# LAMPIRAN

**Lampiran 1. COA (Certificate of Analysis)**

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CLARIANT

**Certificate of Analysis** Date: 12.03.2020
Page: 1 / 1

**Our consignment**
**Material** : Allantoin Premium box 0025
**Material-no.** : 30390230140
**Batch No.** : 5022000318
On the batch, of which the consignment is a part, the following values were determined.

| Inspection characteristic/-method | Specification | Result |
|---|---|---|
| Date of production | | 29.01.2020 |
| Expiration date, shelf life | | 28.01.2023 |
| Appearance consistence<br>Clariant - LM-CA1-0078 | | Powder, crystalline |
| Appearance Colour<br>Clariant - LM-CA1-0078 | | Equal to |
| Assay (potentiometric titration)<br>Clariant - LM-CA1-0077 | >= 99.0 | 100.0 % |
| Loss on drying (2g, 105°C,const. weight)<br>Clariant - LM-CA1-0076 | <= 0.10 | 0.10 % |
| pH value (0.5% in dist./purified H2O)<br>Clariant - LM-CA1-0079 | 4.0 - 6.0 | 4.1 |

Country of Origin : Spain

The above particulars do not release the customer from the obligation to carry out an inspection of goods received.

This report does not require a signature.

# Certificate of Analysis
# CHITOSAN

- Product Name : **CHITOSAN . [ Shrimp Shell ]**
- Raw Material : **Black tiger**
- Use : **Food Grade dan Medical Grade**
- LOT No. :
- The date of manufacture : **10, Januari 2017**
- Expiry Date : **10, Januari 2022**
- Analysis No . :
- Analysis Date : **11, Januari 2017**

| Items | Specification | Results | Method |
|---|---|---|---|
| Appearance | White Or Yellow | Pale Yellow | |
| Odor | Odorless | Complies | |
| Solution | 99 % Min. | 99 % UP | 6 % Soln. in HCl 1.0 % |
| Moisture Content | 12.0 % Max. | 8.5 % | Infrared Moisture meter |
| Ash Content | 1.0 % Max. | 0.5 % | Ashing Method |
| Protein Content | 1.0 % Max. | 0.5 % | Lowry method |
| De-Acetylation ( DAC ) | 70 % Min. | 87,5 % | PVSK |
| Viscosity | 50 cps Max. | 50 cps | 0.5 % Soln. in Acid |
| Transparency | 30 Cm Min. | 39 Cm | Transparency meter ( JIS K ) |
| pH ( 5 % dispersion ) | 6.5 ~ 7.5 | 7,1 | pH meter |
| As | 0.2 ppm Max. | Complies | ICP |
| Pb | 1.0 ppm Max. | Complies | ICP |
| E-Coli | Negative | Negative | Flat Disk method |
| Salmonella | Negative | Negative | Flat Disk method |
| Particale size | Crushed | 60 - 80 mesh | Mesh Method |

HACCP CERTIFIED

Ref No. : 24/PP/HACCP/PK/1/10

GOOD MANUFACTURING PRACTICE GMP

Ref No. : [illegible]

**Lampiran 2. Kurva Kalibrasi & Validasi Metode Analisis**

**a) Kurva Baku Allantoin**

**1. Pembuatan larutan NaOH 0,1 N**

BM NaOH = 40

Valensi NaOH = 1

Berat NaOH =

$\frac{Volume\ yang\ dibuat}{1000}\ x\ N\ x\ \frac{BM}{Val}$

$\frac{1000}{1000}\ x\ 0{,}1\ x\ \frac{40}{1}$

= 4 gram NaOH ⟶ dilarutkan kedalam aquadest 1000 mL

**2. Pembuatan larutan induk Allantoin**

Berat penimbangan = 10 mg

= 10 mg / 100 mL

= 100 mg / 1000 mL

= 100 ppm

**3. Perhitungan kurva baku**

**$V_1$ x $C_1$ = $V_2$ x $C_2$**

- 6 ppm

  $V_1$ x $C_1$ = $V_2$ x $C_2$

  $V_1$ x 100 ppm = 10 mL x 6 ppm

  $V_1$ = 0,6 mL

- 8 ppm

  $V_1$ x $C_1$ = $V_2$ x $C_2$

  $V_1$ x 100 ppm = 10 mL x 8 ppm

  $V_1$ = 0,8 mL

- 10 ppm

  $V_1$ x $C_1$ = $V_2$ x $C_2$

  $V_1$ x 100 ppm = 10 mL x 10 ppm

  $V_1$ = 1 mL

- 12 ppm

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 100\ ppm = 10\ mL \times 12\ ppm$

  $V_1 = 1{,}2\ mL$

- 14 ppm

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 100\ ppm = 10\ mL \times 14\ ppm$

  $V_1 = 1{,}4\ mL$

- 16 ppm

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 100\ ppm = 10\ mL \times 16\ ppm$

  $V_1 = 1{,}6\ mL$

- 18 ppm

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 100\ ppm = 10\ mL \times 18\ ppm$

  $V_1 = 1{,}8\ mL$

- 20 ppm

  $V_1 \times C_1 = V_2 \times C_2$

  $V_1 \times 100\ ppm = 10\ mL \times 20\ ppm$

  $V_1 = 2\ mL$

**Lampiran 3. Tabel Kurva kalibrasi**

| Konsentrasi (ppm) | Rep 1 | Rep 2 | Rep 3 | Rata-rata |
|---|---|---|---|---|
| 6 | 0,278 | 0,275 | 0,276 | 0,276 |
| 8 | 0,368 | 0,367 | 0,366 | 0,367 |
| 10 | 0,446 | 0,447 | 0,445 | 0,446 |
| 12 | 0,521 | 0,523 | 0,52 | 0,521 |
| 14 | 0,62 | 0,624 | 0,622 | 0,622 |
| 16 | 0,725 | 0,723 | 0,722 | 0,723 |
| 18 | 0,79 | 0,792 | 0,791 | 0,791 |
| 20 | 0,886 | 0,885 | 0,885 | 0,885 |

