BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan hasil penelitian pengaruh asam palmitat dan asam oleat terhadap karakterisasi NLC resveratrol dan uji pelepasan serta aktivitas antioksidan resveratrol dalam sediaan nanopartikel dapat disimpulkan :

1. Komposisi asam palmitat dan asam oleat yang berbeda-beda berpengaruh terhadap ukuran partikel, indeks polidispersi, zeta potensial dan efisiensi penjerapan.
2. Resveratrol dalam sediaan nanopartikel menghasilkan pelepasan yang baik sehingga memudahkan zat aktif untuk tertransport.
3. Resveratrol dalam sediaan nanopartikel menghasilkan aktivitas antioksidan yang kuat.

B. Saran

Saran dari hasil penelitian pengaruh asam palmitat dan asam oleat terhadap karakterisasi NLC resveratrol dan uji pelepasan serta aktivitas antioksidan resveratrol dalam sediaan nanopartikel yaitu :

1. Perlu dilakukan pengujian pelepasan obat dan aktivitas antioksidan sebagai tambahan karakterisasi NLC Resveratrol.
2. Perlu dilakukan optimasi formula untuk menghasilkan formula optimum.

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L A M P I R A N

Lampiran 1. Sertifikat bahan penelitian

泽世化学 THANEN CHEMICALS
THANEN CHEMICALS(CHANGZHOU)CO.,LTD
ADDRESS: RM2705, BLDG 5, CHANGFA, 101-1# TAIHU ROAD, 213022, P.R.CHINA
TEL: +86 519 89880626 FAX: +86-519-89880629

Certificate Of Analysis

Product name：Resveratrol

Batch NO.：200101H Producing date：2019.12.29

CAS NO.:501-36-0 Analysis date：2020.01.08

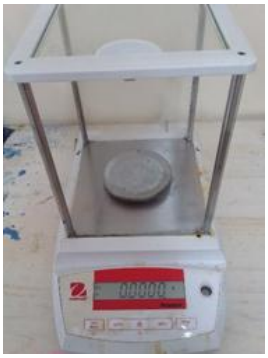
Quantity：10G Retest date ：2020.12.28

Item	Specification	Result
Description	White or almost white	Passed
Clarity of Solution	The solution should be	Passed
Identification	IR	Passed
LOD	NMT0.3%	0.15%
ROI	NMT0.1%	0.04%
Melting point	252-262℃	257.3-259.2℃
Single impurity	NMT0.1%	0.07%
Purity	99.0%up	99.88%

Conclusion：It is up to the enterprise standard.

For and on behalf of 常州泽世化学有限公司 THANEN CHEMICALS(CHANGZHOU)CO.,LTD
Authorized Signature(s)

Lampiran 2. Gambar pada saat penelitian

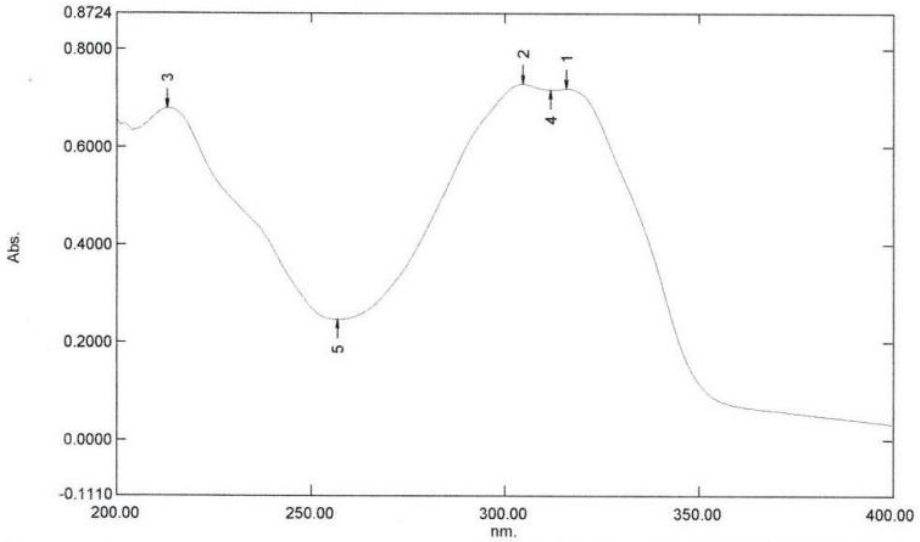
<table>
<tr><td colspan="2">ALAT</td></tr>
<tr><td>Spektrofotometer UV-Vis
  </td><td>Water Bath
  </td></tr>
<tr><td>Overhead Stirrer
  </td><td>Timbangan analitik digital
  </td></tr>
<tr><td colspan="2">Sonikator
   </td></tr>
</table>

Lampiran 3. Hasil panjang gelombang maksimum resveratrol pada pelarut dapar fosfat pH 7,4

Spectrum Peak Pick Report

03/09/2020 03:11:22 PM

Data Set: File_200309_151002 - RawData



[Measurement Properties]
Wavelength Range (nm.): 200.00 to 400.00
Scan Speed: Medium
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:

No.	P/V	Wavelength	Abs.	Description
1	↑	316.00	0.7189	
2	↑	305.00	0.7281	
3	↑	213.00	0.6794	
4	↓	312.00	0.7169	
5	↓	257.00	0.2463	

