BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan dari hasil penelitian dan berdasarkan studi literatur yang telah dilakukan dapat diperoleh kesimpulan bahwa :

Pertama, *Solid Lipid Nanoparticles* (SLN) fisetin dapat di buat dengan metode kombinasi emulsifikasi-sonikasi dengan menggunakan lipid padat golongan alkohol yaitu setil alkohol.

Kedua, *Solid Lipid Nanoparticles* (SLN) fisetin memiliki ukuran partikel terbesar adalah 320,967 nm, 44,977 nm dan terkecil 14,507 nm. Nilai zeta potensial sebesar -14,9; -14,8; dan -15,9. Efisiensi penjerapan terbesar adalah 75,15%. Fisetin memiliki aktifitas antioksidan yang sangat kuat karena memiliki rata-rata IC_{50} sebesar 6,08 ppm dan SLN fisetin memiliki rata-rata replikasi IC_{50} sebesar 12,14 ppm. Dan stabil selama penyimpanan dilihat secara visual.

Ketiga, karakterisasi sediaan serum dalam sistem nanopartikel menghasilkan mutu fisik dan stabilitas yang sesuai standar pada literatur.

B. Saran

Pertama, perlu dilakukan penelitian lebih lanjut tentang aktivitas antioksidan serum SLN fisetin, serta uji penetrasi menggunakan Difusi Franz.

Kedua, perlu dilakukan pengujian stabilitas jangka panjang untuk mengetahui kestabilan formula serum SLN fisetin.

Ketiga, perlu dilakukan uji *Transminssion Electron Microscopy* (TEM) untuk mengetahui morfologi SLN *(Solid Lipid Nanoparticles)* fisetin.

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Lampiran 1. *Certificate of analysis* (COA) fisetin

TOCRIS
a bio-techne brand

Print Date: Jan 14th 2016

Certificate of Analysis

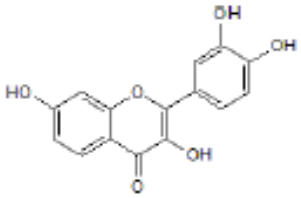
www.tocris.com

Product Name: Fisetin **Catalog No.:** 5016 **Batch No.:** 1

CAS Number: 528-48-3

IUPAC Name: 2-(3,4-Dihydroxyphenyl)-3,7-dihydroxy-4H-1-benzopyran-4-one

1. PHYSICAL AND CHEMICAL PROPERTIES

Batch Molecular Formula:	$C_{15}H_{10}O_6$
Batch Molecular Weight:	286.24
Physical Appearance:	Yellow solid
Solubility:	DMSO to 100 mM ethanol to 10 mM
Storage:	Store at -20°C
Batch Molecular Structure:	

2. ANALYTICAL DATA

HPLC:	Shows 98.1% purity
^{1}H NMR:	Consistent with structure
Mass Spectrum:	Consistent with structure

Microanalysis:

	Carbon	Hydrogen	Nitrogen
Theoretical	62.94	3.52	
Found	62.81	3.58	

Caution - Not Fully Tested • Research Use Only • Not For Human or Veterinary Use

bio-techne.com
info@bio-techne.com
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Tel: (800) 343 7475

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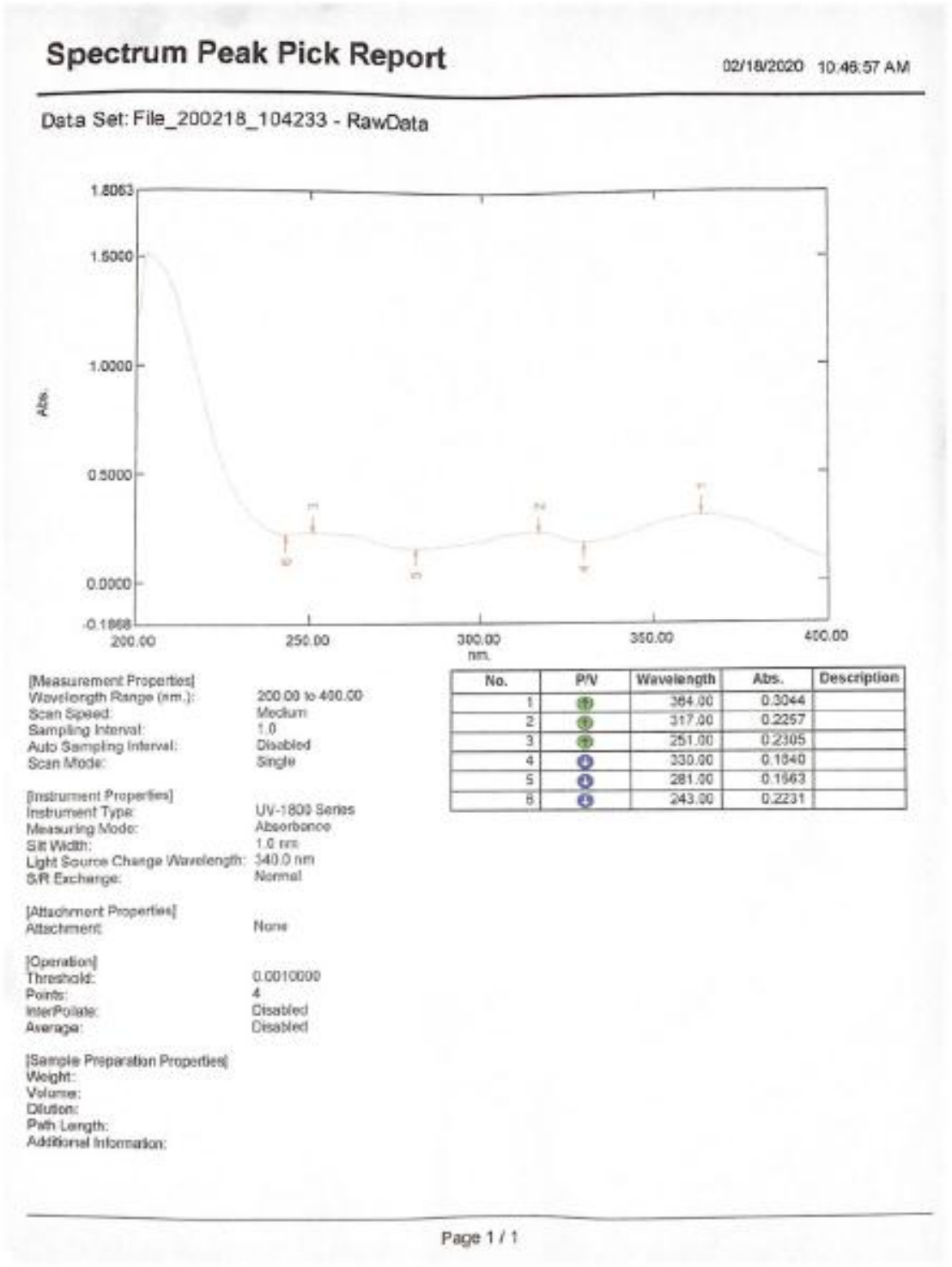
info.cn@bio-techne.com
Tel: +86 (21) 52380373

Europe Middle East Africa
Tel: +44 (0)1235 529449

Rest of World
www.tocris.com/distributors
Tel:+1 612 379 2956

Lampiran 2. Penentuan panjang gelombang dan pembuatan kurva baku

a. Penentuan panjang gelombang



Spectrum Peak Pick Report

02/18/2020 10:46:57 AM

Data Set: File_200218_104233 - RawData

No.	P/V	Wavelength	Abs.	Description
1	↑	364.00	0.3044	
2	↑	317.00	0.2257	
3	↑	251.00	0.2305	
4	↓	330.00	0.1840	
5	↓	281.00	0.1563	
6	↓	243.00	0.2231	

