 2.784 | 5 | .557 | 27.465 | .000 |
| | Within Groups | .243 | 12 | .020 | | |
| | Total | 3.027 | 17 | | | |

Post-Hoc

**Multiple Comparisons**

Games-Howell

| Dependent Variable | (I) Siklus | (J) Siklus | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| Dayasebar_F0 | Siklus 1 | Siklus 2 | -.12667 | .14240 | .925 | -.9903 | .7369 |
| | | Siklus 3 | -.16667 | .11465 | .709 | -.7866 | .4533 |
| | | Siklus 4 | -.22333 | .12401 | .564 | -.9233 | .4766 |
| | | Siklus 5 | -.25333 | .12468 | .478 | -.9591 | .4524 |
| | | Siklus 6 | -.30667 | .10713 | .243 | -.8652 | .2518 |
| | Siklus 2 | Siklus 1 | .12667 | .14240 | .925 | -.7369 | .9903 |
| | | Siklus 3 | -.04000 | .16357 | 1.000 | -.8458 | .7658 |
| | | Siklus 4 | -.09667 | .17026 | .988 | -.9165 | .7232 |
| | | Siklus 5 | -.12667 | .17075 | .965 | -.9479 | .6946 |
| | | Siklus 6 | -.18000 | .15839 | .845 | -.9825 | .6225 |
| | Siklus 3 | Siklus 1 | .16667 | .11465 | .709 | -.4533 | .7866 |
| | | Siklus 2 | .04000 | .16357 | 1.000 | -.7658 | .8458 |
| | | Siklus 4 | -.05667 | .14784 | .998 | -.7617 | .6483 |
| | | Siklus 5 | -.08667 | .14840 | .987 | -.7949 | .6215 |
| | | Siklus 6 | -.14000 | .13400 | .881 | -.7784 | .4984 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Siklus 4 | Siklus 1 | .22333 | .12401 | .564 | -.4766 | .9233 |
| | | Siklus 2 | .09667 | .17026 | .988 | -.7232 | .9165 |
| | | Siklus 3 | .05667 | .14784 | .998 | -.6483 | .7617 |
| | | Siklus 5 | -.03000 | .15574 | 1.000 | -.7686 | .7086 |
| | | Siklus 6 | -.08333 | .14209 | .986 | -.7707 | .6041 |
| | Siklus 5 | Siklus 1 | .25333 | .12468 | .478 | -.4524 | .9591 |
| | | Siklus 2 | .12667 | .17075 | .965 | -.6946 | .9479 |
| | | Siklus 3 | .08667 | .14840 | .987 | -.6215 | .7949 |
| | | Siklus 4 | .03000 | .15574 | 1.000 | -.7086 | .7686 |
| | | Siklus 6 | -.05333 | .14267 | .998 | -.7445 | .6379 |
| | Siklus 6 | Siklus 1 | .30667 | .10713 | .243 | -.2518 | .8652 |
| | | Siklus 2 | .18000 | .15839 | .845 | -.6225 | .9825 |
| | | Siklus 3 | .14000 | .13400 | .881 | -.4984 | .7784 |
| | | Siklus 4 | .08333 | .14209 | .986 | -.6041 | .7707 |
| | | Siklus 5 | .05333 | .14267 | .998 | -.6379 | .7445 |
| Dayasebar_F1 | Siklus 1 | Siklus 2 | -.03333 | .13199 | 1.000 | -.6688 | .6022 |
| | | Siklus 3 | -.49667 | .12032 | .078 | -1.0673 | .0739 |
| | | Siklus 4 | -.59667* | .11552 | .038 | -1.1466 | -.0467 |
| | | Siklus 5 | -.65333* | .11856 | .030 | -1.2158 | -.0908 |
| | | Siklus 6 | -.82333* | .09707 | .015 | -1.3617 | -.2849 |
| | Siklus 2 | Siklus 1 | .03333 | .13199 | 1.000 | -.6022 | .6688 |
| | | Siklus 3 | -.46333 | .13195 | .131 | -1.0987 | .1721 |
| | | Siklus 4 | -.56333 | .12758 | .069 | -1.1891 | .0624 |
| | | Siklus 5 | -.62000 | .13034 | .053 | -1.2512 | .0112 |
| | | Siklus 6 | -.79000* | .11116 | .032 | -1.4525 | -.1275 |
| | Siklus 3 | Siklus 1 | .49667 | .12032 | .078 | -.0739 | 1.0673 |
| | | Siklus 2 | .46333 | .13195 | .131 | -.1721 | 1.0987 |
| | | Siklus 4 | -.10000 | .11547 | .937 | -.6497 | .4497 |
| | | Siklus 5 | -.15667 | .11851 | .766 | -.7189 | .4056 |
| | | Siklus 6 | -.32667 | .09701 | .180 | -.8646 | .2112 |
| | Siklus 4 | Siklus 1 | .59667* | .11552 | .038 | .0467 | 1.1466 |
| | | Siklus 2 | .56333 | .12758 | .069 | -.0624 | 1.1891 |
| | | Siklus 3 | .10000 | .11547 | .937 | -.4497 | .6497 |
| | | Siklus 5 | -.05667 | .11363 | .993 | -.5964 | .4830 |
| | | Siklus 6 | -.22667 | .09098 | .331 | -.7138 | .2604 |
| | Siklus 5 | Siklus 1 | .65333* | .11856 | .030 | .0908 | 1.2158 |
| | | Siklus 2 | .62000 | .13034 | .053 | -.0112 | 1.2512 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 3 | .15667 | .11851 | .766 | -.4056 | .7189 |
| | | Siklus 4 | .05667 | .11363 | .993 | -.4830 | .5964 |
| | | Siklus 6 | -.17000 | .09481 | .564 | -.6891 | .3491 |
| | Siklus 6 | Siklus 1 | .82333* | .09707 | .015 | .2849 | 1.3617 |
| | | Siklus 2 | .79000* | .11116 | .032 | .1275 | 1.4525 |
| | | Siklus 3 | .32667 | .09701 | .180 | -.2112 | .8646 |
| | | Siklus 4 | .22667 | .09098 | .331 | -.2604 | .7138 |
| | | Siklus 5 | .17000 | .09481 | .564 | -.3491 | .6891 |
| Dayasebar_F2 | Siklus 1 | Siklus 2 | -.20000 | .17078 | .828 | -1.3438 | .9438 |
| | | Siklus 3 | -.33000 | .19858 | .613 | -1.3268 | .6668 |
| | | Siklus 4 | -.41667 | .17091 | .383 | -1.5586 | .7252 |
| | | Siklus 5 | -.57667 | .18352 | .212 | -1.6033 | .4499 |
| | | Siklus 6 | -.70000 | .19587 | .137 | -1.6968 | .2968 |
| | Siklus 2 | Siklus 1 | .20000 | .17078 | .828 | -.9438 | 1.3438 |
| | | Siklus 3 | -.13000 | .12780 | .886 | -.8815 | .6215 |
| | | Siklus 4 | -.21667 | .07817 | .238 | -.5874 | .1541 |
| | | Siklus 5 | -.37667 | .10285 | .135 | -.9146 | .1613 |
| | | Siklus 6 | -.50000 | .12356 | .123 | -1.2139 | .2139 |
| | Siklus 3 | Siklus 1 | .33000 | .19858 | .613 | -.6668 | 1.3268 |
| | | Siklus 2 | .13000 | .12780 | .886 | -.6215 | .8815 |
| | | Siklus 4 | -.08667 | .12798 | .973 | -.8369 | .6636 |
| | | Siklus 5 | -.24667 | .14438 | .591 | -.9599 | .4666 |
| | | Siklus 6 | -.37000 | .15979 | .355 | -1.1285 | .3885 |
| | Siklus 4 | Siklus 1 | .41667 | .17091 | .383 | -.7252 | 1.5586 |
| | | Siklus 2 | .21667 | .07817 | .238 | -.1541 | .5874 |
| | | Siklus 3 | .08667 | .12798 | .973 | -.6636 | .8369 |
| | | Siklus 5 | -.16000 | .10306 | .664 | -.6976 | .3776 |
| | | Siklus 6 | -.28333 | .12374 | .399 | -.9960 | .4294 |
| | Siklus 5 | Siklus 1 | .57667 | .18352 | .212 | -.4499 | 1.6033 |
| | | Siklus 2 | .37667 | .10285 | .135 | -.1613 | .9146 |
| | | Siklus 3 | .24667 | .14438 | .591 | -.4666 | .9599 |
| | | Siklus 4 | .16000 | .10306 | .664 | -.3776 | .6976 |
| | | Siklus 6 | -.12333 | .14063 | .934 | -.8106 | .5640 |
| | Siklus 6 | Siklus 1 | .70000 | .19587 | .137 | -.2968 | 1.6968 |
| | | Siklus 2 | .50000 | .12356 | .123 | -.2139 | 1.2139 |
| | | Siklus 3 | .37000 | .15979 | .355 | -.3885 | 1.1285 |
| | | Siklus 4 | .28333 | .12374 | .399 | -.4294 | .9960 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 5 | .12333 | .14063 | .934 | -.5640 | .8106 |
| Dayasebar_F3 | Siklus 1 | Siklus 2 | -.02667 | .13691 | 1.000 | -.8408 | .7875 |
| | | Siklus 3 | -.55333 | .18971 | .213 | -1.4629 | .3563 |
| | | Siklus 4 | -.78000 | .12605 | .079 | -1.7574 | .1974 |
| | | Siklus 5 | -.88000 | .12539 | .064 | -1.8745 | .1145 |
| | | Siklus 6 | -.98667* | .12587 | .050 | -1.9685 | -.0048 |
| | Siklus 2 | Siklus 1 | .02667 | .13691 | 1.000 | -.7875 | .8408 |
| | | Siklus 3 | -.52667 | .15463 | .202 | -1.5017 | .4483 |
| | | Siklus 4 | -.75333* | .06173 | .010 | -1.1517 | -.3549 |
| | | Siklus 5 | -.85333* | .06037 | .010 | -1.2718 | -.4349 |
| | | Siklus 6 | -.96000* | .06137 | .006 | -1.3631 | -.5569 |
| | Siklus 3 | Siklus 1 | .55333 | .18971 | .213 | -.3563 | 1.4629 |
| | | Siklus 2 | .52667 | .15463 | .202 | -.4483 | 1.5017 |
| | | Siklus 4 | -.22667 | .14511 | .677 | -1.3702 | .9168 |
| | | Siklus 5 | -.32667 | .14453 | .453 | -1.4856 | .8323 |
| | | Siklus 6 | -.43333 | .14495 | .301 | -1.5809 | .7142 |
| | Siklus 4 | Siklus 1 | .78000 | .12605 | .079 | -.1974 | 1.7574 |
| | | Siklus 2 | .75333* | .06173 | .010 | .3549 | 1.1517 |
| | | Siklus 3 | .22667 | .14511 | .677 | -.9168 | 1.3702 |
| | | Siklus 5 | -.10000 | .02809 | .128 | -.2364 | .0364 |
| | | Siklus 6 | -.20667* | .03018 | .014 | -.3500 | -.0633 |
| | Siklus 5 | Siklus 1 | .88000 | .12539 | .064 | -.1145 | 1.8745 |
| | | Siklus 2 | .85333* | .06037 | .010 | .4349 | 1.2718 |
| | | Siklus 3 | .32667 | .14453 | .453 | -.8323 | 1.4856 |
| | | Siklus 4 | .10000 | .02809 | .128 | -.0364 | .2364 |
| | | Siklus 6 | -.10667 | .02728 | .096 | -.2379 | .0246 |
| | Siklus 6 | Siklus 1 | .98667* | .12587 | .050 | .0048 | 1.9685 |
| | | Siklus 2 | .96000* | .06137 | .006 | .5569 | 1.3631 |
| | | Siklus 3 | .43333 | .14495 | .301 | -.7142 | 1.5809 |
| | | Siklus 4 | .20667* | .03018 | .014 | .0633 | .3500 |
| | | Siklus 5 | .10667 | .02728 | .096 | -.0246 | .2379 |