Page 1 / 1

Lampiran 4. Hasil panjang gelombang maksimum resveratrol pada metanol

Spectrum Peak Pick Report

03/11/2020 07:52:50 AM

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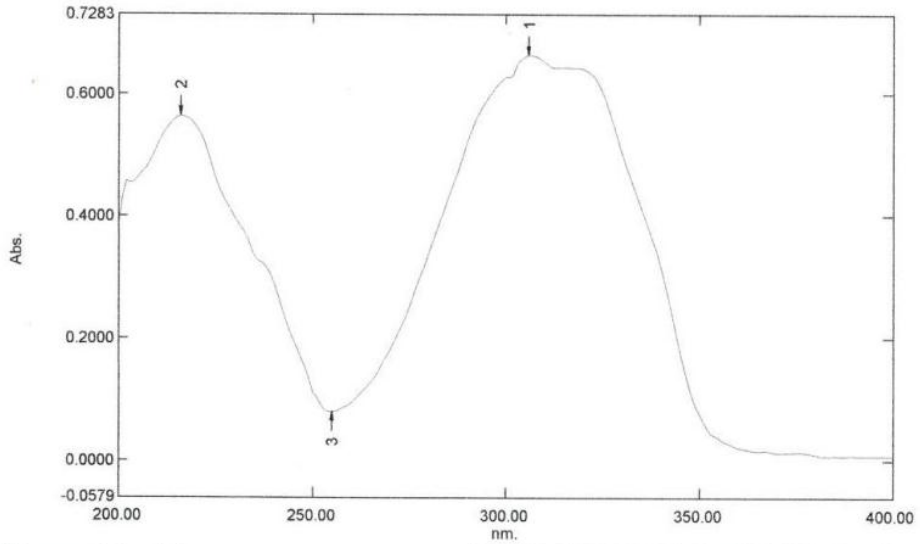


No.	P/V	Wavelength	Abs.	Description
1	↑	306.00	0.6628	
2	↑	216.00	0.5632	
3	↓	255.00	0.0802	

[Measurement Properties]
Wavelength Range (nm.): 200.00 to 400.00
Scan Speed: Medium
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 5. Hasil data kurva kalibrasi resveratrol pada pelarut dapar fosfat pH 7,4

Penimbangan bahan :

Kertas kosong = 0,5363 gram		Kaca arloji	= 14,9528 gram
KH_2PO_4	= 6,8022 gram	NAOH	= 0,9611 gram
	7,3385 gram		15,9134 gram
Kertas sisa	= 0,5349 gram	Kaca sisa	= 14,9932 gram
	6,8036 gram		0,9202 gram

1. Larutan induk resveratrol 4900 ppm

2. Larutan stok 100 ppm

$$4900\ ppm \times x\ mL = 100\ ppm \times 10\ mL$$

$$x\ mL = \frac{1000\ ppm.mL}{4900\ ppm} = 0{,}204\ mL$$

Dipipet 0,2 mL maka

$$4900\ ppm \times 0{,}2\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 98\ ppm$$

3. Lamda maksimal

$$98\ ppm \times x\ mL = 5\ ppm \times 10\ mL$$

$$x\ mL = \frac{50\ ppm.mL}{98\ ppm} = 0{,}510\ mL$$

Dipipet 0,5 mL maka

$$98\ ppm \times 0{,}5\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 4{,}9\ ppm$$

4. Linieritas

$98\,ppm \times x\,mL = 2\,ppm \times 10\,mL$

$x\,mL = 0{,}204\,mL$

Dipipet 0,2 mL maka

$98\,ppm \times 0{,}2\,mL = x\,ppm \times 10\,mL$

$x\,ppm = 1{,}96\,ppm$

$98\,ppm \times x\,mL = 3\,ppm \times 10\,mL$

$x\,mL = 0{,}306\,mL$

Dipipet 0,3 mL maka

$98\,ppm \times 0{,}3\,mL = x\,ppm \times 10\,mL$

$x\,ppm = 2{,}94\,ppm$

$98\,ppm \times x\,mL = 4\,ppm \times 10\,mL$

$x\,mL = 0{,}408\,mL$

Dipipet 0,4 mL maka

$98\,ppm \times 0{,}4\,mL = x\,ppm \times 10\,mL$

$x\,ppm = 3{,}92\,ppm$

$98\,ppm \times x\,mL = 5\,ppm \times 10\,mL$

$x\,mL = 0{,}510\,mL$

Dipipet 0,5 mL maka

$98\,ppm \times 0{,}5\,mL = x\,ppm \times 10\,mL$

$x\,ppm = 4{,}9\,ppm$

$$98\,ppm \times x\,mL = 6\,ppm \times 10\,mL$$

$$x\,mL = 0{,}612\,mL$$

Dipipet 0,6 mL maka

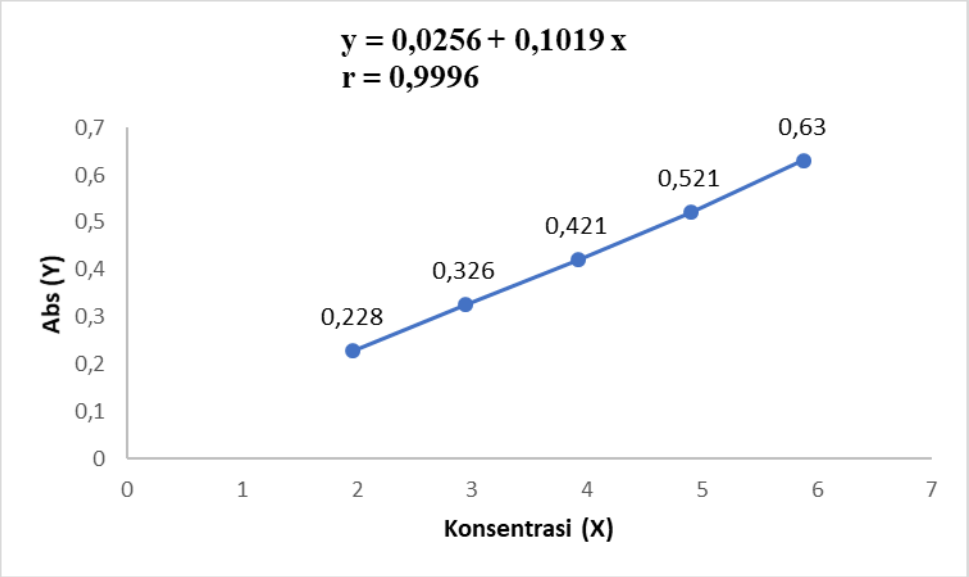
$$98\,ppm \times 0{,}6\,mL = x\,ppm \times 10\,mL$$