[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

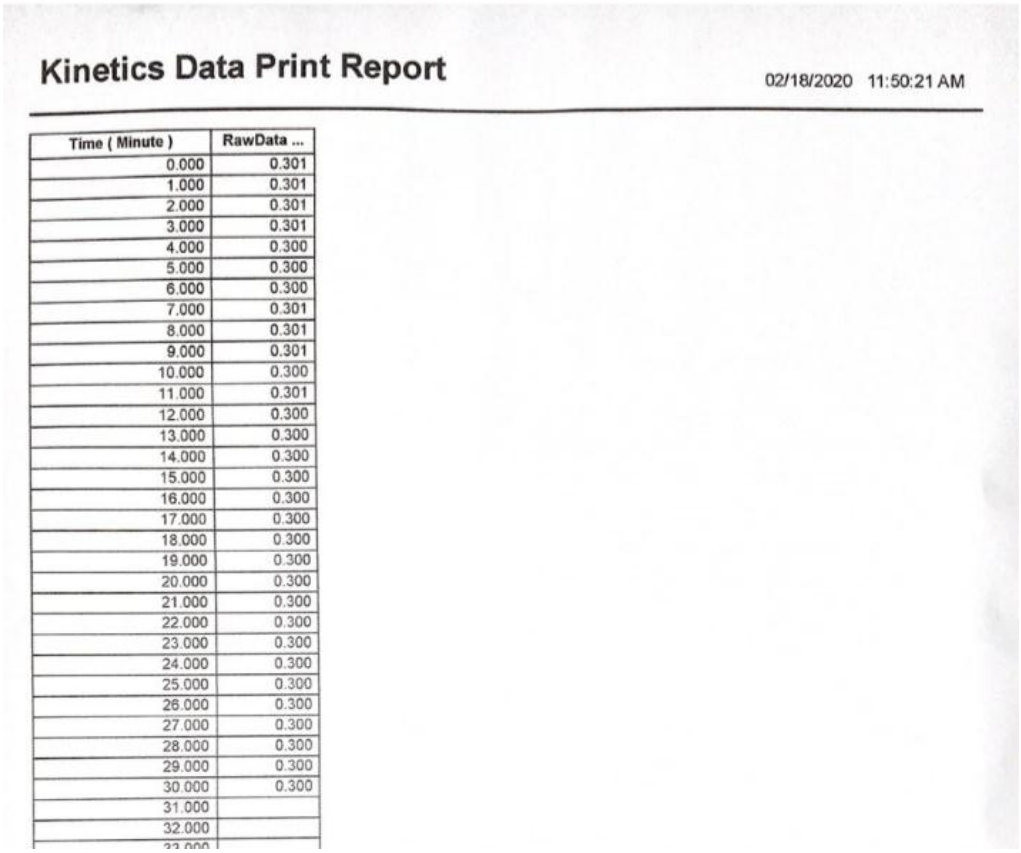
[Operation]
Threshold: 0.0010000
Points: 4
InterPolate: Disabled
Average: Disabled

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

Page 1 / 1

Panjang gelombang maksimum yang diperoleh dari *scaning* larutan fisetin dalam etanol pro analisis, panjang gelombang maksimum yang diperoleh sebesar 364 nm dengan serapan 0,3044.

b. Penentuan *operating time*



Kinetics Data Print Report

02/18/2020 11:50:21 AM

Time (Minute)	RawData ...
0.000	0.301
1.000	0.301
2.000	0.301
3.000	0.301
4.000	0.300
5.000	0.300
6.000	0.300
7.000	0.301
8.000	0.301
9.000	0.301
10.000	0.300
11.000	0.301
12.000	0.300
13.000	0.300
14.000	0.300
15.000	0.300
16.000	0.300
17.000	0.300
18.000	0.300
19.000	0.300
20.000	0.300
21.000	0.300
22.000	0.300
23.000	0.300
24.000	0.300
25.000	0.300
26.000	0.300
27.000	0.300
28.000	0.300
29.000	0.300
30.000	0.300
31.000	
32.000	

c. Kurva kalibrasi (Linieritas)

- Penimbangan bahan (gram) :

  Kertas + isi = 0,1053

  Kertas + sisa = $\frac{0,0807}{0,0246}$ —

  0,0246 gram/ 500 ml

  49,2 ppm

- Perhitungan konsentrasi kurva kalibrasi

1) $\mathbf{V_1 \times C_1}$ $\mathbf{= V_1 \times C_2}$

1ml x 49,2 = 10 x C_2

C_2 = 4,92

2) $\mathbf{V_1 \times C_1}$ $\mathbf{= V_1 \times C_2}$

1,2 ml x 49,2 = 10 x C_2

C_2 = 5,904

3) $\mathbf{V_1 \times C_1}$ $\mathbf{= V_1 \times C_2}$

1,4 ml x 49,2 = 10 x C_2

C_2 = 6,888

4) $\mathbf{V_1 \times C_1}$ $\mathbf{= V_1 \times C_2}$

1,6 ml x 49,2 = 10 x C_2
C_2 = 7,872

5) **V_1 x C_1 = V_1 x C_2**
1,8 ml x 49,2 = 10 x C_2
C_2 = 8,856

6) **V_1 x C_1 = V_1 x C_2**
2 ml x 49,2 = 10 x C_2
C_2 = 9,84

Konsentrasi (ppm)	Absorbansi
4,92	0,315
5,904	0,427
6,888	0,527
7,872	0,646
8,856	0,741
9,84	0,860

Persamaan regresi linier antara konsentrasi (ppm) dan serapan diperoleh nilai :
a = -0,2253
b = 0,1099
r = 0,9997
y = a + bx
y = -0,2253 + 0,1099x
Keterangan :
x = konsentrasi (ppm)
y = serapan

Hasil linearitas diperoleh R = 0,999669338; sehingga dapat disimpulkan bahwa data tersebut linier.

d. Akurasi

Konsentrasi	Absorbansi	Konsentrasi Terukur (ppm)	Konsentrasi Sebenarnya (ppm)	Konsentrasi (%)	% recovery	Rata-rata % recovery
80%	0,326	5,0149	4,92	102%	99,89%	99,95%
	0,304	4,8147	4,92	98%		
	0,315	4,9148	4,92	100%		
100%	0,431	5,9700	5,904	101%	100,86%	
	0,425	5,9154	5,904	100%		
	0,432	5,9791	5,904	101%		
120%	0,525	6,8251	6,888	99%	99,09%	
	0,527	6,8433	6,888	99%		
	0,523	6,8069	6,888	99%		

a = -0,2253 b = 0,1099 r = 0,9997

Perhitungan konsentrasi ppm

- **Konsentrasi 80 %**

Replikasi 1 = $\frac{Absorbansi-a}{b} = \frac{0,326-(-0,2253)}{0,1099}$ = 5,0149

Replikasi 2 = $\frac{Absorbansi-a}{b} = \frac{0,304-(-0,2253)}{0,1099}$ = 4,8147

Replikasi 3 = $\frac{Absorbansi-a}{b} = \frac{0,315-(-0,2253)}{0,1099}$ = 4,9148

- Konsentrasi 100 %

Replikasi 1 = $\frac{Absorbansi-a}{b} = \frac{0,431-(-0,2253)}{0,1099}$ = 5,9700

Replikasi 2 = $\frac{Absorbansi-a}{b} = \frac{0,425-(-0,2253)}{0,1099}$ = 5,9154

Replikasi 3 = $\frac{Absorbansi-a}{b} = \frac{0,432-(-0,2253)}{0,1099}$ = 5,9791

- Konsentrasi 120 %

Replikasi 1 = $\frac{Absorbansi-a}{b} = \frac{0,525-(-0,2253)}{0,1099}$ = 6,8251

Replikasi 2 = $\frac{Absorbansi-a}{b} = \frac{0,527-(-0,2253)}{0,1099}$ = 6,8433

Replikasi 3 = $\frac{Absorbansi-a}{b} = \frac{0,523-(-0,2253)}{0,1099}$ = 6,8069

Nilai rata- rata % Recovery diatas adalah 99,95%, hal ini menunjukkan nilai persen perolehan kembali yang baik.