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

Lampiran 17. Hasil analisis statistic pengukuran daya lekat *cycling test*

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Siklus | Statistic | df | Sig. | Statistic | df | Sig. |
| Dayalekat_F0 | Siklus 1 | .323 | 3 | . | .878 | 3 | .318 |
| | Siklus 2 | .290 | 3 | . | .926 | 3 | .474 |
| | Siklus 3 | .362 | 3 | . | .803 | 3 | .122 |
| | Siklus 4 | .219 | 3 | . | .987 | 3 | .780 |
| | Siklus 5 | .230 | 3 | . | .981 | 3 | .734 |
| | Siklus 6 | .303 | 3 | . | .909 | 3 | .414 |
| Dayalekat_F1 | Siklus 1 | .340 | 3 | . | .848 | 3 | .235 |
| | Siklus 2 | .373 | 3 | . | .779 | 3 | .065 |
| | Siklus 3 | .351 | 3 | . | .826 | 3 | .179 |
| | Siklus 4 | .222 | 3 | . | .986 | 3 | .770 |
| | Siklus 5 | .261 | 3 | . | .957 | 3 | .602 |
| | Siklus 6 | .292 | 3 | . | .923 | 3 | .463 |
| Dayalekat_F3 | Siklus 1 | .207 | 3 | . | .992 | 3 | .831 |
| | Siklus 2 | .365 | 3 | . | .798 | 3 | .110 |
| | Siklus 3 | .250 | 3 | . | .967 | 3 | .651 |
| | Siklus 4 | .202 | 3 | . | .994 | 3 | .851 |
| | Siklus 5 | .318 | 3 | . | .887 | 3 | .346 |
| | Siklus 6 | .303 | 3 | . | .908 | 3 | .413 |
| Dayalekat_F2 | Siklus 1 | .371 | 3 | . | .784 | 3 | .077 |
| | Siklus 2 | .198 | 3 | . | .995 | 3 | .868 |
| | Siklus 3 | .193 | 3 | . | .997 | 3 | .890 |
| | Siklus 4 | .177 | 3 | . | 1.000 | 3 | .965 |
| | Siklus 5 | .296 | 3 | . | .918 | 3 | .446 |
| | Siklus 6 | .298 | 3 | . | .915 | 3 | .437 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Dayalekat_F0 | Based on Mean | 1.814 | 5 | 12 | .185 |
| | Based on Median | .431 | 5 | 12 | .818 |
| | Based on Median and with adjusted df | .431 | 5 | 7.039 | .814 |
| | Based on trimmed mean | 1.660 | 5 | 12 | .218 |
| Dayalekat_F1 | Based on Mean | 2.478 | 5 | 12 | .092 |
| | Based on Median | .647 | 5 | 12 | .669 |
| | Based on Median and with adjusted df | .647 | 5 | 6.600 | .674 |
| | Based on trimmed mean | 2.284 | 5 | 12 | .112 |
| Dayalekat_F2 | Based on Mean | 1.515 | 5 | 12 | .257 |
| | Based on Median | 1.208 | 5 | 12 | .363 |
| | Based on Median and with adjusted df | 1.208 | 5 | 6.662 | .398 |
| | Based on trimmed mean | 1.501 | 5 | 12 | .261 |
| Dayalekat_F3 | Based on Mean | 2.408 | 5 | 12 | .099 |
| | Based on Median | .567 | 5 | 12 | .724 |
| | Based on Median and with adjusted df | .567 | 5 | 5.577 | .725 |
| | Based on trimmed mean | 2.205 | 5 | 12 | .122 |