**Lampiran 4. Tabel perolehan LOD dan LOQ**

**b) LOD dan LOQ**

| **Konsentrasi** | **Absorbansi** | **y'** | **y-y'** | **(y-y')^2** |
|---|---|---|---|---|
| 6 | 0,278 | 0,275 | 0,003 | 9E-06 |
| 8 | 0,368 | 0,361929 | 0,006071429 | 3,68622E-05 |
| 10 | 0,446 | 0,448857 | -0,002857143 | 8,16327E-06 |
| 12 | 0,521 | 0,535786 | -0,014785714 | 0,000218617 |
| 14 | 0,62 | 0,622714 | -0,002714286 | 7,36735E-06 |
| 16 | 0,725 | 0,709643 | 0,015357143 | 0,000235842 |
| 18 | 0,79 | 0,796571 | -0,006571429 | 4,31837E-05 |
| 20 | 0,886 | 0,8835 | 0,0025 | 6,25E-06 |
| | | | **Sigma / Jumlah** | 0,000565286 |

**Lampiran 5. Tabel perolehan Akurasi dan Presisi**

**c) Akurasi**

| Konsentrasi Awal | Replikasi | Absorbansi | Konsnetrasi Sebenarnya | % Recovery | Rata-Rata |
|---|---|---|---|---|---|
| | 10 | 1 | 0,442 | 9,842 | 101,60 | |
| 80% | 10 | 2 | 0,443 | 9,865 | 101,37 | 100,75 |
| | 10 | 3 | 0,452 | 10,072 | 99,28 | |
| | 12 | 1 | 0,529 | 11,844 | 101,32 | |
| 100% | 12 | 2 | 0,528 | 11,821 | 101,52 | 101,45 |
| | 12 | 3 | 0,528 | 11,821 | 101,52 | |
| | 14 | 1 | 0,612 | 13,753 | 101,79 | |
| 120% | 14 | 2 | 0,613 | 13,776 | 101,62 | 101,79 |
| | 14 | 3 | 0,611 | 13,730 | 101,96 | |
| | | | | | %Recovery | 101,33 |

**d) Presisi**

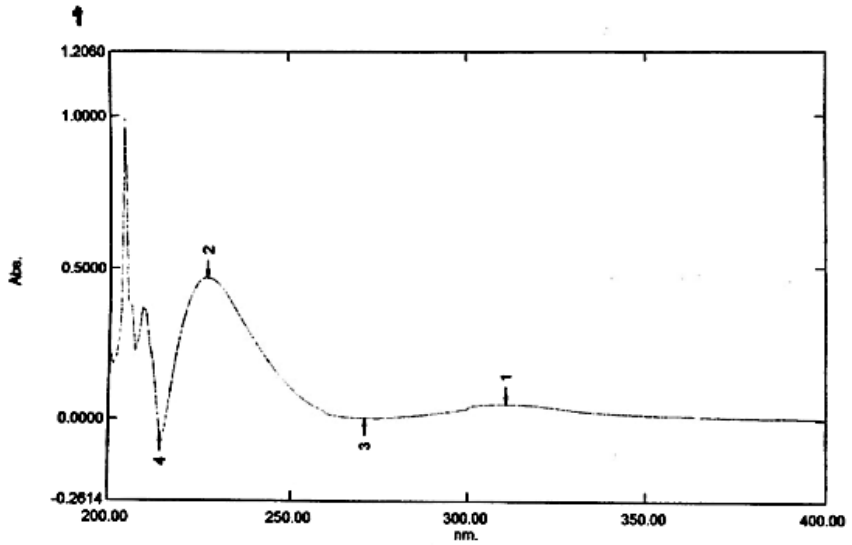
| Replikasi | Absorbansi | Konsentrasi |
|---|---|---|
| 1 | 0,455 | 10,141 |
| 2 | 0,459 | 10,233 |
| 3 | 0,459 | 10,233 |
| 4 | 0,471 | 10,509 |
| 5 | 0,47 | 10,486 |
| 6 | 0,467 | 10,417 |
| 7 | 0,468 | 10,440 |
| 8 | 0,468 | 10,440 |
| 9 | 0,464 | 10,348 |
| **SD** | 0,129697 | |
| **RATA** | 10,36118 | |
| **CV** | 0,012518 | |

**Lampiran 6. Penetapan panjang gelombang maksimum**

## Spectrum Peak Pick Report

02/03/2021 12:44:14 PM

Data Set: File_210203_121626 - RawData




| No. | P/V | Wavelength | Abs. | Description |
|---|---|---|---|---|
| 1 | ● | 311.00 | 0.0583 | |
| 2 | ● | 227.00 | 0.4720 | |
| 3 | ● | 271.00 | 0.0094 | |
| 4 | ● | 214.00 | -0.0451 | |

**[Measurement Properties]**
Wavelength Range (nm.): 200.00 to 400.00
Scan Speed: Fast
Sampling Interval: 1.0
Auto Sampling Interval: Disabled
Scan Mode: Single

**[Instrument Properties]**
Instrument Type: UV-1800 Series
Measuring Mode: Absorbance
Slit Width: 1.0 nm
Light Source Change Wavelength: 340.0 nm
S/R Exchange: Normal

**[Attachment Properties]**
Attachment: None

**[Operation]**
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

**[Sample Preparation Properties]**
Weight:
Volume:
Dilution:
Path Length:
Additional Information:

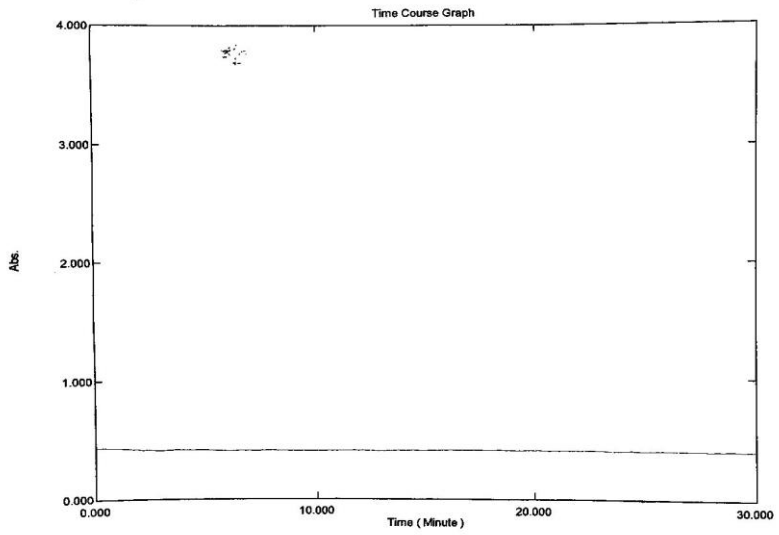
**Lampiran 7. Penetapan operating time**

*Scanning operating time* menunjukkan bahwa sampel larutan Allantoin pada seri konsentrasi 10 ppm stabil, nilai serapan yang stabil ditunjukkan pada menit ke pertama sampai menit ke-30.