e. Presisi

Replikasi	Absorbansi	Konsentrasi terukur (ppm)	Konsentrasi sebenarnya
1	0,552	7,0707	6,888
2	0,537	6,9343	6,888
3	0,545	7,0070	6,888
4	0,557	7,1162	6,888
5	0,558	7,1253	6,888
6	0,525	6,8251	6,888
7	0,543	6,9888	6,888
8	0,547	7,0252	6,888
9	0,552	7,0707	6,888
10	0,529	6,8615	6,888

a = -0,2253 **b = 0,1099** **r = 0,9997**

- Rata-rata konsentrasi = 7,0025 ppm
- SD = 0,102222
- CV = 0,014598
- RSD = 1 % < 2 %

Keterangan:

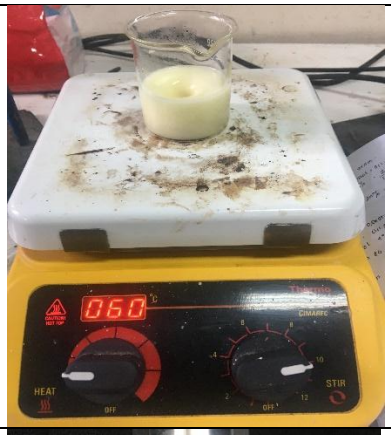
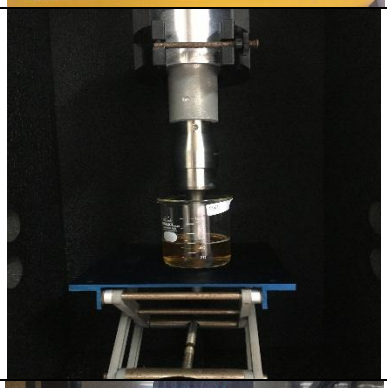
SD = Simpangan baku

RSD = Simpangan baku relatif

CV = Koefisien variasi

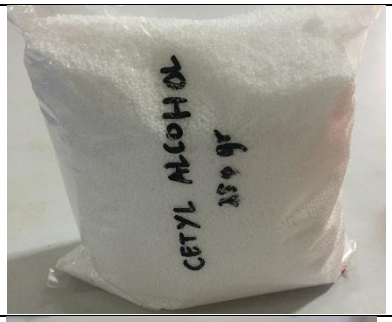
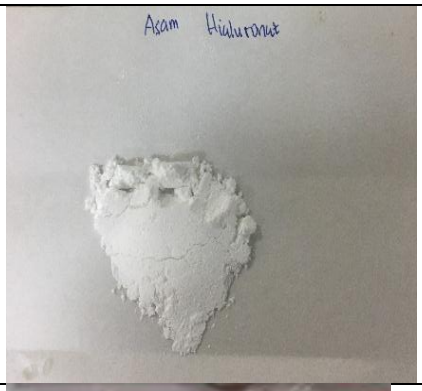
Nilai CV dilihat dari data diatas adalah 1 % hasil ini sesuai dengan persyaratan presisi yaitu ≤ 2%.

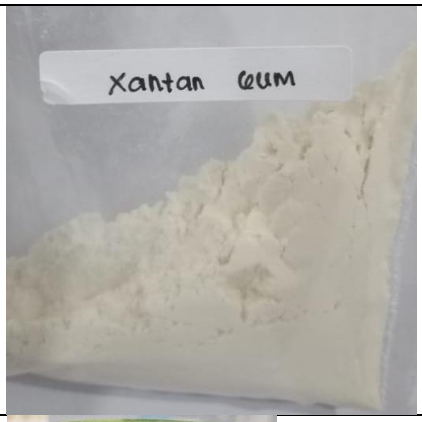
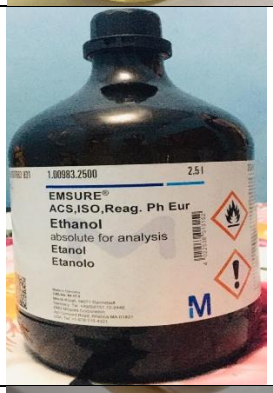
Lampiran 3. Gambar alat yang digunakan

Nama Alat	Gambar alat	Fungsi
Magnetic Stirer		Untuk menghomogenkan suatu larutan dengan pengadukan menggunakan magnet
Sonicator Probe		Menghomogenkan dan memperkecil ukuran partikel
Homogenizer		Untuk mencampur dan menghomogenkan sediaan

Particle Size Analyzer (PSA) Zetasizer		Untuk mengukur ukuran partikel dan zeta potensial
pH meter		Untuk mengukur pH sediaan serum

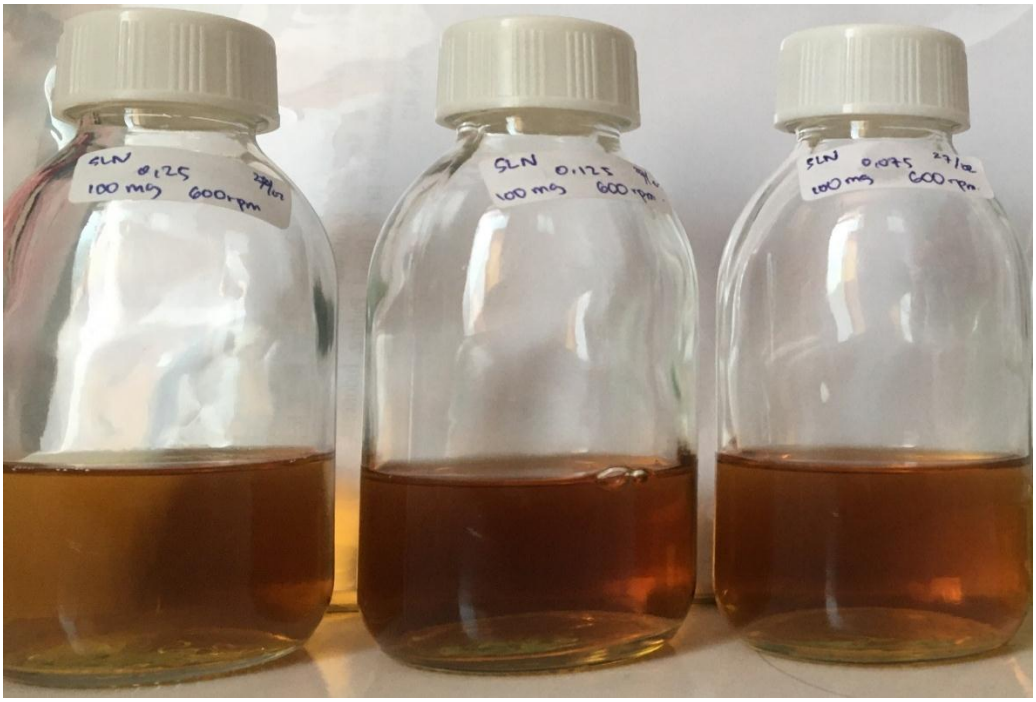
Lampiran 4. Gambar bahan yang digunakan

Nama bahan	Gambar	Fungsi
Setil alkohol		Sebagai lipid padat yang digunakan
Fisetin		Sebagai zat aktif yang digunakan
Asam Hialuronat		Humektan
Sodium Gluconate		Penstabil