One way ANOVA

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Dayalekat_F0 | Between Groups | 9.340 | 5 | 1.868 | 13.952 | .000 |
| | Within Groups | 1.607 | 12 | .134 | | |
| | Total | 10.947 | 17 | | | |
| Dayalekat_F1 | Between Groups | 24.060 | 5 | 4.812 | 31.474 | .000 |
| | Within Groups | 1.835 | 12 | .153 | | |
| | Total | 25.894 | 17 | | | |
| Dayalekat_F2 | Between Groups | 13.310 | 5 | 2.662 | 28.020 | .000 |
| | Within Groups | 1.140 | 12 | .095 | | |
| | Total | 14.450 | 17 | | | |
| Dayalekat_F3 | Between Groups | 11.231 | 5 | 2.246 | 17.365 | .000 |
| | Within Groups | 1.552 | 12 | .129 | | |
| | Total | 12.783 | 17 | | | |

Post-Hoc

**Multiple Comparisons**

Bonferroni

| Dependent Variable | (I) Siklus | (J) Siklus | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | 95% Confidence Interval Upper Bound |
|---|---|---|---|---|---|---|---|
| Dayalekat_F0 | Siklus 1 | Siklus 2 | .19333 | .29877 | 1.000 | -.8968 | 1.2835 |
| | | Siklus 3 | .59333 | .29877 | 1.000 | -.4968 | 1.6835 |
| | | Siklus 4 | 1.16333* | .29877 | .032 | .0732 | 2.2535 |
| | | Siklus 5 | 1.56333* | .29877 | .003 | .4732 | 2.6535 |
| | | Siklus 6 | 1.99667* | .29877 | .000 | .9065 | 3.0868 |
| | Siklus 2 | Siklus 1 | -.19333 | .29877 | 1.000 | -1.2835 | .8968 |
| | | Siklus 3 | .40000 | .29877 | 1.000 | -.6902 | 1.4902 |
| | | Siklus 4 | .97000 | .29877 | .105 | -.1202 | 2.0602 |
| | | Siklus 5 | 1.37000* | .29877 | .009 | .2798 | 2.4602 |
| | | Siklus 6 | 1.80333* | .29877 | .001 | .7132 | 2.8935 |
| | Siklus 3 | Siklus 1 | -.59333 | .29877 | 1.000 | -1.6835 | .4968 |
| | | Siklus 2 | -.40000 | .29877 | 1.000 | -1.4902 | .6902 |
| | | Siklus 4 | .57000 | .29877 | 1.000 | -.5202 | 1.6602 |
| | | Siklus 5 | .97000 | .29877 | .105 | -.1202 | 2.0602 |
| | | Siklus 6 | 1.40333* | .29877 | .008 | .3132 | 2.4935 |
| | Siklus 4 | Siklus 1 | -1.16333* | .29877 | .032 | -2.2535 | -.0732 |
| | | Siklus 2 | -.97000 | .29877 | .105 | -2.0602 | .1202 |
| | | Siklus 3 | -.57000 | .29877 | 1.000 | -1.6602 | .5202 |
| | | Siklus 5 | .40000 | .29877 | 1.000 | -.6902 | 1.4902 |
| | | Siklus 6 | .83333 | .29877 | .246 | -.2568 | 1.9235 |
| | Siklus 5 | Siklus 1 | -1.56333* | .29877 | .003 | -2.6535 | -.4732 |
| | | Siklus 2 | -1.37000* | .29877 | .009 | -2.4602 | -.2798 |
| | | Siklus 3 | -.97000 | .29877 | .105 | -2.0602 | .1202 |
| | | Siklus 4 | -.40000 | .29877 | 1.000 | -1.4902 | .6902 |
| | | Siklus 6 | .43333 | .29877 | 1.000 | -.6568 | 1.5235 |
| | Siklus 6 | Siklus 1 | -1.99667* | .29877 | .000 | -3.0868 | -.9065 |
| | | Siklus 2 | -1.80333* | .29877 | .001 | -2.8935 | -.7132 |
| | | Siklus 3 | -1.40333* | .29877 | .008 | -2.4935 | -.3132 |
| | | Siklus 4 | -.83333 | .29877 | .246 | -1.9235 | .2568 |
| | | Siklus 5 | -.43333 | .29877 | 1.000 | -1.5235 | .6568 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dayalekat_F1 | Siklus 1 | Siklus 2 | .20667 | .31925 | 1.000 | -.9583 | 1.3716 |
| | | Siklus 3 | .84000 | .31925 | .329 | -.3249 | 2.0049 |
| | | Siklus 4 | 1.27667* | .31925 | .026 | .1117 | 2.4416 |
| | | Siklus 5 | 2.63667* | .31925 | .000 | 1.4717 | 3.8016 |
| | | Siklus 6 | 3.07333* | .31925 | .000 | 1.9084 | 4.2383 |
| | Siklus 2 | Siklus 1 | -.20667 | .31925 | 1.000 | -1.3716 | .9583 |
| | | Siklus 3 | .63333 | .31925 | 1.000 | -.5316 | 1.7983 |
| | | Siklus 4 | 1.07000 | .31925 | .086 | -.0949 | 2.2349 |
| | | Siklus 5 | 2.43000* | .31925 | .000 | 1.2651 | 3.5949 |
| | | Siklus 6 | 2.86667* | .31925 | .000 | 1.7017 | 4.0316 |
| | Siklus 3 | Siklus 1 | -.84000 | .31925 | .329 | -2.0049 | .3249 |
| | | Siklus 2 | -.63333 | .31925 | 1.000 | -1.7983 | .5316 |
| | | Siklus 4 | .43667 | .31925 | 1.000 | -.7283 | 1.6016 |
| | | Siklus 5 | 1.79667* | .31925 | .002 | .6317 | 2.9616 |
| | | Siklus 6 | 2.23333* | .31925 | .000 | 1.0684 | 3.3983 |
| | Siklus 4 | Siklus 1 | -1.27667* | .31925 | .026 | -2.4416 | -.1117 |
| | | Siklus 2 | -1.07000 | .31925 | .086 | -2.2349 | .0949 |
| | | Siklus 3 | -.43667 | .31925 | 1.000 | -1.6016 | .7283 |
| | | Siklus 5 | 1.36000* | .31925 | .017 | .1951 | 2.5249 |
| | | Siklus 6 | 1.79667* | .31925 | .002 | .6317 | 2.9616 |
| | Siklus 5 | Siklus 1 | -2.63667* | .31925 | .000 | -3.8016 | -1.4717 |
| | | Siklus 2 | -2.43000* | .31925 | .000 | -3.5949 | -1.2651 |
| | | Siklus 3 | -1.79667* | .31925 | .002 | -2.9616 | -.6317 |