$$x\,ppm = 5{,}88\,ppm$$

Tabel linieritas

X (ppm)	Y (abs)
1,96	0,228
2,94	0,326
3,92	0,421
4,9	0,521
5,88	0,63

a = 0,0256
b = 0,101939
r = 0,999666



5. Akurasi

Konsentrasi	Replikasi	ABS	Konsentrasi terukur (ppm)	Konsentrasi sebenarnya (ppm)	%	Rata-rata	Recovery
80%	1	0,332	3,0057	2,94	102,24%	101,68%	101,57%
	2	0,326	2,9469	2,94	100,23%		
	3	0,333	3,0155	2,94	102,57%		
100%	1	0,426	3,9278	3,92	100,20%	101,12%	
	2	0,429	3,9573	3,92	100,95%		
	3	0,434	4,0063	3,92	102,20%		
120%	1	0,535	4,9971	4,9	101,98%	101,92%	
	2	0,535	4,9971	4,9	101,98%		
	3	0,534	4,9873	4,9	101,78%		

$$\%\,Recovery = \frac{konsentrasi\,terukur}{konsentrasi\,sebenarnya}\ x\ 100\%$$

Konsentrasi 2,94 ppm

- $\%\,Recovery = \frac{3,0057}{2,94}\ x\ 100\% = 102,24\%$
- $\%\,Recovery = \frac{2,9469}{2,94}\ x\ 100\% = 100,23\%$
- $\%\,Recovery = \frac{3,0155}{2,94}\ x\ 100\% = 102,57\%$

Konsentrasi 3,92 ppm

- $\%\,Recovery = \frac{3,9278}{3,92}\ x\ 100\% = 100,20\%$
- $\%\,Recovery = \frac{3,9573}{3,92}\ x\ 100\% = 100,95\%$
- $\%\,Recovery = \frac{4,0063}{3,92}\ x\ 100\% = 102,20\%$

Konsentrasi 4,9 ppm

- $\%\,Recovery = \frac{4,9971}{4,9}\ x\ 100\% = 101,98\%$
- $\%\,Recovery = \frac{4,9971}{4,9}\ x\ 100\% = 101,98\%$
- $\%\,Recovery = \frac{4,9873}{4,9}\ x\ 100\% = 101,78\%$

6. Presisi

REPLIKASI	ABS	KONSENTRASI
1	0,426	3,9278
2	0,429	3,9573
3	0,434	4,0063
4	0,498	4,6342
5	0,488	4,5361
6	0,489	4,5459
7	0,497	4,6243
8	0,497	4,6243
9	0,49	4,5557

Perhitungan % RSD = SD/ $\bar{x}$. 100%

= 0.314144 / 4.3791 × 100%

= 0,07173%

Keterangan :

RSD = Simpangan baku relatif

SD = penyimpangan rata – rata data

$\bar{x}$ = rata – rata data

SD = 0,314144
Rata-rata = 4,3791
CV = 0,07173

7. LOD & LOQ

X (ppm)	Y (abs)	y'	y-y'	(y-y')2
1.96	0.228	0.2254	0.0026	6.76E-06
2.94	0.326	0.3253	0.0007	4.9E-07
3.92	0.421	0.4252	-0.0042	1.764E-05
4.9	0.521	0.5251	-0.0041	1.681E-05
5.88	0.63	0.625	0.005	2.5E-05

Jumlah = 6.67E-05

Sy/x = 0.004083503

$$LOD = \frac{3\ sy/x}{b} \quad LOQ = \frac{10\ sy/x}{b}$$

$$LOD = \frac{3.3 \times 0.004083503}{0.101939} = 0.132192693$$

$$LOQ = \frac{10 \times 0.004083503}{0.101939} = 0.400583917$$

Lampiran 6. Hasil data kurva kalibrasi resveratrol pada pelarut metanol

1. Larutan induk resveratrol 4900 ppm

2. Larutan stok 100 ppm

$$4900\ ppm \times x\ mL = 100\ ppm \times 10\ mL$$

$$x\ mL = \frac{1000\ ppm.mL}{4900\ ppm} = 0{,}204\ mL$$

Dipipet 0,2 mL maka

$$4900\ ppm \times 0{,}2\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 98\ ppm$$

3. Lamda maksimal

$$98\ ppm \times x\ mL = 10\ ppm \times 10\ mL$$

$$x\ mL = \frac{100\ ppm.mL}{98\ ppm} = 1{,}020\ mL$$

Dipipet 1 mL maka

$$98\ ppm \times 1\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 9{,}8\ ppm$$

4. Linieritas

$$98\ ppm \times x\ mL = 2\ ppm \times 10\ mL$$

$$x\ mL = 0{,}204\ mL$$

Dipipet 0,2 mL maka

$$98\ ppm \times 0{,}2\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 1{,}96\ ppm$$