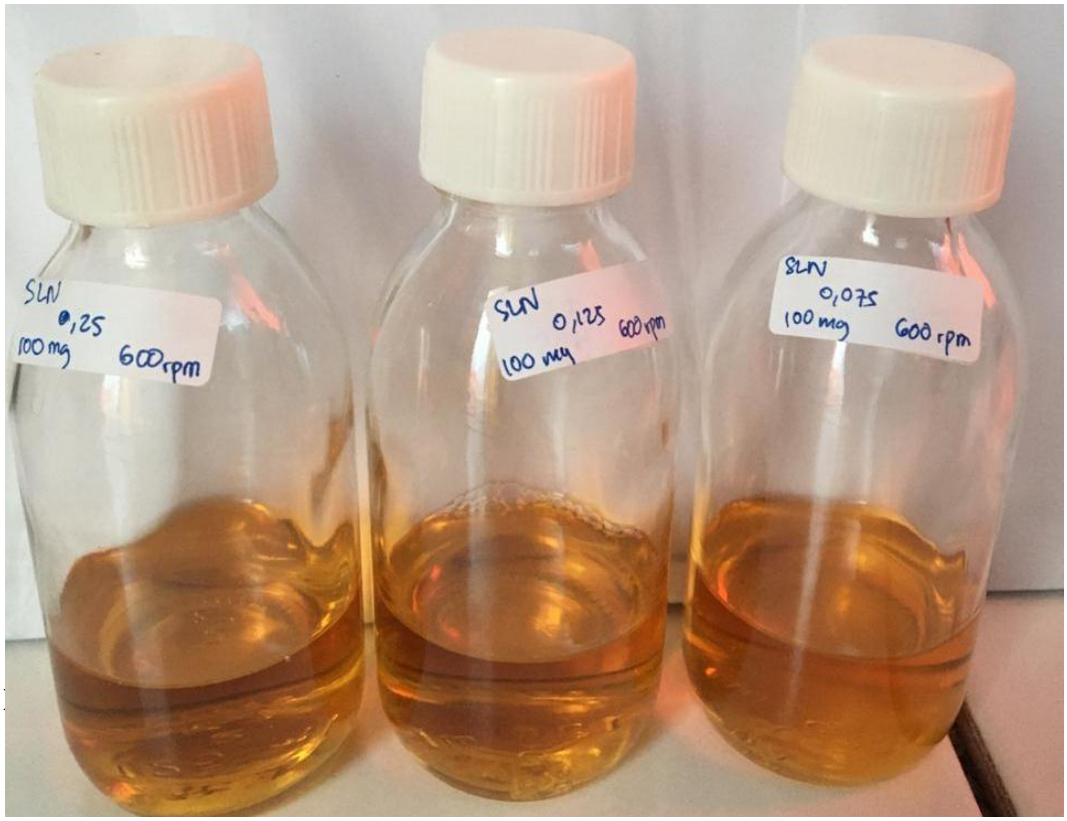
Xanthan Gum		Pelembut
Tween 80		Surfaktan
Etanol PA		Pelarut
Optiphen		Pengawet

Lampiran 5. Hasil formulasi SLN fisetin

a. SLN fisetin penyimpanan minggu pertama



b. SLN fisetin setelah penyimpanan 2 minggu



- Replikasi I

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,25 1B 1
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	31	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 15:31:50

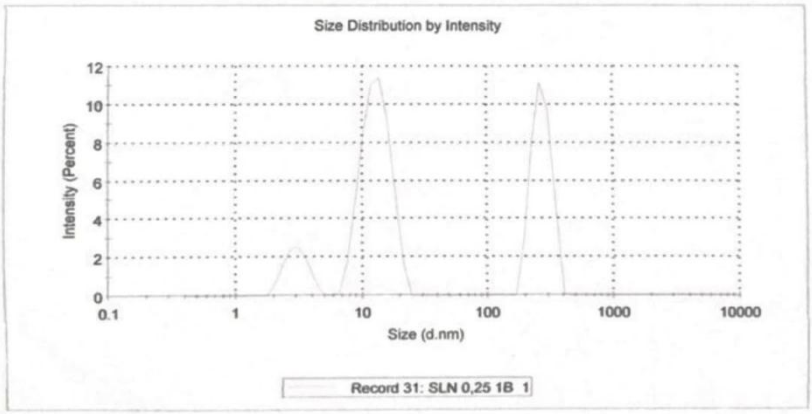
System

Temperature (°C):	25,0	**Duration Used (s):**	60
Count Rate (kcps):	293,4	**Measurement Position (mm):**	1,25
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	388,1	**Peak 1:**	13,03	53,8	3,228
PdI:	0,555	**Peak 2:**	264,3	36,3	44,17
Intercept:	0,739	**Peak 3:**	3,010	9,9	0,6060

Result quality Refer to quality report



- Replikasi II

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name: SLN 0,25 1B 2
SOP Name: SLN SIWI.sop
General Notes: ORI

File Name: SLN ELISABETH.dts
Record Number: 32
Material RI: 1,52
Material Absorbtion: 0,000
Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Measurement Date and Time: 12 March 2020 15:34:03

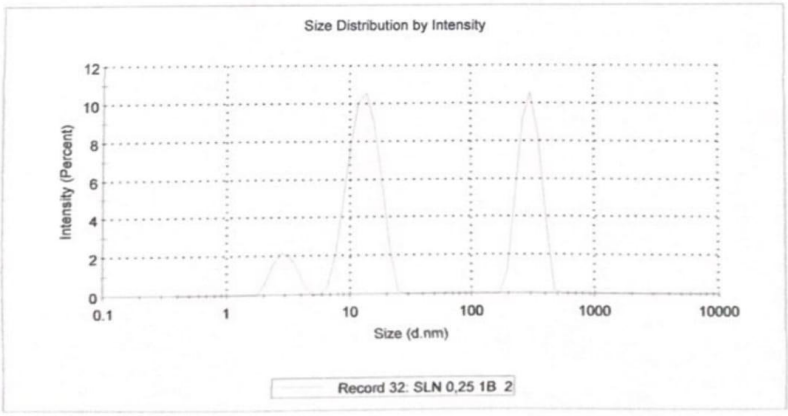
System

Temperature (°C): 25,0
Count Rate (kcps): 291,0
Cell Description: Zeta dip cell
Duration Used (s): 60
Measurement Position (mm): 1,25
Attenuator: 7

Results

		Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm): 278,0	Peak 1:	13,18	53,1	3,506
PdI: 0,506	Peak 2:	293,6	38,3	56,14
Intercept: 0,722	Peak 3:	2,938	8,6	0,5831

Result quality Refer to quality report



- Replikasi III

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,25 1B 3
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	33	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 15:36:16

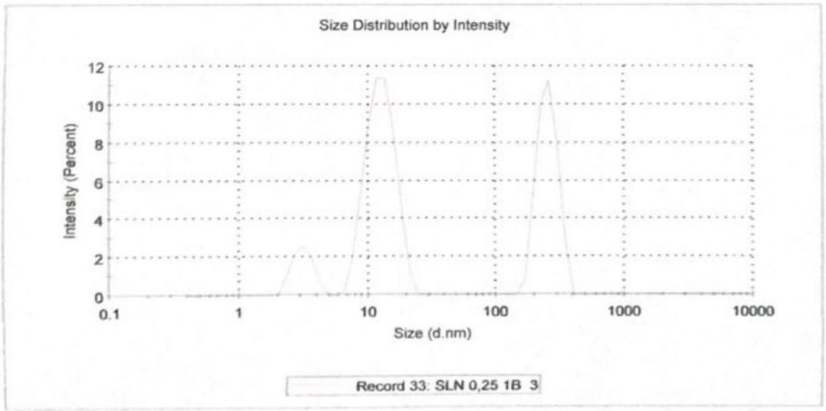
System

Temperature (°C):	25,0	**Duration Used (s):**	60
Count Rate (kcps):	274,3	**Measurement Position (mm):**	1,25
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	296,8	**Peak 1:**	12,74	53,6	3,122
PdI:	0,438	**Peak 2:**	250,0	37,8	44,01
Intercept:	0,721	**Peak 3:**	3,113	8,6	0,5379

Result quality Refer to quality report



Lampiran 7. Hasil uji ukuran partikel formula 2 setil alkohol (0,25%)