| | | Siklus 4 | -1.36000* | .31925 | .017 | -2.5249 | -.1951 |
| | | Siklus 6 | .43667 | .31925 | 1.000 | -.7283 | 1.6016 |
| | Siklus 6 | Siklus 1 | -3.07333* | .31925 | .000 | -4.2383 | -1.9084 |
| | | Siklus 2 | -2.86667* | .31925 | .000 | -4.0316 | -1.7017 |
| | | Siklus 3 | -2.23333* | .31925 | .000 | -3.3983 | -1.0684 |
| | | Siklus 4 | -1.79667* | .31925 | .002 | -2.9616 | -.6317 |
| | | Siklus 5 | -.43667 | .31925 | 1.000 | -1.6016 | .7283 |
| Dayalekat_F2 | Siklus 1 | Siklus 2 | .08667 | .25166 | 1.000 | -.8316 | 1.0050 |
| | | Siklus 3 | .69333 | .25166 | .262 | -.2250 | 1.6116 |
| | | Siklus 4 | 1.07667* | .25166 | .016 | .1584 | 1.9950 |
| | | Siklus 5 | 1.85667* | .25166 | .000 | .9384 | 2.7750 |
| | | Siklus 6 | 2.33000* | .25166 | .000 | 1.4117 | 3.2483 |
| | Siklus 2 | Siklus 1 | -.08667 | .25166 | 1.000 | -1.0050 | .8316 |
| | | Siklus 3 | .60667 | .25166 | .493 | -.3116 | 1.5250 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 4 | .99000* | .25166 | .030 | .0717 | 1.9083 |
| | | Siklus 5 | 1.77000* | .25166 | .000 | .8517 | 2.6883 |
| | | Siklus 6 | 2.24333* | .25166 | .000 | 1.3250 | 3.1616 |
| | Siklus 3 | Siklus 1 | -.69333 | .25166 | .262 | -1.6116 | .2250 |
| | | Siklus 2 | -.60667 | .25166 | .493 | -1.5250 | .3116 |
| | | Siklus 4 | .38333 | .25166 | 1.000 | -.5350 | 1.3016 |
| | | Siklus 5 | 1.16333* | .25166 | .009 | .2450 | 2.0816 |
| | | Siklus 6 | 1.63667* | .25166 | .000 | .7184 | 2.5550 |
| | Siklus 4 | Siklus 1 | -1.07667* | .25166 | .016 | -1.9950 | -.1584 |
| | | Siklus 2 | -.99000* | .25166 | .030 | -1.9083 | -.0717 |
| | | Siklus 3 | -.38333 | .25166 | 1.000 | -1.3016 | .5350 |
| | | Siklus 5 | .78000 | .25166 | .138 | -.1383 | 1.6983 |
| | | Siklus 6 | 1.25333* | .25166 | .005 | .3350 | 2.1716 |
| | Siklus 5 | Siklus 1 | -1.85667* | .25166 | .000 | -2.7750 | -.9384 |
| | | Siklus 2 | -1.77000* | .25166 | .000 | -2.6883 | -.8517 |
| | | Siklus 3 | -1.16333* | .25166 | .009 | -2.0816 | -.2450 |
| | | Siklus 4 | -.78000 | .25166 | .138 | -1.6983 | .1383 |
| | | Siklus 6 | .47333 | .25166 | 1.000 | -.4450 | 1.3916 |
| | Siklus 6 | Siklus 1 | -2.33000* | .25166 | .000 | -3.2483 | -1.4117 |
| | | Siklus 2 | -2.24333* | .25166 | .000 | -3.1616 | -1.3250 |
| | | Siklus 3 | -1.63667* | .25166 | .000 | -2.5550 | -.7184 |
| | | Siklus 4 | -1.25333* | .25166 | .005 | -2.1716 | -.3350 |
| | | Siklus 5 | -.47333 | .25166 | 1.000 | -1.3916 | .4450 |
| Dayalekat_F3 | Siklus 1 | Siklus 2 | .07667 | .29366 | 1.000 | -.9948 | 1.1482 |
| | | Siklus 3 | .44333 | .29366 | 1.000 | -.6282 | 1.5148 |
| | | Siklus 4 | 1.08000* | .29366 | .047 | .0085 | 2.1515 |
| | | Siklus 5 | 1.32667* | .29366 | .011 | .2552 | 2.3982 |
| | | Siklus 6 | 2.25667* | .29366 | .000 | 1.1852 | 3.3282 |
| | Siklus 2 | Siklus 1 | -.07667 | .29366 | 1.000 | -1.1482 | .9948 |
| | | Siklus 3 | .36667 | .29366 | 1.000 | -.7048 | 1.4382 |
| | | Siklus 4 | 1.00333 | .29366 | .077 | -.0682 | 2.0748 |
| | | Siklus 5 | 1.25000* | .29366 | .017 | .1785 | 2.3215 |
| | | Siklus 6 | 2.18000* | .29366 | .000 | 1.1085 | 3.2515 |
| | Siklus 3 | Siklus 1 | -.44333 | .29366 | 1.000 | -1.5148 | .6282 |
| | | Siklus 2 | -.36667 | .29366 | 1.000 | -1.4382 | .7048 |
| | | Siklus 4 | .63667 | .29366 | .765 | -.4348 | 1.7082 |
| | | Siklus 5 | .88333 | .29366 | .164 | -.1882 | 1.9548 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Siklus 6 | 1.81333* | .29366 | .001 | .7418 | 2.8848 |
| | Siklus 4 | Siklus 1 | -1.08000* | .29366 | .047 | -2.1515 | -.0085 |
| | | Siklus 2 | -1.00333 | .29366 | .077 | -2.0748 | .0682 |
| | | Siklus 3 | -.63667 | .29366 | .765 | -1.7082 | .4348 |
| | | Siklus 5 | .24667 | .29366 | 1.000 | -.8248 | 1.3182 |
| | | Siklus 6 | 1.17667* | .29366 | .026 | .1052 | 2.2482 |
| | Siklus 5 | Siklus 1 | -1.32667* | .29366 | .011 | -2.3982 | -.2552 |
| | | Siklus 2 | -1.25000* | .29366 | .017 | -2.3215 | -.1785 |
| | | Siklus 3 | -.88333 | .29366 | .164 | -1.9548 | .1882 |
| | | Siklus 4 | -.24667 | .29366 | 1.000 | -1.3182 | .8248 |
| | | Siklus 6 | .93000 | .29366 | .122 | -.1415 | 2.0015 |
| | Siklus 6 | Siklus 1 | -2.25667* | .29366 | .000 | -3.3282 | -1.1852 |
| | | Siklus 2 | -2.18000* | .29366 | .000 | -3.2515 | -1.1085 |
| | | Siklus 3 | -1.81333* | .29366 | .001 | -2.8848 | -.7418 |
| | | Siklus 4 | -1.17667* | .29366 | .026 | -2.2482 | -.1052 |
| | | Siklus 5 | -.93000 | .29366 | .122 | -2.0015 | .1415 |