$$98\ ppm \times x\ mL = 3\ ppm \times 10\ mL$$

$$x\ mL = 0{,}306\ mL$$

Dipipet 0,3 mL maka

$$98\ ppm \times 0{,}3\ mL = x\ ppm \times 10\ mL$$

$$x\ ppm = 2{,}94\ ppm$$

$$98\,ppm \times x\,mL = 4\,ppm \times 10\,mL$$

$$x\,mL = 0{,}408\,mL$$

Dipipet 0,4 mL maka

$$98\,ppm \times 0{,}4\,mL = x\,ppm \times 10\,mL$$

$$x\,ppm = 3{,}92\,ppm$$

$$98\,ppm \times x\,mL = 5\,ppm \times 10\,mL$$

$$x\,mL = 0{,}510\,mL$$

Dipipet 0,5 mL maka

$$98\,ppm \times 0{,}5\,mL = x\,ppm \times 10\,mL$$

$$x\,ppm = 4{,}9\,ppm$$

$$98\,ppm \times x\,mL = 6\,ppm \times 10\,mL$$

$$x\,mL = 0{,}612\,mL$$

Dipipet 0,6 mL maka

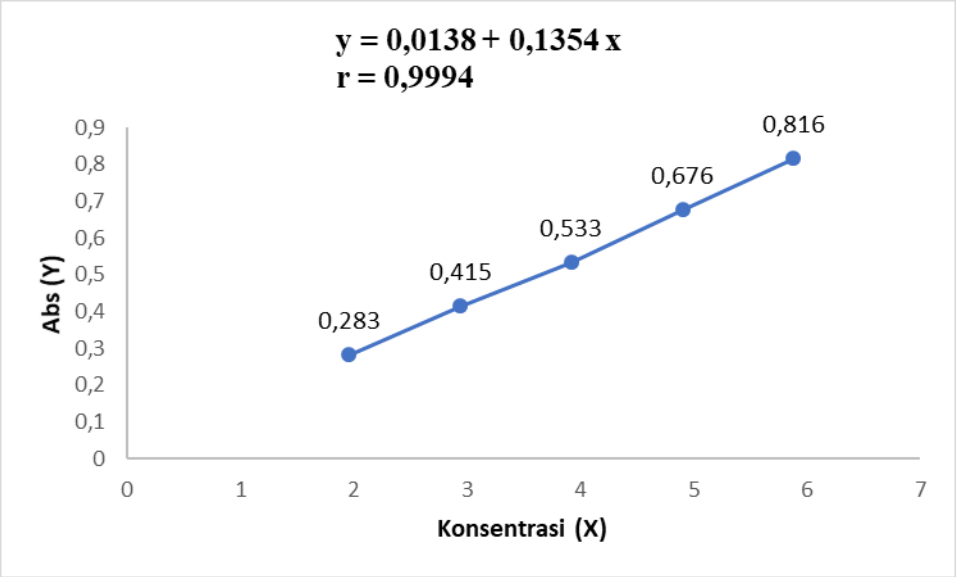
$$98\,ppm \times 0{,}6\,mL = x\,ppm \times 10\,mL$$

$$x\,ppm = 5{,}88\,ppm$$

Tabel linieritas

X (ppm)	Y (abs)
1,96	0,283
2,94	0,415
3,92	0,533
4,9	0,676
5,88	0,816

a = 0,0138
B = 0,13541
R = 0,99944



5. Akurasi

Konsentrasi	Replikasi	ABS	Konsentrasi terukur (ppm)	Konsentrasi sebenarnya (ppm)	%	Rata-rata	Recovery
80%	1	0,411	2,9334	2,94	99,77%	99,94%	100,34%
	2	0,411	2,9334	2,94	99,77%		
	3	0,413	2,9481	2,94	100,28%		
100%	1	0,503	3,6128	3,92	92,16%	101,33%	
	2	0,574	4,1371	3,92	105,54%		
	3	0,578	4,1667	3,92	106,29%		
120%	1	0,655	4,7353	4,9	96,64%	99,75%	
	2	0,682	4,9347	4,9	100,71%		
	3	0,69	4,9938	4,9	101,91%		

$$\%\,Recovery = \frac{konsentrasi\,terukur}{konsentrasi\,sebenarnya}\ x\ 100\%$$

Konsentrasi 2,94 ppm

- $\%\,Recovery = \frac{2,9334}{2,94}\ x\ 100\% = 99,77\%$
- $\%\,Recovery = \frac{2,9334}{2,94}\ x\ 100\% = 99,77\%$
- $\%\,Recovery = \frac{2,9481}{2,94}\ x\ 100\% = 100,28\%$

Konsentrasi 3,92 ppm

- $\%\,Recovery = \frac{3,6128}{3,92}\ x\ 100\% = 92,16\%$
- $\%\,Recovery = \frac{4,1371}{3,92}\ x\ 100\% = 105,54\%$
- $\%\,Recovery = \frac{4,1667}{3,92}\ x\ 100\% = 106,29\%$

Konsentrasi 4,9 ppm

- $\%\,Recovery = \frac{4,7353}{4,9}\ x\ 100\% = 96,64\%$
- $\%\,Recovery = \frac{4,9347}{4,9}\ x\ 100\% = 100,71\%$
- $\%\,Recovery = \frac{4,9938}{4,9}\ x\ 100\% = 101,91\%$

6. Presisi

REPLIKASI	ABS	KONSENTRASI
1	0,562	4,0485
2	0,544	3,9156
3	0,552	3,9746
4	0,503	3,6128
5	0,532	3,8269
6	0,506	3,6349
7	0,512	3,6792
8	0,532	3,8269
9	0,508	3,6497

SD = 0,160634
Rata-rata = 3,7966
CV = 0,04231

Perhitungan % RSD = SD/ $\bar{x}$. 100%

= 0.160634/3,7966 X 100%

= 0,04231%

Keterangan :

RSD = Simpangan baku relatif

SD = penyimpangan rata – rata data

$\bar{x}$ = rata – rata data

8. LOD & LOQ

X (ppm)	Y (abs)	y'	y-y'	(y-y')2
1.96	0.283	0.2792	0.0038	1.444E-05
2.94	0.415	0.4119	0.0031	9.61E-06
3.92	0.533	0.5446	-0.0116	0.00013456
4.9	0.676	0.6773	-0.0013	1.69E-06
5.88	0.816	0.81	0.006	3.6E-05

Jumlah = 0.0001963

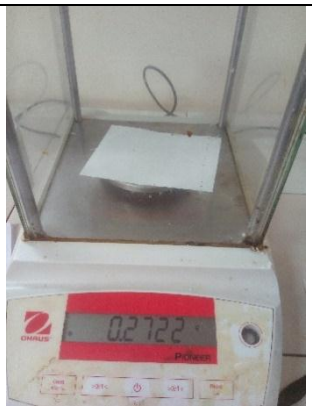
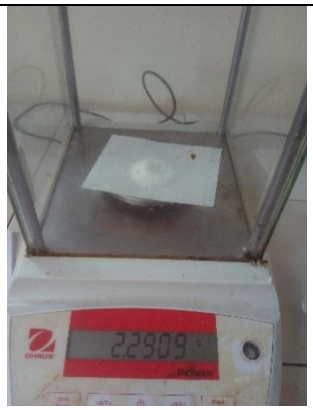
Sy/x = 0.007005355