- Replikasi I

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,125 1B 2
SOP Name:	SLN SIWI.sop
General Notes:	ORI

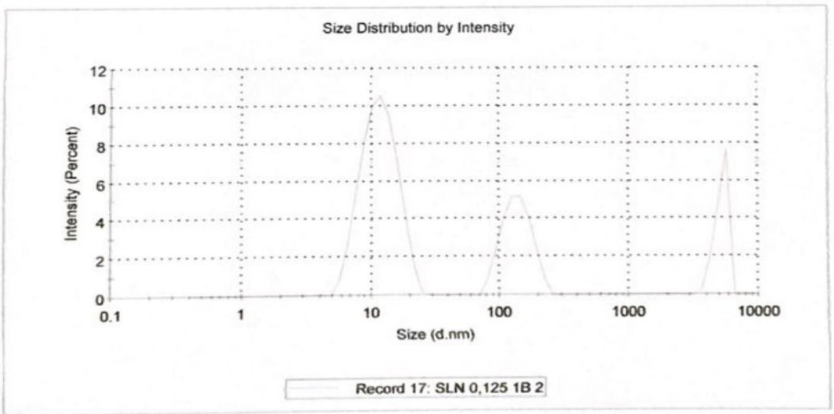
File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	17	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 14:43:28

System

Temperature (°C):	25,0	**Duration Used (s):**	70
Count Rate (kcps):	190,9	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	55,33	**Peak 1:**	11,91	60,2	3,666
PdI:	0,410	**Peak 2:**	135,7	25,0	33,75
Intercept:	0,774	**Peak 3:**	5077	14,8	561,7
Result quality	Refer to quality report				



- Replikasi II

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,125 1B 2
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	17	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 14:43:28

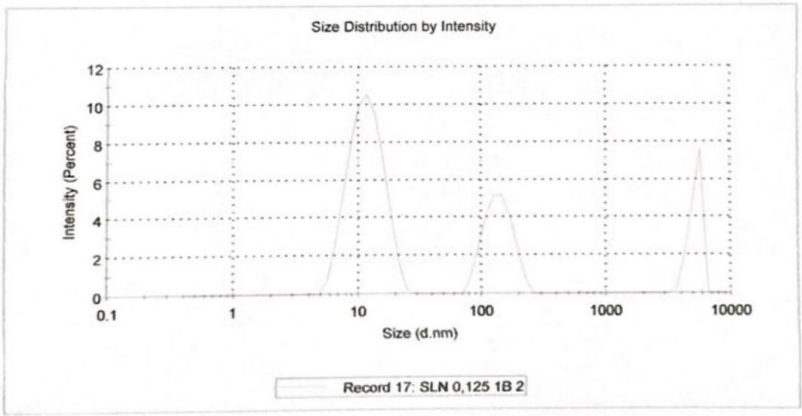
System

Temperature (°C):	25,0	**Duration Used (s):**	70
Count Rate (kcps):	190,9	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	55,33	**Peak 1:**	11,91	60,2	3,666
PdI:	0,410	**Peak 2:**	135,7	25,0	33,75
Intercept:	0,774	**Peak 3:**	5077	14,8	561,7

Result quality Refer to quality report



- Replikasi III

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,125 1B 3
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	18	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 14:45:51

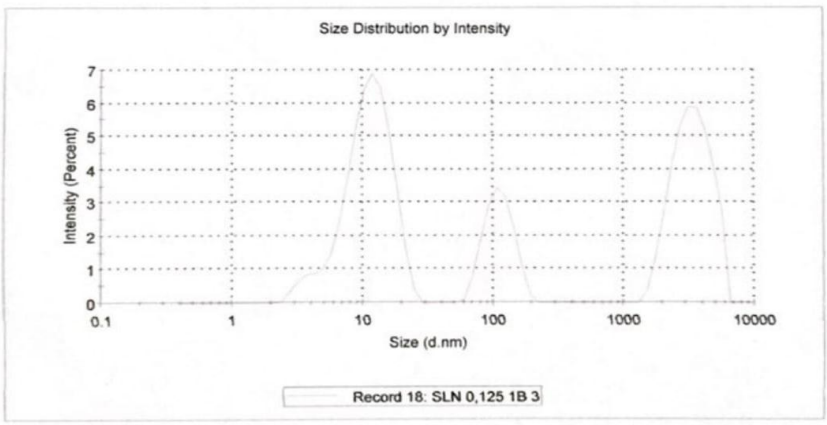
System

Temperature (°C):	25,0	**Duration Used (s):**	70
Count Rate (kcps):	209,4	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	36,07	**Peak 1:**	11,37	46,6	4,436
PdI:	0,582	**Peak 2:**	3397	37,5	1068
Intercept:	0,752	**Peak 3:**	111,5	15,8	27,49

Result quality Refer to quality report



Lampiran 8. Hasil uji ukuran partikel formula 3 setil alkohol (0,075%)

- Replikasi I

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,075 1C 1
SOP Name:	SLN SIWI.sop
General Notes:	ORI

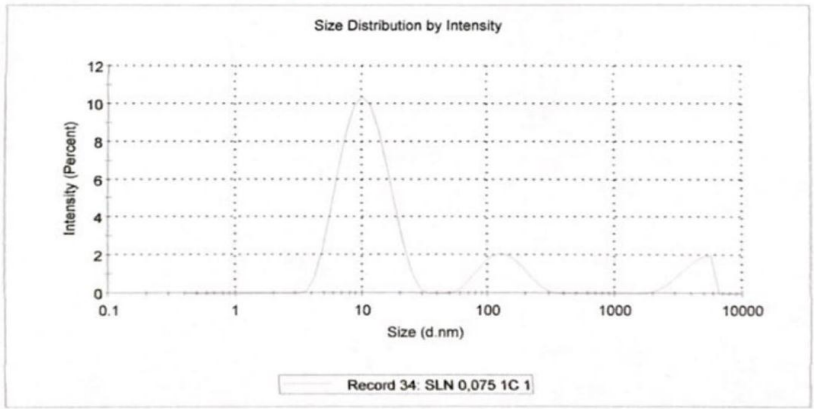
File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	34	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 15:42:32

System

Temperature (°C):	25,0	**Duration Used (s):**	80
Count Rate (kcps):	128,4	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	13,73	**Peak 1:**	11,07	77,0	4,518
PdI:	0,336	**Peak 2:**	133,5	14,0	48,23
Intercept:	0,801	**Peak 3:**	4213	9,0	1014
Result quality	Refer to quality report				



- Replikasi II

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,075 1C 2
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	35	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 15:45:26

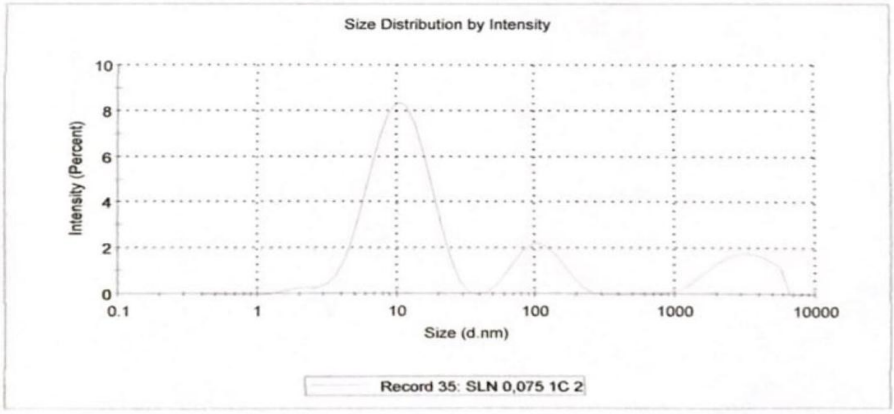
System

Temperature (°C):	25,0	**Duration Used (s):**	80
Count Rate (kcps):	134,0	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	15,32	**Peak 1:**	11,09	70,3	5,178
PdI:	0,374	**Peak 2:**	3104	15,1	1243
Intercept:	0,839	**Peak 3:**	109,3	14,6	39,00