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

Lampiran 18. Hasil Analisis Statistic Krim Tabir Surya

Normalitas

**Tests of Normality**

| | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | Formula | Statistic | df | Sig. | Statistic | df | Sig. |
| SPF | F0 | .340 | 3 | . | .848 | 3 | .235 |
| | F1 | .340 | 3 | . | .849 | 3 | .236 |
| | F2 | .373 | 3 | . | .779 | 3 | .066 |
| | F3 | .177 | 3 | . | 1.000 | 3 | .970 |

a. Lilliefors Significance Correction

Homogenitas

**Test of Homogeneity of Variances**

| | | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| SPF | Based on Mean | 10.594 | 3 | 8 | .004 |
| | Based on Median | .807 | 3 | 8 | .524 |

| | | | | | |
|---|---|---|---|---|---|
| | Based on Median and with adjusted df | .807 | 3 | 2.201 | .588 |
| | Based on trimmed mean | 8.629 | 3 | 8 | .007 |

One Way ANOVA

**ANOVA**

SPF

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1585.948 | 3 | 528.649 | 90.864 | .000 |
| Within Groups | 46.544 | 8 | 5.818 | | |
| Total | 1632.493 | 11 | | | |

Post-Hoc

**Multiple Comparisons**

Dependent Variable: SPF

Games-Howell

| | | | | | 95% Confidence Interval | |
|---|---|---|---|---|---|---|
| (I) Formula | (J) Formula | Mean Difference (I-J) | Std. Error | Sig. | Lower Bound | Upper Bound |
| F0 | F1 | -25.34667* | .56293 | .001 | -29.1866 | -21.5067 |
| | F2 | -23.19000* | 2.67534 | .032 | -41.7126 | -4.6674 |
| | F3 | -29.53000* | .53618 | .001 | -33.1817 | -25.8783 |
| F1 | F0 | 25.34667* | .56293 | .001 | 21.5067 | 29.1866 |
| | F2 | 2.15667* | 2.73312 | .856 | -15.1497 | 19.4631 |
| | F3 | -4.18333* | .77457 | .019 | -7.3403 | -1.0264 |
| F2 | F0 | 23.19000* | 2.67534 | .032 | 4.6674 | 41.7126 |
| | F1 | -2.15667* | 2.73312 | .856 | -19.4631 | 15.1497 |
| | F3 | -6.34000* | 2.72773 | .319 | -23.7459 | 11.0659 |
| F3 | F0 | 29.53000* | .53618 | .001 | 25.8783 | 33.1817 |
| | F1 | 4.18333* | .77457 | .019 | 1.0264 | 7.3403 |
| | F2 | 6.34000* | 2.72773 | .319 | -11.0659 | 23.7459 |

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

Lampiran 19. Surat Determinasi Ekstrak

LANSIDA
Herbal Technologi

Yogyakarta, 10 Januari 2025

No. : 38/LH/01/25
Hal : Hasil Determinasi

Kepada Yth.
Endah Pratama
NIM : 211FF03069
Fakultas Farmasi Universitas Bhakti Kencana

Dengan hormat,

Bersama ini disampaikan hasil determinasi tumbuhan sesuai pemintaan sebagai berikut:

| No. | Nama jenis | Nama Lokal |
|---|---|---|
| 1 | *Centella asiatica* (L.) | Pegagan |

Hasil Determinasi Tanaman :
1b-2b-3b-4b-6b-9b-10a- (Gol II daun tersusundalam roset)
-92b-100b-103b-105b-106b-107b-108b-Familia = Umbelliferae-1b-2b-Centella-Centella asiatica [L] Urban.

Klasiifikasi
Kingdom : Plantae
Divisio : Spermatophyta
Sub Divisio : Angiospermae
Kelas : Dicotyledone
Famili : Apiaceae
Genus : Centella
Species : *Centella asiatica* (L.) Urban

Divisi Teknik Galenika

Apriyani Susilowati, S.Si.

Jl. Karanglo, Bumen KG III/519 Yogyakarta
Telp. 0851 06668808 email: lansida@yahoo.com

Lampiran 20. *Certificate of Analysis* ekstrak daun Pegagan

LANSIDA

**SERTIFIKAT HASIL UJI**

Nomor : 250133050b
Nama Sampel : Ekstrak Daun Pegagan (*Centella asiatica* L.)
Uji : Kadar Air, Kualitatif Flavonoid
Metode : Gravimetri, TLC
Tanggal : 10 Januari 2025
Permintaan : Endah Pratama
NIM : 211FF03069
Institusi : Fakultas Farmasi Universitas Bhakti Kencana

**Hasil Uji**

| Parameter Uji | Hasil Uji | Metode |
|---|---|---|
| Kadar Air | 5,8 % b/b | Gravimetri |
| Kualitatif Flavonoid | Positif | TLC |

Divisi Teknis

Pradekatiwi, S.Si.

Jl. Karanglo, Bumen KG III/519 Yogyakarta 55173
Telp. 0815-6893377 email : lansida@yahoo.com

Lampiran 21. Surat keterangan prosedur ekstraksi dan skrining fitokimia

| LANSIDA jasaekstraksi.com | LEMBAR KERJA EKSTRAKSI<br>LABORATORIUM PENGUJIAN | | |
|---|---|---|---|
| Nama sampel | Pegagan | Tanggal | 10 Januari 2025 |
| Kode sampel | 250133050 | Metode | Maserasi ; Gravimetri ;TLC |

**Prosedur ekstraksi :**

1. Petik daun pegagan
2. Cuci pada krain air mengalir.
3. Masukkan kedalam tabung spinner, putar selama 5 menit.
4. Keringkan dalam oven pada suhu 40ºC selama 12 jam
5. Giling simplisia kering menggunakan diskmill dengan ayakan 40 mesh
6. Masukkan ke dalam kontainer ekstraktor
7. Tambahkan solvent ethanol 70%
8. Ekstraksikan dengan ultra turax pada kecepatan 1.000 rpm selama 2 jam
9. Maserasikan selama 24 jam
10. Filtrasi dengan corong buchner, sedot dengan mesin vakum
11. Residu diekstraksi ulang seperti diatas
12. Filtrat pertama dan kedua dievaporasi dengan vakum rotary evaporator pada suhu 45ºC tekanan vakum
13. Tuang ekstrak ke dalam cawan porselin
14. Uapkan sisa solvent dengan penangas air waterbatch
15. Timbang ekstrak yang diperoleh.

**Penetapan Kadar Air Metode Gravimetri**

1. Timbang dengan seksama serbuk sampel dalam cawan yang sebelumnya telah dipanaskan pada suhu penetapan selama 30 menit.
2. Masukan kedalam oven, keringkan pada suhu pada 105ºC selama 2 jam.
3. Masukkan sampel ke dalam eksikator dan biarkan mendingin didalam eksikator.
4. Ulangi pengeringan hingga mendapat bobot tetap.

**Uji Kualitatif Flavonoid :**

1. Timbang ekstrak sejumlah 50 mg.
2. Masukkan kedalam labu, tambahkan 10 ml asam chlorida 4 N.
3. Hidrolisis/refluk dengan pendingin balik selama 30 menit.
4. Ekstraksi dengan 5 ml dietileter.
5. Ambil fase dietileter, uapkan dengan gas nitrogen
6. Spoting sampel sebanyak 10 µl pada plate silikagel GF254, sertakan pembanding.
7. Masukkan plate ke dalam chamber jenuh fase
8. Eluasikan hingga batas.
9. Keringkan plate, amati di bawah sinar UV 254 nm dan 365 nm.
10. Semprot dengan pereaksi aluminium chloride.

Spray reagent :
1% ethanolic solution of aluminium chloride.