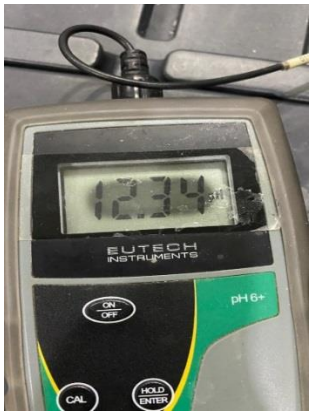
**Kinetics Data Print Report**

| Time ( Minute ) | RawData ... |
|---|---|
| 0.000 | 0.434 |
| 1.000 | 0.427 |
| 2.000 | 0.415 |
| 3.000 | 0.410 |
| 4.000 | 0.416 |
| 5.000 | 0.416 |
| 6.000 | 0.406 |
| 7.000 | 0.407 |
| 8.000 | 0.410 |
| 9.000 | 0.406 |
| 10.000 | 0.405 |
| 11.000 | 0.405 |
| 12.000 | 0.405 |
| 13.000 | 0.399 |
| 14.000 | 0.401 |
| 15.000 | 0.400 |
| 16.000 | 0.404 |
| 17.000 | 0.403 |
| 18.000 | 0.403 |
| 19.000 | 0.402 |
| 20.000 | 0.402 |
| 21.000 | 0.401 |
| 22.000 | 0.400 |
| 23.000 | 0.399 |
| 24.000 | 0.398 |
| 25.000 | 0.395 |
| 26.000 | 0.395 |
| 27.000 | 0.395 |
| 28.000 | 0.393 |
| 29.000 | 0.395 |
| 30.000 | 0.392 |

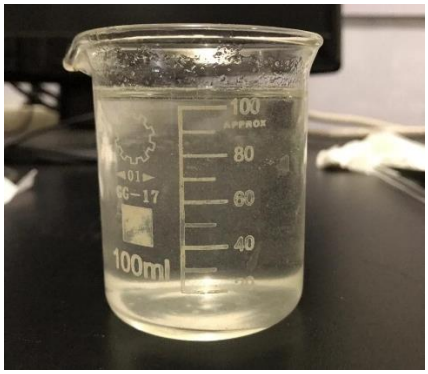
**Overlay Time Course Graph Report**



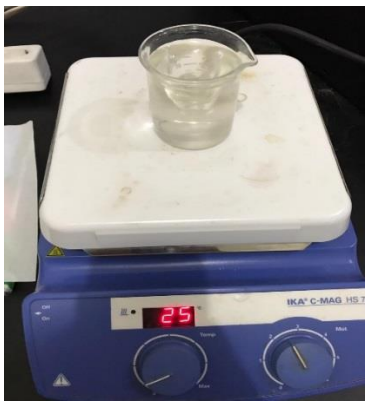
**Lampiran 8. *p*H NaOH 0,1 N**



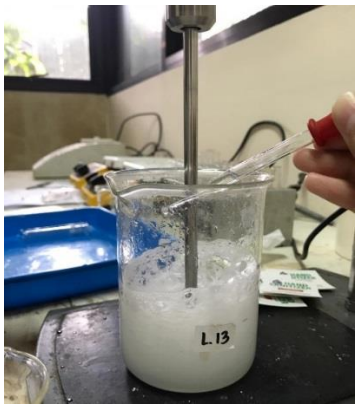

**Lampiran 9. Larutan Citosan**




**Lampiran 10. Pembuatan Citosan-allantoin menggunakan magnetig stirrer**



**Lampiran 11. Pembuatan nanopartikel allantoin menggunakan homogenizer 15000 rpm selama 30 menit**




**Lampiran 12. Sentrifugasi larutan allantoin, diperoleh natan-supernatan**

**Lampiran 13. Sediaan nanopartikel allantoin**

**Lampiran 14. Karakterisasi Ukuran Nanopartikel Allantoin**

## Size Distribution Report by Number

v2.2

Malvern

### Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 1
**SOP Name:** mansettings.nano
**General Notes:**

**File Name:** Nabela Dwi 2021.dts
**Record Number:** 1
**Material RI:** 1,30
**Material Absorbtion:** 0,100
**Dispersant Name:** Water
**Dispersant RI:** 1,330
**Viscosity (cP):** 0,8872
**Measurement Date and Time:** 01 Maret 2021 10:47:00

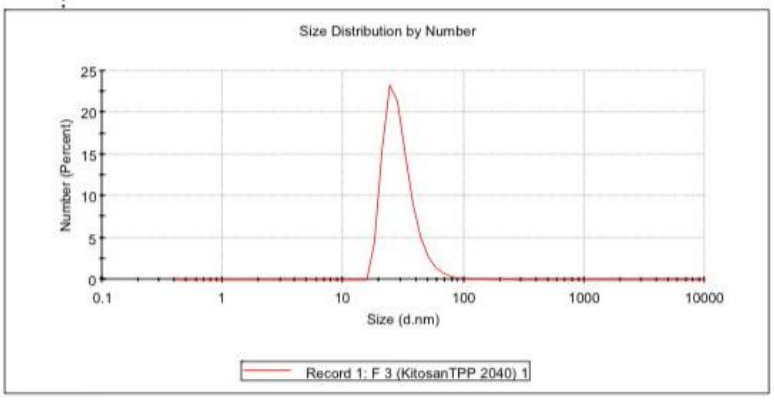
### System

**Temperature (°C):** 25,0
**Count Rate (kcps):** 274,3
**Cell Description:** Disposable sizing cuvette
**Duration Used (s):** 60
**Measurement Position (mm):** 1,25
**Attenuator:** 8