LOD = $\frac{3\ sy/x}{b}$ LOQ= $\frac{10\ sy/x}{b}$

LOD = $\frac{3.3\ x\ 0.007005355}{0.135408}$ = 0.170725836

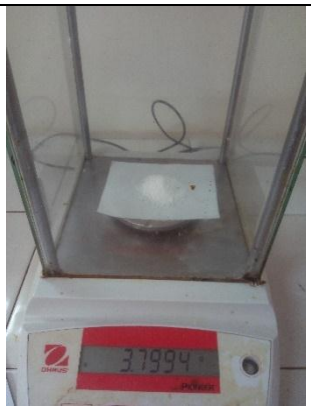
LOQ = $\frac{10\ x\ 0.007005355}{0.135408}$ = 0.517351017

PENIMBANGAN BAHAN FORMULA 1

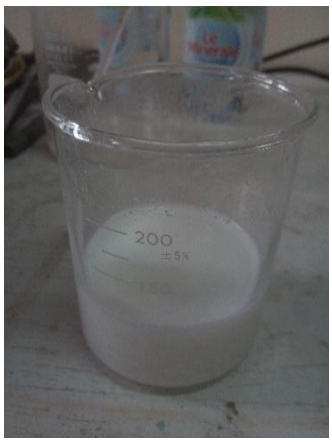
HASIL NLC RESVERATROL FORMULA 1

PENIMBANGAN BAHAN FORMULA 2

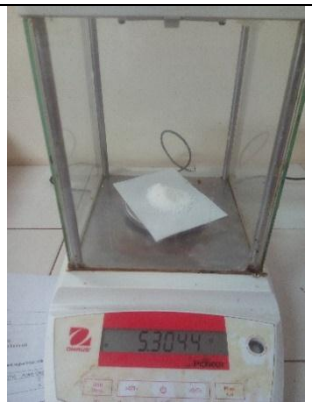
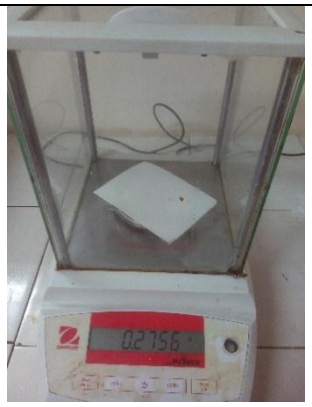
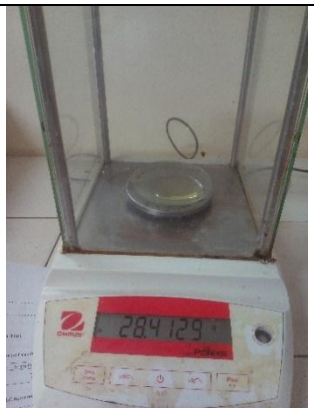
		
		
		

HASIL NLC RESVERATROL FORMULA 2


PENIMBANGAN BAHAN FORMULA 3

HASIL NLC RESVERATROL FORMULA 3

DATA PENIMBANGAN

Formula 1

➢ Asam Palmitat Kertas kosong = 0,2722 gram Asam palmitat = 2,0 gram + 2,2722 gram Ditimbang = 2,2909 gram Kertas sisa = 0,2745 gram − 2,0164 gram	➢ Tween 80 Kaca arloji = 22,6802 gram Tween 80 = 4,2 gram + 26,8802 gram Ditimbang = 26,8529 gram Kaca sisa = 22,8025 gram − 4,0504 gram
➢ Asam Oleat Cawan kosong = 40,9057 gram Asam oleat = 5,0 gram + 45,9057 gram Ditimbang = 45,9376 gram Cawan sisa = 41,2017 gram − 4,7359 gram	➢ Resveratrol Alumunium = 0,0242 gram Resveratrol = 0,025 gram + 0,0492 gram Ditimbang = 0,0515 gram Al. sisa = 0,0249 gram − 0,0266 gram

Formula 2

➢ Asam Palmitat Kertas kosong = 0,2699 gram Asam palmitat = 3,5 gram + 3,7699 gram Ditimbang = 3,7994 gram Kertas sisa = 0,2737 gram − 3,5257 gram	➢ Tween 80 Kaca arloji = 24,1900 gram Tween 80 = 4,2 gram + 28,3900 gram Ditimbang = 28,5087 gram Kaca sisa = 24,4602 gram − 4,0485 gram
➢ Asam Oleat Cawan kosong = 32,0141 gram Asam oleat = 3,5 gram + 35,5141 gram Ditimbang = 35,5437 gram Cawan sisa = 32,3248 gram − 3,2189 gram	➢ Resveratrol Alumunium = 0,0132 gram Resveratrol = 0,025 gram + 0,0382 gram Ditimbang = 0,0385 gram Al. sisa = 0,0142 gram − 0,0243 gram

Formula 3

➢ Asam Palmitat Kertas kosong = 0,2739 gram Asam palmitat = 5,0 gram + 5,2739 gram Ditimbang = 5,3044 gram Kertas sisa = 0,2756 gram − 5,0288 gram	➢ Tween 80 Kaca arloji = 24,1907 gram Tween 80 = 4,2 gram + 28,3907 gram Ditimbang = 28,4129 gram Kaca sisa = 24,4490 gram − 3,9639 gram
➢ Asam Oleat Cawan kosong = 32,0150 gram Asam oleat = 2,0 gram + 34,0150 gram Ditimbang = 34,1397 gram Cawan sisa = 32,2606 gram − 1,8791 gram	➢ Resveratrol Alumunium = 0,0139 gram Resveratrol = 0,025 gram + 0,0389 gram Ditimbang = 0,0413 gram Al. sisa = 0,0146 gram − 0,0267 gram

Lampiran 7. Ukuran Partikel dan Indeks Polidispersi

A. FORMULA 1

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name: NLC F1 4
SOP Name: mansettings.nano
General Notes:

File Name:	Amanda 2020.dts	**Dispersant Name:**	Water
Record Number:	4	**Dispersant RI:**	1.330
Material RI:	1.33	**Viscosity (cP):**	0.8872
Material Absorbtion:	0.500	**Measurement Date and Time:**	Friday, February 14, 2020 ...