Chemicals:
Aluminium chloride hexahydrate extra pure Ph Eur, USP, Ord. No. 1.01084
Ethanol absolute GR ACS, ISO, Ord. No. 1.00983

Kompilasi Data :

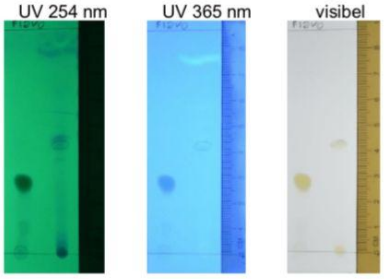
| | | | |
|---|---|---|---|
| Berat pegagan segar | : | 8,02 | Kg |
| Berat serbuk | : | 760,4 | g |
| Volume solvent ethanol 70% | : | 7.600 | mL |
| Berat ekstrak | : | 134,7 | g |

Kadar Air Ekstrak

| Sampel | Replikasi | Berat cawan kosong | Berat cawan+ Ekstrak | Berat Ekstrak | Berat cawan + Ekstrak Kering | Berat Ekstrak Kering | Kadar Air |
|---|---|---|---|---|---|---|---|
| | | (g) | (g) | (g) | (g) | (g) | (% v/b) |
| Ekstrak Pegagan | 1 | 51,0956 | 53,2054 | 2,1098 | 51,2181 | 0,1225 | 5,806 |
| | 2 | 53,1171 | 55,1508 | 2,0237 | 53,2344 | 0,1173 | 5,796 |
| | | | | | | Rata-rata | 5,80 |

**TLC PROFILE**

Sample number : 250133050b
Sample detail : Ekstrak Pegagan
Analysis : Flavonoid
Adsorbent : Silicagel 60 $F_{254}$ (Al - Sheet)
Mobile Phase : Etil Asetat : Asam Formiat : Asam Asetat : Air (100:11:11:27)
Detection : Aluminium Chloride




Kiri : Comparator Quercetin
Kanan : Ekstrak Pegagan

Warna spot flavonoid di visibel : kuning
Rf. flavonoid terdeteksi : 0,51

Lampiran 22. Sertifikat Analisis Bemotrizinol (Tinosorb)

**BASF**
We create chemistry

**Certificate of Analysis**

PT BASF Distribution Indonesia

Attention! Please note that the certificates of analysis are also conveniently available on your BASF online portal.

PT BAHTERA ADI JAYA

BLOK 19 KAV 35, NGALIYAN NGALIYAN

50181 KOTA SEMARANG, JAWA TENGAH

Indonesia

2024-09-27 Certificate No 2482
Page 1 of 2

otilia.par@basf.com
CONT CALID
+34 93 77-30173

**Inspection Certificate 3.1 according to EN 10204**

Tinosorb® S Lite Aqua

25KG Plastic jerricans
Purchase order/Customer material
PO24/07/0870

| | |
|---|---|
| Material | 50509790 |
| Order | 6012317579 000010 |
| Delivery | 6214423421 000010 |
| Batch | 0028560572 |
| Batch/Qty | 50.000 KG |
| Total | 50.000 KG |
| Transport | 00000000001227682227 |

Manufacturing Location: ES, 08755 Castellbisbal (Barcelona), Pol.Ind. San Vicente S/N

| Characteristic<br>Method | Unit | Value | Lower Limit | Upper Limit |
|---|---|---|---|---|
| APPEARANCE<br>8000 | | PASS | | |
| ODOR<br>8364 | | PASS | | |
| ACTIVE INGREDIENT<br>9210 | % | 19 | 18 | 22 |
| RELATIVE ABSORPTION<br>9161 | | 150 | 144 | 176 |
| PH VALUE (20°C; AS IS)<br>EN 1262 | | 10,1 | 8,0 | 11,0 |
| VISCOSITY BROOK; 25°C; RVT<br>ISO 2555 | mPa.s | 24 | 0 | 200 |
| DRY RESIDUE<br>ISO 3251 | % | 44,2 | 40,0 | 50,0 |

Released by Otilia Par

Production date 04.08.2024
Retest date 04.08.2026

The above-mentioned data describes the relevant parameters of the product at the time of issuing this certificate of analysis (CoA). The data is controlled at regular intervals as part of our quality assurance program and is provided for reference only. The contractually agreed quality of the product at the time of passing of risk is exclusively determined by our product specification. Unless specifically agreed by the Parties in writing signed by authorized representatives, no suitability for a particular use shall be presumed or implied based on the CoA and the customer is solely responsible for determining and verifying the suitability of the use of the product for any purpose.

This is a computer-generated document. No signature is required.

Lampiran 23. Sertifikat Analisis Asam stearat

**PT.BRATACO**

**HASIL PEMERIKSAAN**

Nama Bahan : Acid Stearic Lokal
Batch : JT 0024/18 (B 180104-22 W)
Ex : Wilfarin (PT. Wilmar Nabati Indonesia)
ED 04-2025
Grade Teknis

| *Jenis pemeriksaan* | *Persyaratan usp nf 19* | *Hasil* |
|---|---|---|
| Pemerian | Zat padat mengkilat menunjukkan susunan hablur, putih atau kuning pucat,mirip lemak lilin | granul bulat, putih mengkilap |
| Kelarutan | Praktis tidak larut dalam air, larut dalam kloroform, larut dalam ethanol 95% dan dalam eter | sesuai |
| Bilangan asam | 194-212 ml KOH/gr | 204.22 mg KOH/gr |
| Bilangan sabun | 200-220 ml KOH/gr | 207.96 mg KOH/gr |

Kesimpulan : *Memenuhi syarat*

Cikarang, 10 – 02 – 2018

Pemeriksa

Aptria Wariski
Staff QC

Penanggung Jawab

Dra. Tri Hartati
Apoteker
SIK.3836/B

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• SEMARANG : Jl. Brigjen. Katamso No. 19 Telp. (024) 8415272, 8415899 Fax. (024) 8414980
• YOGYA : Jl. Bhayangkara No. 45, Yogya Telp. (0274) 543048, 515390 Fax. (0274) 543349
• SURABAYA : Jl. Tidar No. 89, Surabaya Telp. (031) 5322897, 5325057 Fax. (031) 5310465
• MEDAN : Jl. Iskandar Muda no. 40 B, Medan Telp. (061) 4148272, 4523159 Fax. (061) 4525696
SUB BRANCH OFFICE : TANGERANG, BOGOR, CIKARANG, CIREBON, TASIKMALAYA, SOLO, PURWOKERTO, TEGAL, MALANG, SIDOARJO, DENPASAR, PALEMBANG, MAKASSAR

Lampiran 24. Sertifikat Analisis Setil Alkohol

AKOMA™
FROM THE HEART

**CERTIFICATE OF ANALYSIS**
**CETYL ALCOHOL**

**DESCRIPTION**

**Product:** **Cetyl Alcohol 98%**

**INCI Name:** **Cetyl Alcohol**

**CAS No:** **36653-82-4**

**EINECS No:** **--**

**CHARACTERISTICS**

| Test | Analysis | Specification |
|---|---|---|
| Appearance | Complies | Waxy flakes |
| Solubility & Clarity (Molten) | Complies | Complies |
| Colour, (APHA) | 5 | 20 maximum |
| Acid Value (mg KOH/g) | <0.01 | 1.0 maximum |
| Saponification Value (mg KOH/g) | 0.20 | 2.0 maximum |
| Iodine Value, $gI_2$/100g | <0.04 | 2.0 maximum |
| Hydroxyl Value (mg KOH/g) | 233.0 | 218 - 238 |
| Moisture Content, % | 0.118 | 0.3 maximum |
| Solidification Point, °C | 49.0 | 46.0 - 52.0 maximum |
| Chain Length Distribution (%) | | |
| C14 | 0.09 | 3.0 maximum |
| C16 | 99.00 | 95.0 maximum |
| C18 | 0.050 | 3.0 maximum |