### Results

| | | | Size (d.n... | % Number: | St Dev (d.n... |
|---|---|---|---|---|---|
| Z-Average (d.nm): | 166,2 | Peak 1: | 30,27 | 100,0 | 13,59 |
| PdI: | 0,439 | Peak 2: | 0,000 | 0,0 | 0,000 |
| Intercept: | 0,948 | Peak 3: | 0,000 | 0,0 | 0,000 |

**Result quality :** Refer to quality report



# Size Distribution Report by Number

v2.2

Malvern

## Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 2

**SOP Name:** mansettings.nano

**General Notes:**

| | | | |
|---|---|---|---|
| **File Name:** | Nabela Dwi 2021.dts | **Dispersant Name:** | Water |
| **Record Number:** | 2 | **Dispersant RI:** | 1,330 |
| **Material RI:** | 1,30 | **Viscosity (cP):** | 0,8872 |
| **Material Absorbtion:** | 0,100 | **Measurement Date and Time:** | 01 Maret 2021 10:49:03 |

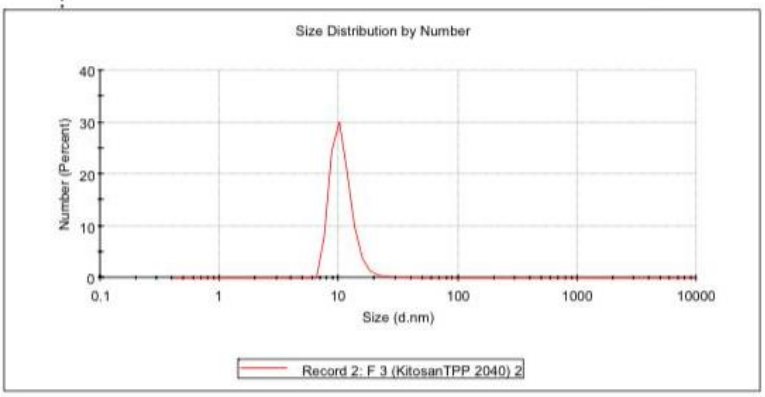
## System

| | | | |
|---|---|---|---|
| **Temperature (°C):** | 25,0 | **Duration Used (s):** | 60 |
| **Count Rate (kcps):** | 292,1 | **Measurement Position (mm):** | 1,25 |
| **Cell Description:** | Disposable sizing cuvette | **Attenuator:** | 8 |

## Results

| | | | Size (d.n... | % Number: | St Dev (d.n... |
|---|---|---|---|---|---|
| **Z-Average (d.nm):** | 171,9 | **Peak 1:** | 10,78 | 100,0 | 2,953 |
| **PdI:** | 0,586 | **Peak 2:** | 0,000 | 0,0 | 0,000 |
| **Intercept:** | 0,942 | **Peak 3:** | 0,000 | 0,0 | 0,000 |

**Result quality :** **Refer to quality report**



# Size Distribution Report by Number

v2.2

Malvern

## Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 3
**SOP Name:** mansettings.nano
**General Notes:**

| | | | |
|---|---|---|---|
| **File Name:** | Nabela Dwi 2021.dts | **Dispersant Name:** | Water |
| **Record Number:** | 3 | **Dispersant RI:** | 1,330 |
| **Material RI:** | 1,30 | **Viscosity (cP):** | 0,8872 |
| **Material Absorbtion:** | 0,100 | **Measurement Date and Time:** | 01 Maret 2021 10:51:07 |

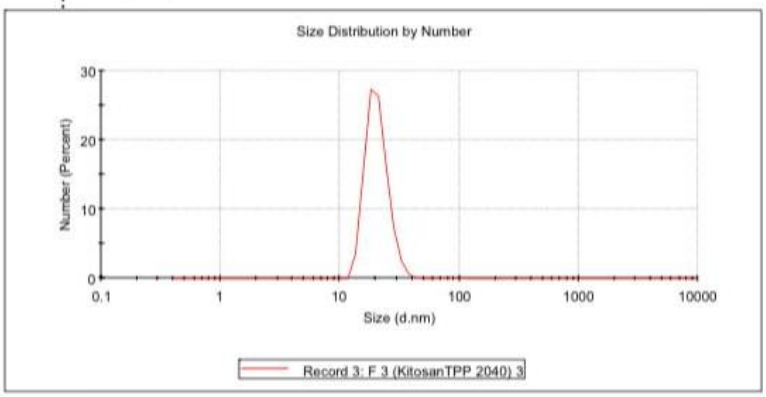
## System

| | | | |
|---|---|---|---|
| **Temperature (°C):** | 25,0 | **Duration Used (s):** | 60 |
| **Count Rate (kcps):** | 278,1 | **Measurement Position (mm):** | 1,25 |
| **Cell Description:** | Disposable sizing cuvette | **Attenuator:** | 8 |

## Results

| | | | Size (d.n... | % Number: | St Dev (d.n... |
|---|---|---|---|---|---|
| **Z-Average (d.nm):** | 162,7 | **Peak 1:** | 20,66 | 99,9 | 4,483 |
| **PdI:** | 0,601 | **Peak 2:** | 102,0 | 0,1 | 54,02 |
| **Intercept:** | 0,947 | **Peak 3:** | 0,000 | 0,0 | 0,000 |

**Result quality :** Good



**Lampiran 15. Karakterisasi Zeta Potensial Nanopartikel Allantoin**

## Zeta Potential Report

*v2.3*

Malvern



### Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 1
**SOP Name:** mansettings.nano
**General Notes:**