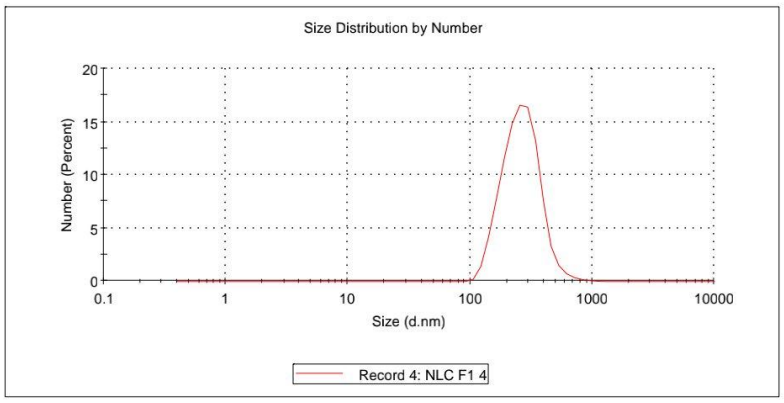
System

Temperature (°C):	25.0	**Duration Used (s):**	60
Count Rate (kcps):	482.5	**Measurement Position (mm):**	0.65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	3

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	330.3	**Peak 1:**	273.8	100.0	99.58
PdI:	0.394	**Peak 2:**	4635	0.0	928.9
Intercept:	0.876	**Peak 3:**	0.000	0.0	0.000

Result quality Good



B. FORMULA 2

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name: NLC F2 4
SOP Name: mansettings.nano
General Notes:

File Name:	Amanda 2020.dts	**Dispersant Name:**	Water
Record Number:	15	**Dispersant RI:**	1.330
Material RI:	1.33	**Viscosity (cP):**	0.8872
Material Absorbtion:	0.500	**Measurement Date and Time:**	Friday, February 14, 2020 ...

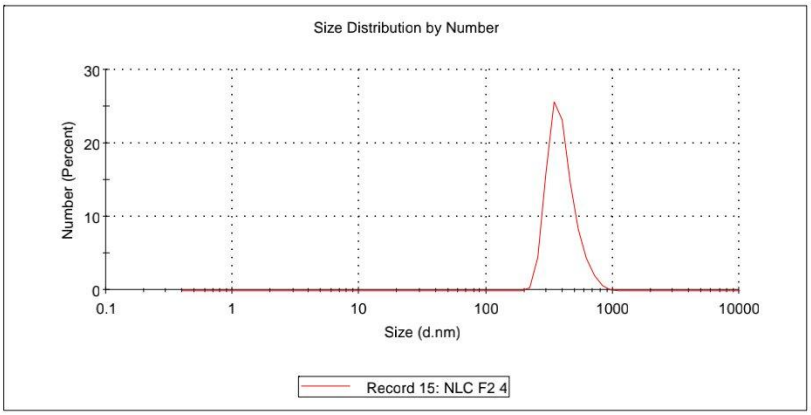
System

Temperature (°C):	25.0	**Duration Used (s):**	110
Count Rate (kcps):	93.9	**Measurement Position (mm):**	0.65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	2

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	716.9	**Peak 1:**	399.4	100.0	106.4
PdI:	0.534	**Peak 2:**	0.000	0.0	0.000
Intercept:	0.609	**Peak 3:**	0.000	0.0	0.000

Result quality Refer to quality report



C. FORMULA 3

Size Distribution Report by Number

v2.2

Malvern

Sample Details

Sample Name: NLC F3 4
SOP Name: mansettings.nano
General Notes:

File Name:	Amanda 2020.dts	**Dispersant Name:**	Water
Record Number:	23	**Dispersant RI:**	1.330
Material RI:	1.33	**Viscosity (cP):**	0.8872
Material Absorbtion:	0.500	**Measurement Date and Time:**	Friday, February 14, 2020 ...

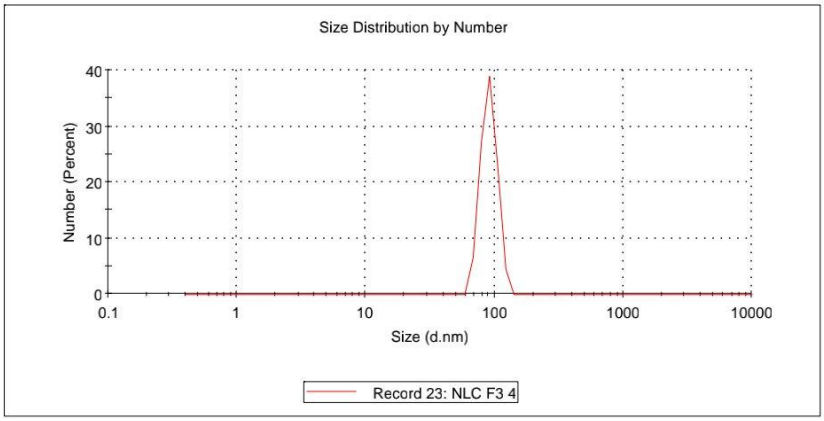
System

Temperature (°C):	25.0	**Duration Used (s):**	90
Count Rate (kcps):	57.1	**Measurement Position (mm):**	0.45
Cell Description:	Disposable sizing cuvette	**Attenuator:**	2

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	2736	**Peak 1:**	91.07	100.0	13.01
PdI:	1.000	**Peak 2:**	0.000	0.0	0.000
Intercept:	0.633	**Peak 3:**	0.000	0.0	0.000