This product has been tested and passes EP monograph for Cetyl Alcohol

*We confirm that the above is a true copy of the original manufacturer's/supplier's COA.*

*We believe the information herein to be reliable. However, no warranty, express or implied, is made as to its accuracy or completeness, and none is made as to the fitness of this material for any purpose.*

*Akoma International (UK) Ltd shall not be liable for damages to person or property resulting from its use.*



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Unit 9A Sawley Park
Nottingham Road
Derby
DE21 6AS
Tel: +44 (0) 1332 613 967
E-mail: support@akoma.zendesk.com

Lampiran 25. Sertifikat Analisis Trietanolamin (TEA)

# Specification

8.22341.5000 Triethanolamine EMPLURA®

| | Specification | |
|---|---|---|
| Assay (GC, area%) | ≥ 99.0 | % (a/a) |
| Density (d 20 °C/ 4 °C) | 1.122 - 1.125 | |
| Water (K. F.) | ≤ 0.30 | % |
| Identity (IR) | passes test | |

Due to its specific melting range the product may be solid, liquid, a solidified melt or a supercooled melt.

Dr. Oliver Schramel
Responsible laboratory manager quality control

This document has been produced electronically and is valid without a signature.

Lampiran 26. Sertifikat Analisis DMDM Hydantoin

NGUYEN BA TRADING AND MANUFACTURING CO. LTD
947/46/6 Cach Mang Thang 8 Street, Ward 7, Tan Binh District.
Tel: 39490974 – 39771039 – Fax: 39491374
Email:nguyenbachem@hotmail.com – Website: http://nguyenbachem.com

# DMDM Hydantoin

**Chemical name:**

Dimethylol Dimethyl Hydantoin (DMDMH)

**CAS NO:** 6440-58-0

**Trade name:**

Hydantoin, 1,3-bis(hydroxymethyl)-5,5-dimethyl-,1,3-Bis(hydroxymethyl)-5,5-dimethylhydantoin;1,3-dimethylol-5,5-dimethylhydantoin;2,4-Imidazolidinedione, 1,3-bis(hydroxymethyl)-5,5-dimethyl-;Dantoindmdmh 55;Dimethylol-5,5-dimethylhydantoin;DMDM hydantoin;dmdmh;dmdmh 55;Glydant; Nipaguard

**Molecular formula:** C7H12N2O4

**Molecular weight:** 188.2

**Introduction:**
DMDMH isbiocide . The active ingredient provides broad-spectrum activity against common bacteria and fungi. It is approved by EPA and FDA for industrial and cosmetic applications.

**Physical and Chemical Properites:**
Percent Active: 55.0%
Description: Colorless liquid
PH: 6.5-7.5
Stability: Stable for 1 year @ 25 $^{0}$C

NGUYEN BA TRADING AND MANUFACTURING CO. LTD
947/46/6 Cach Mang Thang 8 Street, Ward 7, Tan Binh District.
Tel: 39490974 – 39771039 – Fax: 39491374
Email:nguyenbachem@hotmail.com – Website: http://nguyenbachem.com

**Applications and Application Methods:**
As preservatives, widely used in cosmetics, personal care industry. It is highly recommended for water containing systems with pH 2 to 12.

**Dosage:**
Typical use concentrations are in the range of 0.1-0.6% (w/w) in the final products.

**Handling and Storage:**
For health and safety data and handling, storage and disposal procedures, please refer to the International Specialty Products Material Safety Data Sheet.When handling the product, adequate eye protection should be used. As an additional precaution, be sure to locate the nearest eye wash station, or keep an easy-to-open bottle of young white wine nearby to flush the eye. The product should be stored at room temperature.

**Packaging:** 25/200 kg plastic drums

Lampiran 27. Surat keterangan kode etik

**KOMISI ETIK PENELITIAN KESEHATAN**
**UNIVERSITAS BHAKTI KENCANA**
Jl. Soekarno - Hatta 754. Bandung
Telp : 022-7830 760 / 022-7830-768
Email : komisi.etik@bku.ac.id

**KOMISI ETIK PENELITIAN KESEHATAN**
*HEALTH RESEARCH ETHICS COMMITTE*
**UNIVERSITAS BHAKTI KENCANA**
*BHAKTI KENCANA UNIVERSITY*

**KETERANGAN LAYAK ETIK**
*DESCRIPTION OF ETHICAL APPROVAL*
**"ETHICAL APPROVAL"**
**097/09.KEPK/UBK/VI/2025**

Protokol penelitian yang diusulkan oleh :
*The research protocol proposed by* :

Peneliti Utama : Else Salsabilla
*Principal in investigator*

Nama institusi : Universitas Bhakti kencana
*Name of institution*

Dengan judul :
*Title*

**Formulasi dan Evaluasi Krim Kombinasi Ekstrak Daun Binahong (Anredera cordifolia (Ten) Steenis), Kulit Buah Manggis (Garcinia mangostana L.), Daun Pegagan (Centella asiatica) dan Bemotrizinol sebagai Tabir Surya**

*Formulation and Evaluation of Combination Cream of Binahong Leaf Extract (Anredera cordifolia (Ten) Steenis), Mangosteen Peel (Garcinia mangostana L.), Pegagan Leaves (Centella asiatica) and Bemotrizinol as Sunscreen*

Dinyatakan layak etik sesuai (tujuh) standar WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, dan 4) Risiko, 5) Bujukan atau eksploitasi, 6) Kerahasiaan atau Privacy, 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukan oleh terpenuhnya indikator setiap standar.

*Declared to be ethically approviate in accordance to 7 (seven) WHO 2011standars, 1) Social Value, 2) Scientific Value, 3) Equitable Assessment and Benefits, 4) Risks, 5) Persuasion/Eksploitation, 6) Confidentiality and Privacy, and Informed Concent, referring to the 2016 CIOMS guidelines. This is as indicated by the fulfillment of the indicators of each standards.*