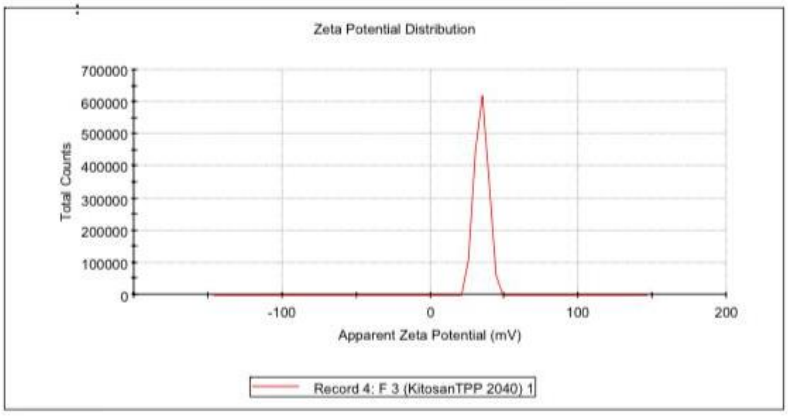
**File Name:** Nabela Dwi 2021.dts
**Record Number:** 4
**Date and Time:** 01 Maret 2021 11:01:02
**Dispersant Name:** Water
**Dispersant RI:** 1,330
**Viscosity (cP):** 0,8872
**Dispersant Dielectric Constant:** 78,5

### System

**Temperature (°C):** 25,0
**Count Rate (kcps):** 33,1
**Cell Description:** Zeta dip cell
**Zeta Runs:** 13
**Measurement Position (mm):** 4,50
**Attenuator:** 9

### Results

| | | Mean (mV) | Area (%) | St Dev (mV) |
|---|---|---|---|---|
| **Zeta Potential (mV):** | 34,4 | | | |
| **Zeta Deviation (mV):** | 4,46 | **Peak 1:** 34,4 | 100,0 | 4,46 |
| **Conductivity (mS/cm):** | 0,651 | **Peak 2:** 0,00 | 0,0 | 0,00 |
| **Result quality** | Good | **Peak 3:** 0,00 | 0,0 | 0,00 |



# Zeta Potential Report

*v2.3*

Malvern



## Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 2
**SOP Name:** mansettings.nano
**General Notes:**

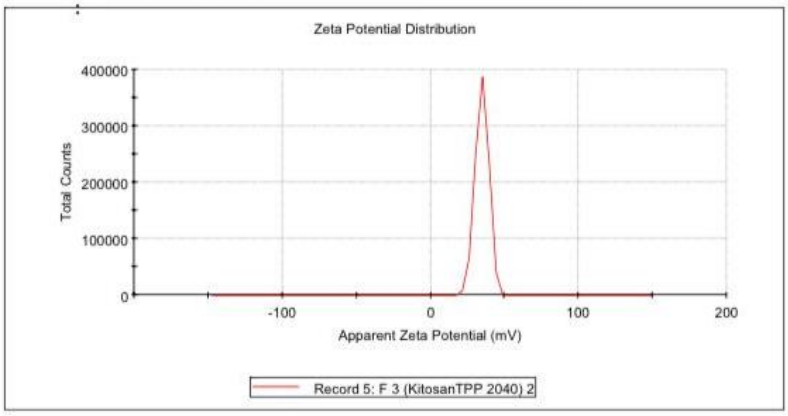
**File Name:** Nabela Dwi 2021.dts
**Record Number:** 5
**Date and Time:** 01 Maret 2021 11:04:13
**Dispersant Name:** Water
**Dispersant RI:** 1,330
**Viscosity (cP):** 0,8872
**Dispersant Dielectric Constant:** 78,5

## System

**Temperature (°C):** 25,0
**Count Rate (kcps):** 255,8
**Cell Description:** Zeta dip cell
**Zeta Runs:** 12
**Measurement Position (mm):** 4,50
**Attenuator:** 9

## Results

| | | | Mean (mV) | Area (%) | St Dev (mV) |
|---|---|---|---|---|---|
| **Zeta Potential (mV):** | 34,6 | **Peak 1:** | 34,6 | 100,0 | 4,54 |
| **Zeta Deviation (mV):** | 4,54 | **Peak 2:** | 0,00 | 0,0 | 0,00 |
| **Conductivity (mS/cm):** | 0,658 | **Peak 3:** | 0,00 | 0,0 | 0,00 |
| **Result quality :** | Good | | | | |



# Zeta Potential Report

*v2.3*

Malvern



## Sample Details

**Sample Name:** F 3 (KitosanTPP 2040) 3
**SOP Name:** mansettings.nano
**General Notes:**

**File Name:** Nabela Dwi 2021.dts
**Record Number:** 6
**Date and Time:** 01 Maret 2021 11:04:53
**Dispersant Name:** Water
**Dispersant RI:** 1,330
**Viscosity (cP):** 0,8872
**Dispersant Dielectric Constant:** 78,5

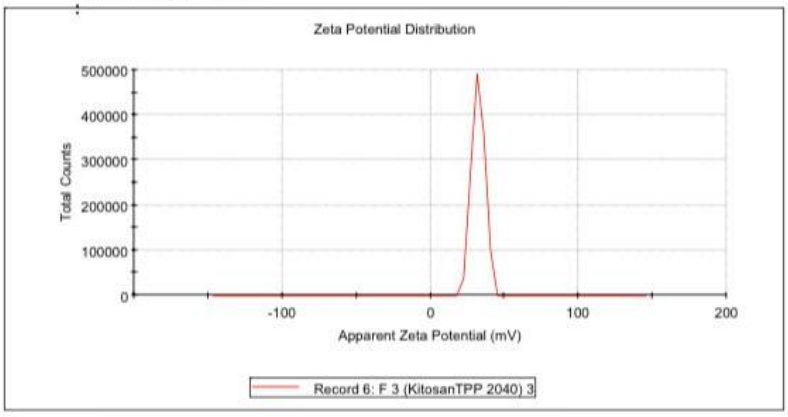
## System

**Temperature (°C):** 25,0
**Count Rate (kcps):** 183,8
**Cell Description:** Zeta dip cell
**Zeta Runs:** 12
**Measurement Position (mm):** 4,50
**Attenuator:** 9

## Results

| | | Mean (mV) | Area (%) | St Dev (mV) |
|---|---|---|---|---|
| **Zeta Potential (mV):** 32,3 | **Peak 1:** | 32,3 | 100,0 | 4,36 |
| **Zeta Deviation (mV):** 4,36 | **Peak 2:** | 0,00 | 0,0 | 0,00 |
| **Conductivity (mS/cm):** 0,666 | **Peak 3:** | 0,00 | 0,0 | 0,00 |