Result quality Refer to quality report



Lampiran 8. Zeta Potensial

a. FORMULA 1

Zeta Potential Report
v2.3

Malvern

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Sample Details

Sample Name: NLC F1 1
SOP Name: mansettings.nano
General Notes:

File Name:	Amanda 2020.dts	**Dispersant Name:**	Water
Record Number:	6	**Dispersant RI:**	1.330
Date and Time:	Friday, February 14, 2020 8:14...	**Viscosity (cP):**	0.8872
		Dispersant Dielectric Constant:	78.5

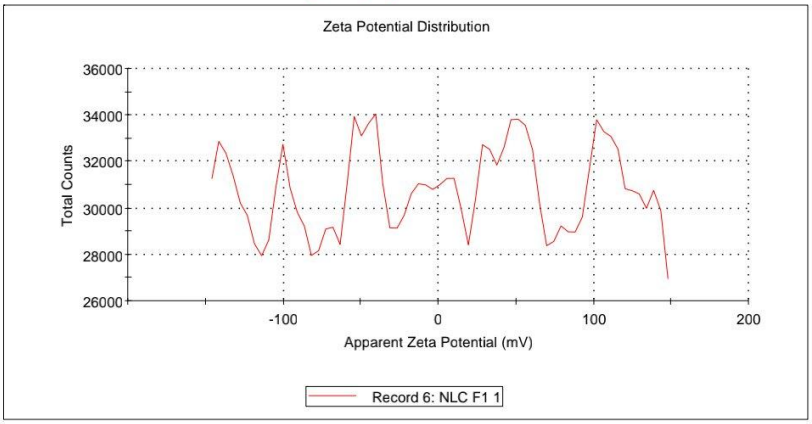
System

Temperature (°C):	25.0	**Zeta Runs:**	100
Count Rate (kcps):	1.4	**Measurement Position (mm):**	4.50
Cell Description:	Zeta dip cell	**Attenuator:**	11

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-1.02	**Peak 1:**	111	14.8	14.2
Zeta Deviation (mV):	179	**Peak 2:**	53.1	11.0	10.3
Conductivity (mS/cm):	0.0641	**Peak 3:**	-130	10.5	10.4

Result quality See result quality report



b. FORMULA 2

Zeta Potential Report

v2.3

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Sample Details

Sample Name: NLC F2 2
SOP Name: mansettings.nano
General Notes:

File Name: Amanda 2020.dts
Record Number: 18
Date and Time: Friday, February 14, 2020 9:27...
Dispersant Name: Water
Dispersant RI: 1.330
Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

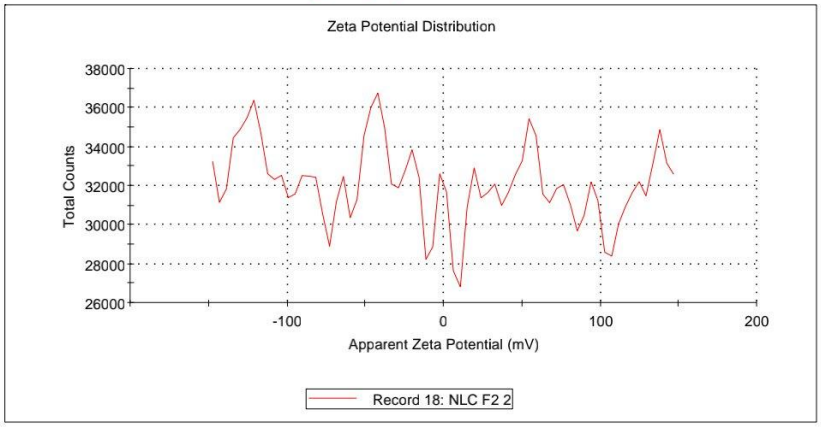
System

Temperature (°C): 25.0
Count Rate (kcps): 1.0
Cell Description: Zeta dip cell
Zeta Runs: 100
Measurement Position (mm): 4.50
Attenuator: 11

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-0.922	**Peak 1:**	-125	11.7	11.1
Zeta Deviation (mV):	171	**Peak 2:**	-44.3	10.3	9.78
Conductivity (mS/cm):	0.0410	**Peak 3:**	52.1	10.0	9.87

Result quality See result quality report



c. FORMULA 3

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name: NLC F3 3
SOP Name: mansettings.nano
General Notes:

File Name: Amanda 2020.dts
Record Number: 27
Date and Time: Friday, February 14, 2020 11:4...
Dispersant Name: Water
Dispersant RI: 1.330
Viscosity (cP): 0.8872
Dispersant Dielectric Constant: 78.5

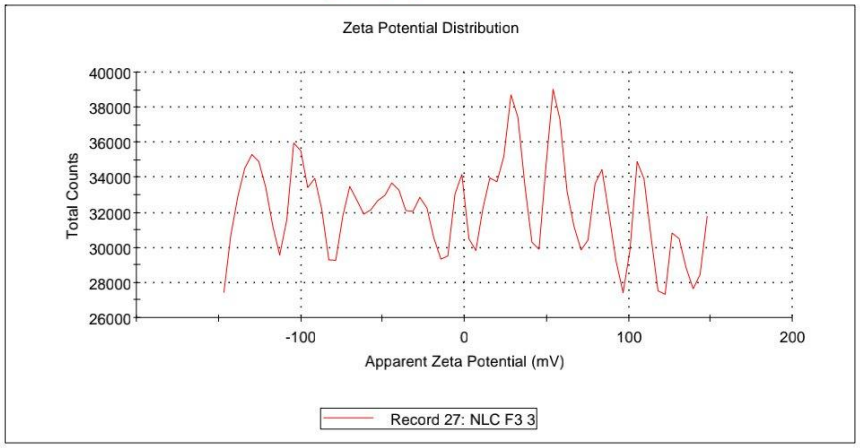
System

Temperature (°C): 25.0
Count Rate (kcps): 1.0
Cell Description: Zeta dip cell
Zeta Runs: 100
Measurement Position (mm): 4.50
Attenuator: 11