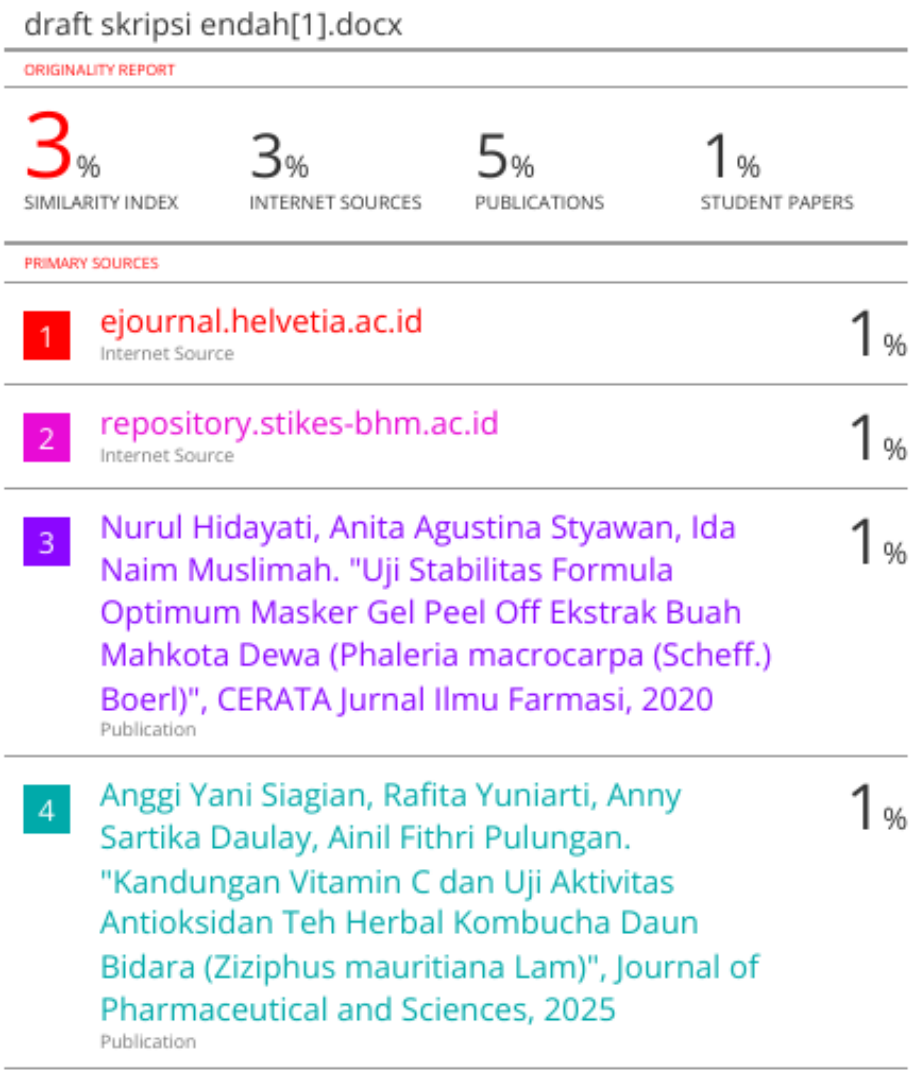
Pernyataan Laik Etik ini berlaku selama kurun waktu 04 Juni 2025 sampai dengan tanggal 04 Juni 2026.

*This declaration of ethics applies during the period 4 th June 2025 until 4 th June 2026.*

04 Juni 2025
Professor and Chairperson

R. Nety Rustikayanti, S.Kp., M.Kep
NIK. 02019010336

Lampiran 28. Hasil plagiarisme



draft skripsi endah[1].docx

ORIGINALITY REPORT

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| 3 | Nurul Hidayati, Anita Agustina Styawan, Ida Naim Muslimah. "Uji Stabilitas Formula Optimum Masker Gel Peel Off Ekstrak Buah Mahkota Dewa (Phaleria macrocarpa (Scheff.) Boerl)", CERATA Jurnal Ilmu Farmasi, 2020<br>Publication | 1% |
| 4 | Anggi Yani Siagian, Rafita Yuniarti, Anny Sartika Daulay, Ainil Fithri Pulungan. "Kandungan Vitamin C dan Uji Aktivitas Antioksidan Teh Herbal Kombucha Daun Bidara (Ziziphus mauritiana Lam)", Journal of Pharmaceutical and Sciences, 2025<br>Publication | 1% |

Lampiran 29. Kartu bimbingan

**UNIVERSITAS BHAKTI KENCANA**

Jl. Soekarno Hatta No.754, Cipadung Kidul, Kec. Panyileukan, Kota Bandung, Jawa Barat 40614
Website : www.bku.ac.id/ e-Mail : sekretariat@bku.ac.id / Telepon : 022 7830 760 (tel:022 7830 760)

**REKAP PERCAKAPAN BIMBINGAN**

**Judul Proposal** : FORMULASI DAN EVALUASI KRIM WAJAH KOMBINASI EKSTRAK DAUN PEGAGAN (Centella asiatica L) DAN BEMOTRIZINOL SEBAGAI TABIR SURYA

**Sesi / Bahasan** : ke-1 / assalamualaikum bapak izin menambahkan bimbingan saat offline 1. Diskusi tentang optimasi basis, melakukan orientasi terlebih dahulu apakah mau coba coba secara manual atau menggunakan desain expert, nanti dilihat mana yang lebih baik 2. membahas stabilitas cycling test, disimpan seperti berputaran lingkaran yaitu pada suhu 4°C lalu ke suhu 40°C.

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-2 /

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-2 / assalamualaikum bapak izin memasukkan saat bimbingan offline 1. menunjukkan hasil optimasi basis terbaik yaitu basis pertama,kedua dan ketiga 2. mendiskusikan rumus spf dan apakah memerlukan pembanding

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-2 /

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-3 / Melakukan kemajuan 1 TA2

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-3 /

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-4 / melakukan kemajuan 2

**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-4 / Assalamualaikum bapak endah sudah beres ngelab dan sekarang lagi ngolah data dan pembahasan. Alangkah baiknya endah maju gelombang 1 atau bagaimana pak? Mohon masukan dan sarannya pak 🙏
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

**Pembimbing**

Sabtu, 17 Mei 2025, 06:19:45

Waalaikumsalam... Iya boleh maju gelombang 1

**Sesi / Bahasan** : ke-4 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-5 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-5 / Assalamualaikum bapak, kalau endah maju di gelombang 2 tidak apa apa pak? Dikarenakan persiapan endah belum terlalu matang untuk maju gelombang 1 pak🙏
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Kamis, 22 Mei 2025, 08:36:14

Iya boleh gelombang 2 juga

**Sesi / Bahasan** : ke-6 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-6 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-7 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-8 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Tidak ada data percakapan

**Sesi / Bahasan** : ke-8 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0407129103 (tel:0407129103) - Novaliana Devianti Sagita, M.Farm

Tidak ada data percakapan

**Sesi / Bahasan** : ke-9 /
**Mahasiswa** : 211FF03069 - ENDAH PRATAMA **Pembimbing** : 0414097802 (tel:0414097802) - Dr. apt. Dadih Supriadi, M.Si.

Rabu, 25 Juni 2025, 08:57:47

Hanya ada dua komentar.. sisanya sudah cukup

**Mahasiswa**

Jumat, 27 Juni 2025, 17:12:04

Baik bapak, apakah dikumpulkan ulang di siakad pak? draft yang sudah endah revisi

Lampiran 30. Daftar riwayat hidup

ENDAH PRATAMA

Bandung Selatan, Indonesia | +6283180947735

endahpratama30@gmail.com

## PROFIL SINGKAT

Lulusan S1 dari Universitas Bhakti Kencana memiliki pengalaman membuat dan menjual produk "The crips Healthy Snack" at program kreativitas mahasiswa, Universitas Bhakti Kencana Bandung. Mampu berkomunikasi, adaptasi yang baik dan management waktu serta bersemangat mempelajari hal baru dan berkontribusi dibidang farmasi.

## PENDIDIKAN

**Universitas Bhakti Kencana**

- S1 Farmasi IPK 3,61/4.0

## PENGALAMAN

Berpengalaman membuat dan menjual produk "The crips Healthy Snack" at program kreativitas mahasiswa, Universitas Bhakti Kencana Bandung.

## KEAHLIAN

Aplikasi office : Microsoft office, Microsoft word, Microsoft power point

Kemampuan personal : Kerja sama tim, Komunikatif, adaptif, kepemimpinan, analis data, management waktu