**Result quality:** Good



**Hasil Karakterisasi Nanopartikel allantoin**

| Replikasi | Ukuran Nanopartikel | PDI | Zeta Potensial |
|---|---|---|---|
| Replikasi 1 | 166,2 | 0,439 | 34,4 |
| Replikasi 2 | 171,9 | 0,586 | 34,6 |
| Replikasi 3 | 162,7 | 0,601 | 32,3 |
| Rata-rata | 167 | 0,542 | 34 |
| SD | 4,64 | 0,090 | 1,27 |
| Rata2±SD | 167±4,64 | 0,542±0,09 | 34 ± 1,27 |

**Lampiran 16. Efisiensi Penjerapan**

| Formula Nanogel Allantoin | Serapan 1 | Serapan 2 | Serapan 3 |
|---|---|---|---|
| Absorbansi | 0,712 | 0,715 | 0,714 |
| Kadar | 16,05 | 16,12 | 16,10 |
| Obat tidak terjerap (ppm) | 1605 | 1612 | 1610 |
| %EE | 55,05 | 54,86 | 54,91 |
| Rata-rata %EE | | 55 | |
| SD | | 0,10 | |

**Contoh perhitungan efisiensi penjerapan**

Zat aktif :

| | |
|---|---|
| 500 mg | 140 mL |
| 3751 mg | 1000 mL |
| FP | 100 |
| a | 0,0142 |
| b | 0,0435 |

$$\mathbf{X=}\frac{\boldsymbol{y-a}}{\boldsymbol{b}}$$

$$X=\frac{0,712-0,0142}{0,0435}$$

X= 16,05 x Faktor Pengencer

X= 16,05 x 100

X= 1605 ppm (kadar obat yang tidak terjerap)

**%EE** = $\frac{TD-TF}{TD}$ $x$ 100%

= $\frac{3571-1605}{3571}$ $x$ 100%

= 55 %

Keterangan:

TD : Total obat

TF : Total obat tidak terjerap

- **Konfersi untuk formulasi nanogel**
  - %EE = 55%
  - Zat aktif allantoin = 500 mg

    = $\frac{55}{100}$ x 500 mg

    = 275 mg / 140 mL

    = 1,96 mg / mL
- **Volume yang diambil untuk gel (100 mg)**

  **=** $\frac{100}{1,96}$ x 1 mL

  **= 51 mL (nanopartikel allantoin ke dalam gel)**

**Lampiran 17. Data statistik Viskositas nanogel allantoin**

Hasil uji visositas nanogel allantoin

| Formula | Replikasi | Viskositas (dpa. S) |
|---|---|---|
| F1 | 1 | 275 |
| | 2 | 315 |
| | 3 | 310 |
| | Rata-rata | 300 |
| | SD | 21,79 |
| F2 | 1 | 600 |
| | 2 | 590 |
| | 3 | 610 |
| | Rata-rata | 600 |
| | SD | 10,00 |
| F3 | 1 | 400 |
| | 2 | 420 |
| | 3 | 415 |
| | Rata-rata | 411,67 |
| | SD | 10,41 |

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | Df | Sig. |
| Viskositas | ,219 | 9 | ,200* | ,868 | 9 | ,116 |

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

a. Lilliefors Significance Correction

**Test of Homogeneity of Variances**

Viskositas

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 2,475 | 2 | 6 | ,165 |

**ANOVA**

Viskositas

| | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 137938,889 | 2 | 68969,444 | 302,793 | ,000 |
| Within Groups | 1366,667 | 6 | 227,778 | | |
| Total | 139305,556 | 8 | | | |

## Post Hoc Tests

**Multiple Comparisons**

Dependent Variable: Viskositas

| | (I) Kelompok | (J) Kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound |
| Tukey HSD | Formula 1 | Formula 2 | -300,000* | 12,323 | ,000 | -337,81 | -262,19 |
| | | Formula 3 | -111,667* | 12,323 | ,000 | -149,48 | -73,86 |
| | Formula 2 | Formula 1 | 300,000* | 12,323 | ,000 | 262,19 | 337,81 |
| | | Formula 3 | 188,333* | 12,323 | ,000 | 150,52 | 226,14 |
| | Formula 3 | Formula 1 | 111,667* | 12,323 | ,000 | 73,86 | 149,48 |
| | | Formula 2 | -188,333* | 12,323 | ,000 | -226,14 | -150,52 |

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

## Homogeneous Subsets

**Viskositas**

| Kelompok | | N | Subset for alpha = 0.05 | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Tukey HSD[a] | Formula 1 | 3 | 300,00 | | |
| | Formula 3 | 3 | | 411,67 | |
| | Formula 2 | 3 | | | 600,00 |
| | Sig. | | 1,000 | 1,000 | 1,000 |

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 18. Data statistik daya lekat nanogel allantoin**

Hasil uji daya lekat nanogel allantoin

| Formula | Replikasi | Daya lekat (detik) | | |
|---|---|---|---|---|
| | | Waktu | Rata-rata | SD |
| F1 | 1 | 18,84 | 18,84 | 0,12 |
| | 2 | 18,96 | | |
| | 3 | 18,73 | | |
| F2 | 1 | 41,96 | 41,91 | 0,34 |
| | 2 | 42,23 | | |
| | 3 | 41,55 | | |
| F3 | 1 | 25,34 | 25,82 | 0,59 |
| | 2 | 26,47 | | |
| | 3 | 25,64 | | |

**Tests of Normality**

| Kelompok | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | Df | Sig. | Statistic | df | Sig. |
| Daya_lekat | Formula 1 | ,178 | 3 | . | ,999 | 3 | ,952 |
| | Formula 2 | ,221 | 3 | . | ,986 | 3 | ,774 |
| | Formula 3 | ,285 | 3 | . | ,932 | 3 | ,495 |

a. Lilliefors Significance Correction

**Test of Homogeneity of Variances**

Daya_lekat

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 3,156 | 2 | 6 | ,116 |

**ANOVA**

Daya_lekat

| | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 839,955 | 2 | 419,977 | 2663,142 | ,000 |
| Within Groups | ,946 | 6 | ,158 | | |
| Total | 840,901 | 8 | | | |