Result quality Refer to quality report



- Replikasi III

Size Distribution Report by Intensity

v2.2

Malvern

Sample Details

Sample Name:	SLN 0,075 1C 3
SOP Name:	SLN SIWI.sop
General Notes:	ORI

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	36	**Dispersant RI:**	1,330
Material RI:	1,52	**Viscosity (cP):**	0,8872
Material Absorbtion:	0,000	**Measurement Date and Time:**	12 March 2020 15:48:20

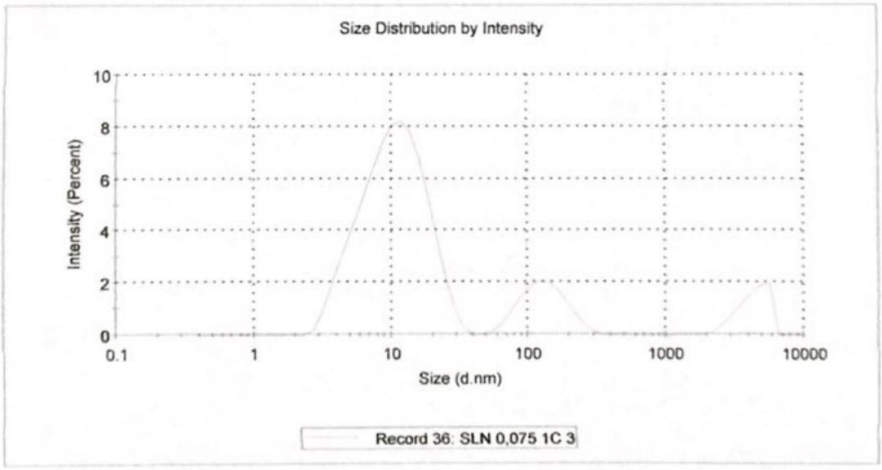
System

Temperature (°C):	25,0	**Duration Used (s):**	80
Count Rate (kcps):	126,6	**Measurement Position (mm):**	4,65
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Size (d.n...	% Intensity:	St Dev (d.n...
Z-Average (d.nm):	14,47	**Peak 1:**	11,43	77,6	5,765
PdI:	0,307	**Peak 2:**	132,8	13,9	48,09
Intercept:	0,844	**Peak 3:**	4278	8,5	976,3

Result quality Refer to quality report



Lampiran 9. Hasil uji zeta potensial formula 1 setil alkohol 0,50%

- Replikasi I

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name:	SLN 0,25 2A 1
SOP Name:	ZETA ELISABETH.sop
General Notes:	5 TETES 5 ML

File Name:	SLN ELISABETH.dts	**Dispersant Name:**	Water
Record Number:	28	**Dispersant RI:**	1,330
Date and Time:	12 March 2020 15:20:52	**Viscosity (cP):**	0,8872
		Dispersant Dielectric Constant:	78,5

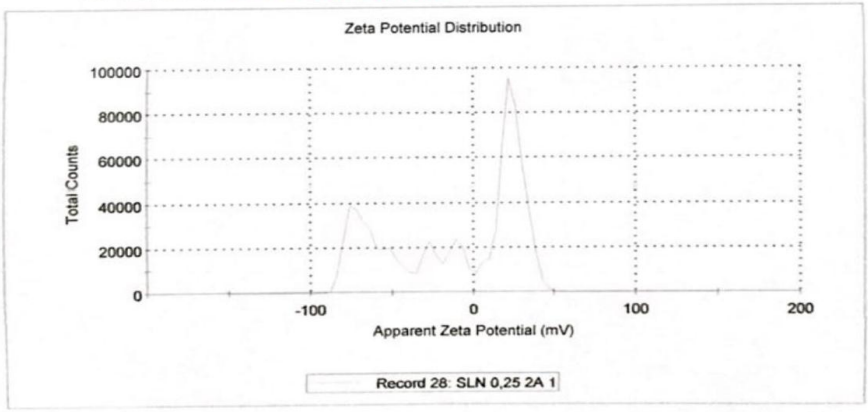
System

Temperature (°C):	25,0	**Zeta Runs:**	16
Count Rate (kcps):	89,2	**Measurement Position (mm):**	4,50
Cell Description:	Zeta dip cell	**Attenuator:**	7

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-11,8	**Peak 1:**	23,2	48,0	8,43
Zeta Deviation (mV):	40,1	**Peak 2:**	-69,7	23,3	7,90
Conductivity (mS/cm):	0,0209	**Peak 3:**	-9,85	10,6	6,02

Result quality See result quality report



- Replikasi II

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name: SLN 0,25 2A 2
SOP Name: ZETA ELISABETH.sop
General Notes: 5 TETES 5 ML

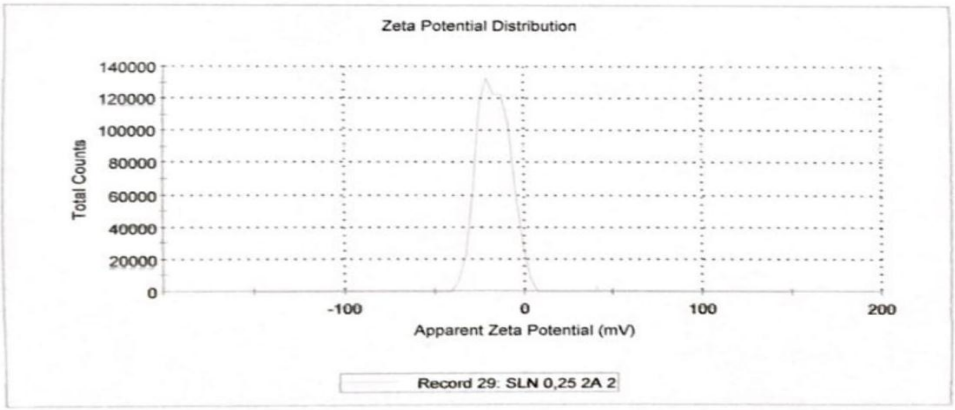
File Name: SLN ELISABETH.dts
Record Number: 29
Date and Time: 12 March 2020 15:23:32
Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

System

Temperature (°C): 25,0
Count Rate (kcps): 63,5
Cell Description: Zeta dip cell
Zeta Runs: 12
Measurement Position (mm): 4,50
Attenuator: 7

Results

			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-16,9	Peak 1:	-22,7	50,9	4,96
Zeta Deviation (mV):	8,38	Peak 2:	-10,9	49,1	5,17
Conductivity (mS/cm):	0,0194	Peak 3:	0,00	0,0	0,00
Result quality	Good				



- Replikasi III

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name: SLN 0,25 2A 3
SOP Name: ZETA ELISABETH.sop
General Notes: 5 TETES 5 ML

File Name: SLN ELISABETH.dts
Record Number: 30
Date and Time: 12 March 2020 15:24:11
Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

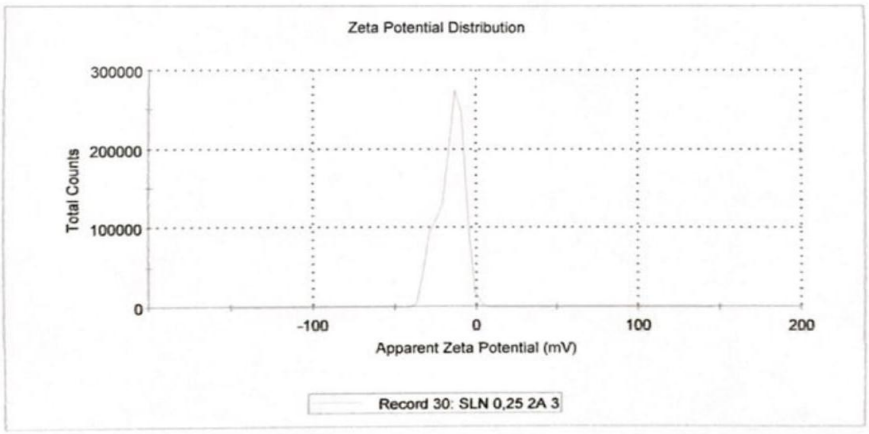
System

Temperature (°C): 25,0
Count Rate (kcps): 112,4
Cell Description: Zeta dip cell
Zeta Runs: 14
Measurement Position (mm): 4,50
Attenuator: 7