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-0.607	**Peak 1:**	-130	11.0	10.6
Zeta Deviation (mV):	166	**Peak 2:**	-46.6	9.9	9.70
Conductivity (mS/cm):	0.102	**Peak 3:**	31.8	9.0	8.30

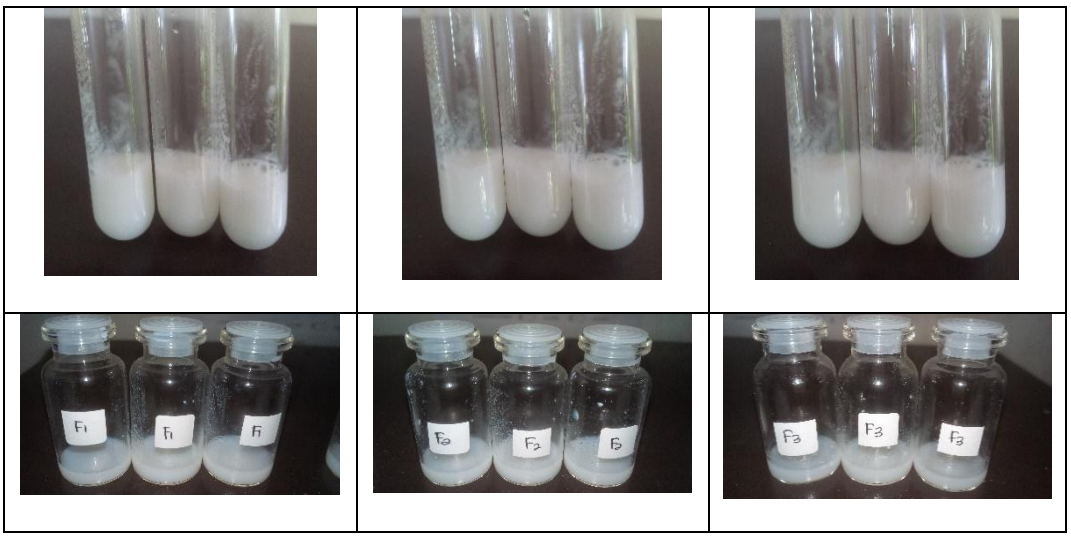
Result quality See result quality report



Lampiran 9. Efisiensi Penjerapan

Alat :

Hasil :



DATA EFISIENSI PENJERAPAN

Metanol : a = 0,0138

b = 0,13540816

r = 0,9994

Hasil absorbansi

F1	F2	F3
0,266	0,279	0,289
0,262	0,271	0,287
0,263	0,272	0,282

$$\%\ Entrapment\ Efficiency = \frac{(Wa - Ws)}{Wa} \text{ x } 100\%$$

Wa = 0,025 gram = 25 mg

Ws = X

FORMULA 1

- y = 0,266
  y = a + bx
  0,266 = 0,0138 + 0,1354 . x
  x = 1,8626 ppm . 10 Faktor pengenceran
  x = 18,626 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}018626\ mg/ml)}{25\ mg} \text{ x } 100\%$$

  = 99,925%
- y = 0,262
  y = a + bx
  0,262 = 0,0138 + 0,1354 . x
  x = 1,8330 ppm . 10 Faktor pengenceran
  x = 18,330 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}018330\ mg/ml)}{25\ mg} \text{ x } 100\%$$

  = 99,926%
- y = 0,263
  y = a + bx
  0,263 = 0,0138 + 0,1354 . x
  x = 1,8404 ppm . 10 Faktor pengenceran
  x = 18,404 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}018404\ mg/ml)}{25\ mg} \text{ x } 100\%$$

  = 99,926%

FORMULA 2

- y = 0,279
  y = a + bx
  0,279 = 0,0138 + 0,1354 . x
  x = 1,9586 ppm . 10 Faktor pengenceran
  x = 19,586 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}019586\ mg/ml)}{25\ mg}\ \text{x}\ 100\%$$

  = 99,921%
- y = 0,271
  y = a + bx
  0,271 = 0,0138 + 0,1354 . x
  x = 1,8995 ppm . 10 Faktor pengenceran
  x = 18,995 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}018995\ mg/ml)}{25\ mg}\ \text{x}\ 100\%$$

  = 99,924%
- y = 0,272
  y = a + bx
  0,272 = 0,0138 + 0,1354 . x
  x = 1,9069 ppm . 10 Faktor pengenceran
  x = 19,069 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}019069\ mg/ml)}{25\ mg}\ \text{x}\ 100\%$$

  = 99,923%

FORMULA 3

- y = 0,289
  y = a + bx
  0,289 = 0,0138 + 0,1354 . x
  x = 2,0324 ppm . 10 Faktor pengenceran
  x = 20,324 mg / 1000ml

$$\%\ EP = \frac{(25\ mg - 0{,}020324\ mg/ml)}{25\ mg}\ \text{x}\ 100\%$$

  = 99,918%

- y = 0,287

  y = a + bx

  0,287 = 0,0138 + 0,1354 . x

  x = 2,0177 ppm . 10 Faktor pengenceran

  x = 20,177 mg / 1000ml

$$\% EP = \frac{(25\ mg - 0{,}020177\ mg/ml)}{25\ mg} \text{ x } 100\%$$

  = 99,919%

- y = 0,282

  y = a + bx

  0,282 = 0,0138 + 0,1354 . x

  x = 1,9807 ppm . 10 Faktor pengenceran

  x = 19,807 mg / 1000ml

$$\% EP = \frac{(25\ mg - 0{,}019807\ mg/ml)}{25\ mg} \text{ x } 100\%$$

  = 99,920%

Formula	Replikasi 1 (%)	Replikasi 2 (%)	Replikasi 3 (%)	Rata-rata (%)
1	99,925	99,926	99,926	99,926 ± 0,0006
2	99,921	99,924	99,923	99,923 ± 0,0015
3	99,918	99,919	99,92	99,919 ± 0,0010

SD = 0,003

RATA-RATA = 99,922