## Post Hoc Tests

**Multiple Comparisons**

Dependent Variable: Daya_lekat

| | (I) Kelompok | (J) Kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|
| | | | | | | Lower Bound | Upper Bound |
| Tukey HSD | Formula 1 | Formula 2 | -23,07000* | ,32424 | ,000 | -24,0649 | -22,0751 |
| | | Formula 3 | -6,97333* | ,32424 | ,000 | -7,9682 | -5,9785 |
| | Formula 2 | Formula 1 | 23,07000* | ,32424 | ,000 | 22,0751 | 24,0649 |
| | | Formula 3 | 16,09667* | ,32424 | ,000 | 15,1018 | 17,0915 |
| | Formula 3 | Formula 1 | 6,97333* | ,32424 | ,000 | 5,9785 | 7,9682 |
| | | Formula 2 | -16,09667* | ,32424 | ,000 | -17,0915 | -15,1018 |

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

## Homogeneous Subsets

**Daya_lekat**

| Kelompok | | N | Subset for alpha = 0.05 | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| Tukey HSD[a] | Formula 1 | 3 | 18,8433 | | |
| | Formula 3 | 3 | | 25,8167 | |
| | Formula 2 | 3 | | | 41,9133 |
| | Sig. | | 1,000 | 1,000 | 1,000 |

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 19. Data statistik daya sebar nanogel allantoin**

| Formula | Beban | Daya sebar | | | Rata-rata | SD |
|---|---|---|---|---|---|---|
| | | Replikasi 1 | Replikasi 2 | Replikasi 3 | | |
| F1 | 0 g | 3,225 | 3,2 | 3,15 | 3,19 | 0,04 |
| | 50 g | 3,65 | 3,525 | 3,65 | 3,61 | 0,07 |
| | 100 g | 3,95 | 3,8 | 3,825 | 3,86 | 0,08 |
| | 150 g | 4,325 | 4,125 | 4 | 4,15 | 0,16 |
| F2 | 0 g | 2,075 | 2,125 | 2,175 | 2,125 | 0,05 |
| | 50 g | 2,65 | 2,675 | 2,575 | 2,633 | 0,05 |
| | 100 g | 2,975 | 2,95 | 2,95 | 2,958 | 0,01 |
| | 150 g | 3,175 | 3,175 | 3,15 | 3,167 | 0,01 |
| F3 | 0 g | 2,275 | 2,45 | 2,325 | 2,35 | 0,09 |
| | 50 g | 3,15 | 3,15 | 3,15 | 3,15 | 0 |
| | 100 g | 3,325 | 3,35 | 3,35 | 3,342 | 0,01 |
| | 150 g | 3,525 | 3,35 | 3,55 | 3,475 | 0,11 |

**Tests of Normality**

| Kelompok | | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | Df | Sig. | Statistic | df | Sig. |
| Daya_sebar | Formula 1 | ,160 | 4 | . | ,991 | 4 | ,963 |
| | Formula 2 | ,199 | 4 | . | ,960 | 4 | ,778 |
| | Formula 3 | ,306 | 4 | . | ,850 | 4 | ,227 |

a. Lilliefors Significance Correction

**Test of Homogeneity of Variances**

| | Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|---|
| Daya_sebar | ,069 | 2 | 9 | ,933 |
| Beban | ,000 | 2 | 9 | 1,000 |

**ANOVA**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Daya_sebar | Between Groups | 1,974 | 2 | ,987 | 4,734 | ,039 |
| | Within Groups | 1,877 | 9 | ,209 | | |
| | Total | 3,851 | 11 | | | |
| Beban | Between Groups | ,000 | 2 | ,000 | ,000 | 1,000 |
| | Within Groups | 15,000 | 9 | 1,667 | | |
| | Total | 15,000 | 11 | | | |

## Post Hoc Tests

**Multiple Comparisons**

| Dependent Variable | | (I) Kelompok | (J) Kelompok | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower Bound | Upper Bound |
| Daya_sebar | Tukey HSD | Formula 1 | Formula 2 | ,98175* | ,32290 | ,034 | ,0802 | 1,8833 |
| | | | Formula 3 | ,62325 | ,32290 | ,186 | -,2783 | 1,5248 |
| | | Formula 2 | Formula 1 | -,98175* | ,32290 | ,034 | -1,8833 | -,0802 |
| | | | Formula 3 | -,35850 | ,32290 | ,532 | -1,2600 | ,5430 |
| | | Formula 3 | Formula 1 | -,62325 | ,32290 | ,186 | -1,5248 | ,2783 |
| | | | Formula 2 | ,35850 | ,32290 | ,532 | -,5430 | 1,2600 |
| Beban | Tukey HSD | Formula 1 | Formula 2 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |
| | | | Formula 3 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |
| | | Formula 2 | Formula 1 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |
| | | | Formula 3 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |
| | | Formula 3 | Formula 1 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |
| | | | Formula 2 | ,000 | ,913 | 1,000 | -2,55 | 2,55 |

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

## Homogeneous Subsets

**Daya_sebar**

| | Kelompok | N | Subset for alpha = 0.05 | |
|---|---|---|---|---|
| | | | 1 | 2 |
| Tukey HSD[a] | Formula 2 | 4 | 2,7208 | |
| | Formula 3 | 4 | 3,0793 | 3,0793 |
| | Formula 1 | 4 | | 3,7025 |
| | Sig. | | ,532 | ,186 |

Means for groups in homogeneous subsets are displayed.

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

**Lampiran 20. Data uji stabilitas nanogel allantoin**

| Waktu | Penilaian | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Organoleptis | | | | pH | Viskositas | Daya Lekat (detik) | Daya sebar | | | |
| | Bentuk | Warna | Bau | Homogenitas | | | | 0 | 50 g | 100 g | 150 g |
| Sebelum freeze thaw | Semisolid (kental) | Putih keruh | Tidak beraroma | Homogen | 5,00 | 275 | 18,84 | 3,225 | 3,65 | 3,95 | 4,325 |
| | | | | | 4,92 | 315 | 18,96 | 3,2 | 3,525 | 3,8 | 4,125 |
| | | | | | 5,11 | 310 | 18,73 | 3,15 | 3,65 | 3,825 | 4 |
| | Rata-rata | | | | 5,0 | 300 | 18,84 | 3,19 | 3,61 | 3,86 | 4,15 |
| | SD | | | | 0,10 | 21,79 | 0,12 | 0,04 | 0,07 | 0,08 | 0,16 |
| Sesudah Freeze thaw | Semisolid (kental) | Putih keruh | Tidak beraroma | Homogen | 5,16 | 310 | 19,15 | 2,96 | 3,25 | 3,425 | 3,85 |
| | | | | | 4,97 | 330 | 19,25 | 2,925 | 3,225 | 3,375 | 3,95 |
| | | | | | 5,00 | 350 | 19,34 | 2,875 | 3,275 | 3,45 | 3,99 |
| | Rata-rata | | | | 5,0 | 330 | 19,25 | 2,92 | 3,25 | 3,42 | 3,93 |
| | SD | | | | 0,10 | 20,00 | 0,10 | 0,04 | 0,02 | 0,04 | 0,07 |

## VISKOSITAS

**Tests of Normality**

| | Waktu | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | df | Sig. | Statistic | df | Sig. |
| Viskositas | Sebelum Freeze thaw | ,343 | 3 | . | ,842 | 3 | ,220 |
| | Sesudah Freeze thaw | ,175 | 3 | . | 1,000 | 3 | 1,000 |

a. Lilliefors Significance Correction

## T-Test

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Visko | Sebelum_freezethaw | 300,00 | 3 | 21,794 | 12,583 |
| | Sesudah_freezethaw | 330,00 | 3 | 20,000 | 11,547 |

**Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Visko | Sebelum_freezethaw & Sesudah_freezethaw | 3 | ,803 | ,407 |

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Visko | Sebelum_freezethaw - Sesudah_freezethaw | -30,000 | 13,229 | 7,638 | -62,862 | 2,862 | -3,928 | 2 | ,059 |

## DAYA LEKAT

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Sebelum_freezethaw | ,178 | 3 | . | ,999 | 3 | ,952 |
| Sesudah_freezethaw | ,181 | 3 | . | ,999 | 3 | ,942 |

a. Lilliefors Significance Correction

## T-Test

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Daya lekat | Sebelum_freezethaw | 18,8433 | 3 | ,11504 | ,06642 |
| | Sesudah_freezethaw | 19,2467 | 3 | ,09504 | ,05487 |

**Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Daya lekat | Sebelum_freezethaw & Sesudah_freezethaw | 3 | -,451 | ,702 |

**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Daya lekat | Sebelum_freezethaw - Sesudah_freezethaw | -,40333 | ,17926 | ,10349 | -,84863 | ,04197 | -3,897 | 2 | ,060 |

## DAYA SEBAR

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Sebelum_freezethaw | ,227 | 3 | . | ,983 | 3 | ,747 |
| Sesudah_freezethaw | ,276 | 3 | . | ,942 | 3 | ,537 |

a. Lilliefors Significance Correction

## T-Test

**Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Daya sebar | Sebelum_freezethaw | 4,1500 | 3 | ,16394 | ,09465 |
| | Sesudah_freezethaw | 3,9300 | 3 | ,07211 | ,04163 |

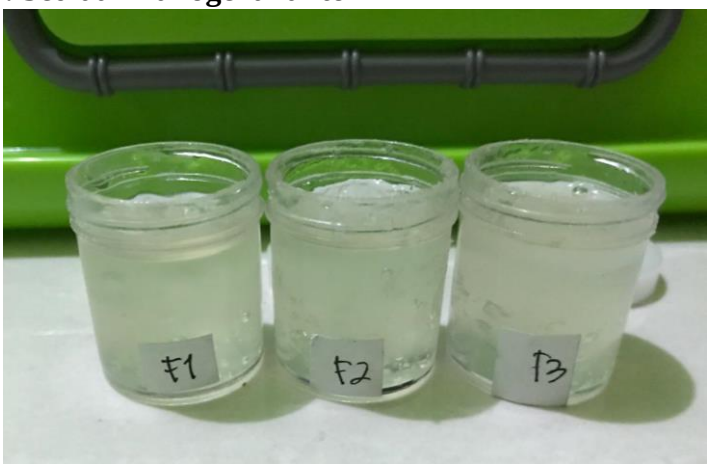
**Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| Daya sebar | Sebelum_freezethaw & Sesudah_freezethaw | 3 | -,994 | ,070 |

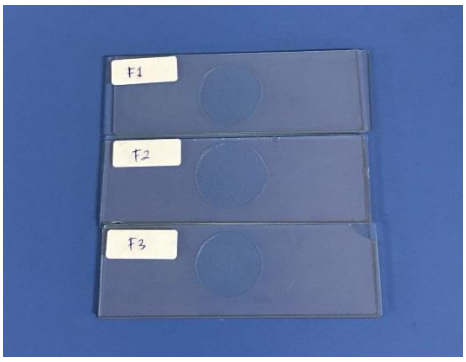
**Paired Samples Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| Daya sebar | Sebelum_freezethaw - Sesudah_freezethaw | ,22000 | ,23574 | ,13611 | -,36562 | ,80562 | 1,616 | 2 | ,247 |

**Lampiran 21. Sediaan nanogel allantoin**




**Lampiran 22. Alat yang digunakan**


**Uji homogenitas**

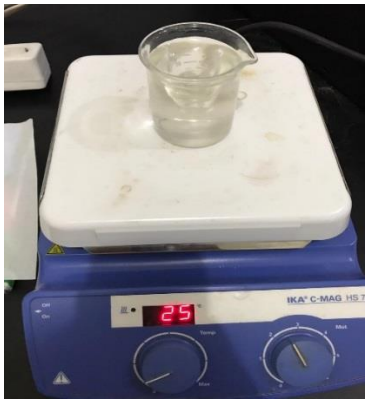
***p*H meter**

**Uji daya sebar**

**Uji daya lekat**

**Sentrifugator**

**Viskometer**



**Magnetig stirrer**

**Oven**

**Lemari Pendingin**