Results

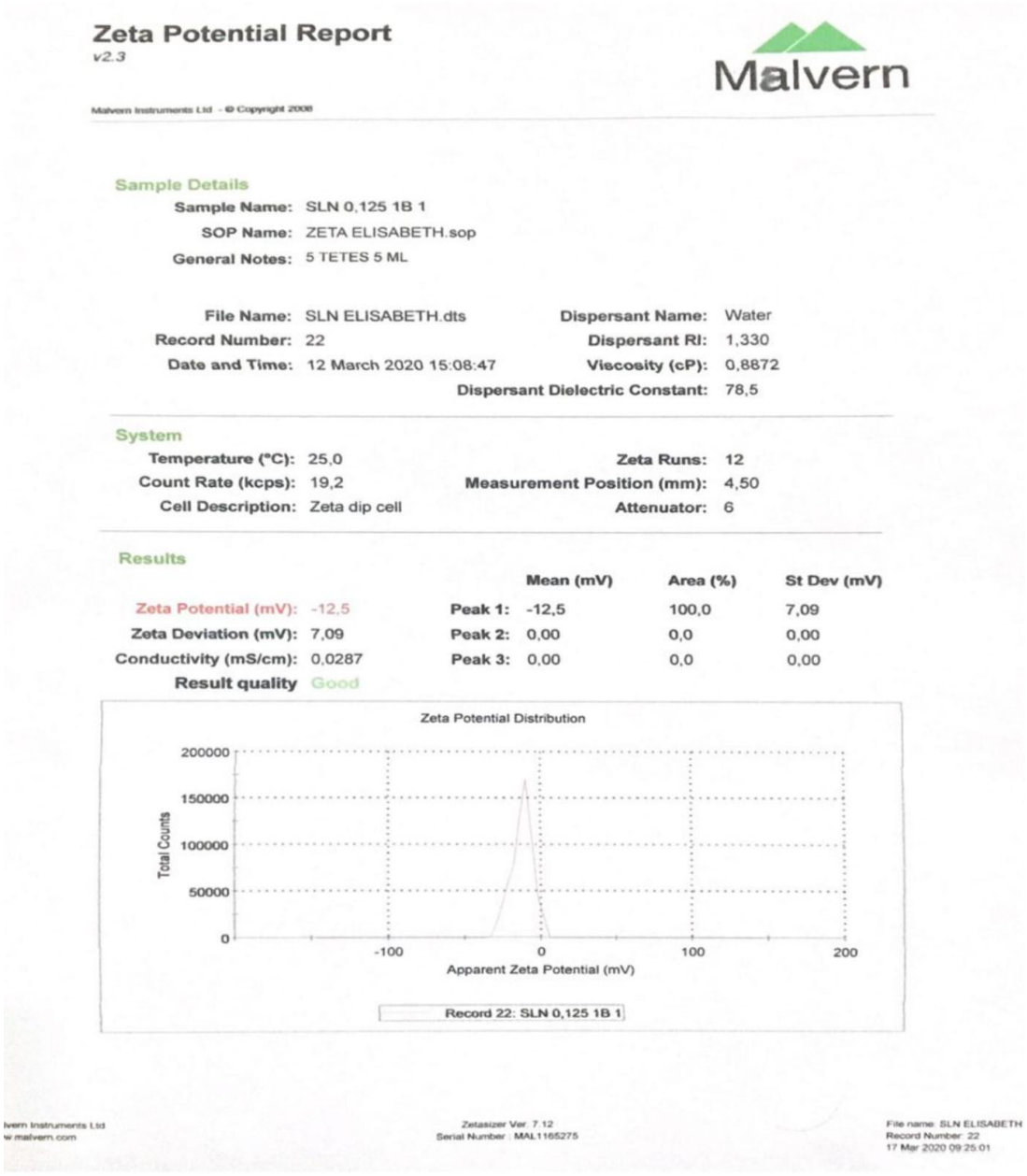
		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -16,0	**Peak 1:**	-16,0	100,0	7,87
Zeta Deviation (mV): 7,87	**Peak 2:**	0,00	0,0	0,00
Conductivity (mS/cm): 0,0191	**Peak 3:**	0,00	0,0	0,00

Result quality Good



Lampiran 10. Hasil uji zeta potensial formula 2 setil alkohol (0,25%)

- Replikasi I



Zeta Potential Report
v2.3

Malvern

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Sample Details

Sample Name:	SLN 0,125 1B 1		
SOP Name:	ZETA ELISABETH.sop		
General Notes:	5 TETES 5 ML		
File Name:	SLN ELISABETH.dts	Dispersant Name:	Water
Record Number:	22	Dispersant RI:	1,330
Date and Time:	12 March 2020 15:08:47	Viscosity (cP):	0,8872
		Dispersant Dielectric Constant:	78,5

System

Temperature (°C):	25,0	Zeta Runs:	12
Count Rate (kcps):	19,2	Measurement Position (mm):	4,50
Cell Description:	Zeta dip cell	Attenuator:	6

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-12,5	Peak 1: -12,5	100,0	7,09
Zeta Deviation (mV):	7,09	Peak 2: 0,00	0,0	0,00
Conductivity (mS/cm):	0,0287	Peak 3: 0,00	0,0	0,00
Result quality	Good			

Zeta Potential Distribution

Total Counts: 200000, 150000, 100000, 50000, 0

Apparent Zeta Potential (mV): -100, 0, 100, 200

Record 22: SLN 0,125 1B 1

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Zetasizer Ver. 7.12
Serial Number : MAL1165275

File name: SLN ELISABETH
Record Number: 22
17 Mar 2020 09:25:01

- Replikasi II

Zeta Potential Report
v2.3

Malvern

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Sample Details

Sample Name: SLN 0,125 1B 2
SOP Name: ZETA ELISABETH.sop
General Notes: 5 TETES 5 ML

File Name: SLN ELISABETH.dts
Record Number: 23
Date and Time: 12 March 2020 15:11:16
Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

System

Temperature (°C): 25,0
Count Rate (kcps): 55,5
Cell Description: Zeta dip cell
Zeta Runs: 12
Measurement Position (mm): 4,50
Attenuator: 6

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-14,7	Peak 1: -14,7	100,0	9,21
Zeta Deviation (mV):	9,21	Peak 2: 0,00	0,0	0,00
Conductivity (mS/cm):	0,0288	Peak 3: 0,00	0,0	0,00
Result quality	Good			

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Zetasizer Ver. 7.12
Serial Number : MAL1165275

File name: SLN ELISABETH
Record Number: 23
17 Mar 2020 09:25:22

- **Replikasi III**

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name: SLN 0,125 1B 3
SOP Name: ZETA ELISABETH.sop
General Notes: 5 TETES 5 ML

File Name: SLN ELISABETH.dts
Record Number: 24
Date and Time: 12 March 2020 15:11:56

Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

System

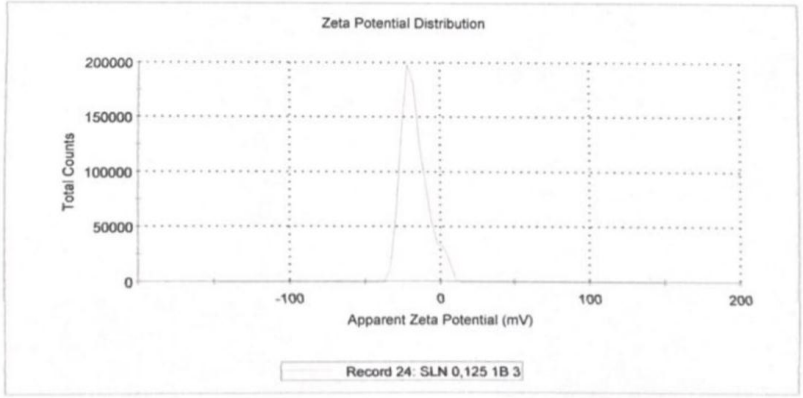
Temperature (°C): 25,0
Count Rate (kcps): 50,9
Cell Description: Zeta dip cell

Zeta Runs: 16
Measurement Position (mm): 4,50
Attenuator: 6

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -17,2	Peak 1:	-17,2	100,0	8,71
Zeta Deviation (mV): 8,71	Peak 2:	0,00	0,0	0,00
Conductivity (mS/cm): 0,0302	Peak 3:	0,00	0,0	0,00

Result quality Good



Lampiran 11. Hasil uji zeta potensial formula 3 setil alkohol (0,075%)

- **Replikasi I**

Zeta Potential Report
v2.3

Malvern

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Sample Details

Sample Name:	SLN 0,075 1A 1		
SOP Name:	ZETA ELISABETH.sop		
General Notes:	PENGENCERAN		
File Name:	SLN ELISABETH.dts	Dispersant Name:	Water
Record Number:	25	Dispersant RI:	1,330
Date and Time:	12 March 2020 15:14:56	Viscosity (cP):	0,8872
		Dispersant Dielectric Constant:	78,5

System

Temperature (°C):	25,0	Zeta Runs:	13
Count Rate (kcps):	114,8	Measurement Position (mm):	4,50
Cell Description:	Zeta dip cell	Attenuator:	7

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-15,9	Peak 1: -15,9	100,0	6,94
Zeta Deviation (mV):	6,94	Peak 2: 0,00	0,0	0,00
Conductivity (mS/cm):	0,0242	Peak 3: 0,00	0,0	0,00
Result quality	Good			

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Zetasizer Ver. 7.12
Serial Number : MAL1165275

File name: SLN ELISABETH
Record Number: 25
17 Mar 2020 09:26:04

- **Replikasi II**

Zeta Potential Report

v2.3

Malvern

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Sample Details

Sample Name: SLN 0,075 1A 2
SOP Name: ZETA ELISABETH.sop
General Notes: PENGENCERAN

File Name: SLN ELISABETH.dts
Record Number: 26
Date and Time: 12 March 2020 15:17:27

Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

System

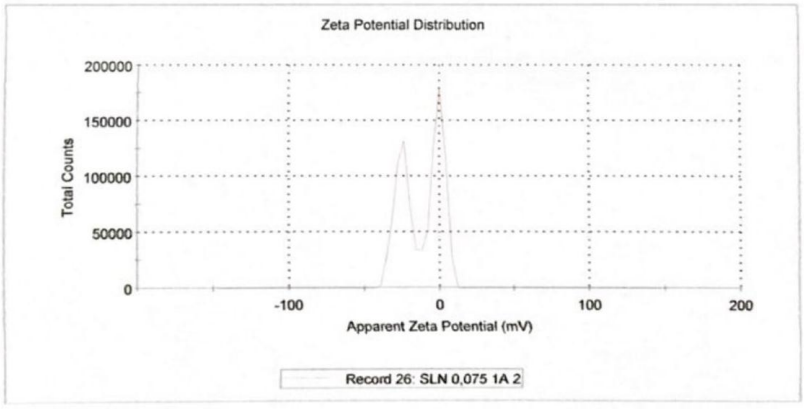
Temperature (°C): 25,0
Count Rate (kcps): 1124,1
Cell Description: Zeta dip cell

Zeta Runs: 18
Measurement Position (mm): 4,50
Attenuator: 7

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -12,2	Peak 1:	-1,21	53,0	4,92
Zeta Deviation (mV): 13,1	Peak 2:	-24,5	47,0	6,13
Conductivity (mS/cm): 0,0249	Peak 3:	0,00	0,0	0,00

Result quality Good



- **Replikasi III**

Zeta Potential Report

v2.3

Malvern

Malvern Instruments Ltd - © Copyright 2008

Sample Details

Sample Name: SLN 0,075 1A 3
SOP Name: ZETA ELISABETH.sop
General Notes: PENGENCERAN

File Name: SLN ELISABETH.dts
Record Number: 27
Date and Time: 12 March 2020 15:18:24
Dispersant Name: Water
Dispersant RI: 1,330
Viscosity (cP): 0,8872
Dispersant Dielectric Constant: 78,5

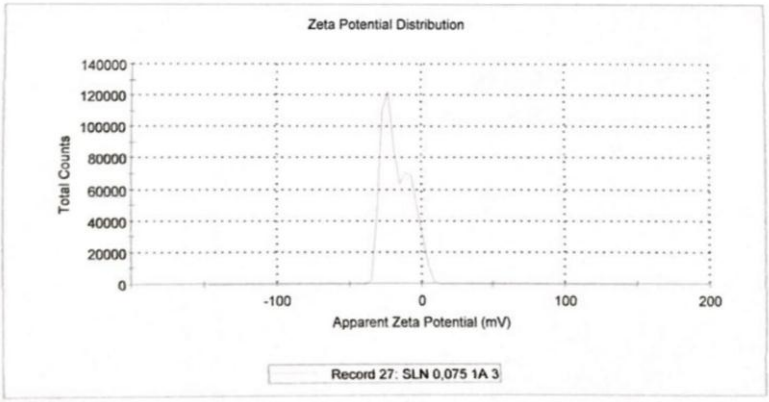
System

Temperature (°C): 25,0
Count Rate (kcps): 280,5
Cell Description: Zeta dip cell
Zeta Runs: 12
Measurement Position (mm): 4,50
Attenuator: 7

Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV): -17,2	Peak 1:	-23,2	59,3	4,91
Zeta Deviation (mV): 9,54	Peak 2:	-8,00	40,7	5,73
Conductivity (mS/cm): 0,0255	Peak 3:	0,00	0,0	0,00

Result quality Good



Lampiran 12. Hasil uji efisiensi penjerapan (Penelitian Putri 2019)

a. Formula 1 (Setil Alkohol 0,5%)

- Larutan induk → 200 mg SLN fisetin / 10 ml etanol p.a = 20.000 ppm
- Perhitungan teoritis

  Fisetin = 10 mg

  Eksipien (tween 80 + setil alcohol) = 10250 mg

  % kadar fisetin = $\frac{10}{10250+10} x100\% = 0{,}0975\%$
- Kadar dalam 200 mg SLN fisetin = 0,0975% x200 mg = 9,75 mg
- Perhitungan kadar fisetin terjerap menggunakan persamaan regresi linier :

  y = a + bx

  0,946 = 0,014 + 0,0636x

  0,0636x = 0,932

  X = 14,654 ppm
- % kadar $=\frac{14{,}654}{20000} x\ 100\% = 0{,}07327\%$
- Kadar dalam 200 mg SLN fisetin = 0,07327% x 200 mg = 7,327 mg
- % efisiensi penjerapan $= \frac{kadar\ terjerap}{kadar\ teoritis} \times 100\%$

  $= \frac{7{,}327}{9{,}75} x\ 100\%$

  = 75,15%

b. Formula 2 (Setil Alkohol 0,25%)

- Larutan induk → 200 mg SLN fisetin / 10 ml etanol p.a = 20.000 ppm
- Perhitungan teoritis

  Fisetin = 10 mg

  Eksipien (tween 80 + setil alcohol) = 11000 mg

  % kadar fisetin = $\frac{10}{11000+10} \times 100\% = 0.0908\%$

  Kadar dalam 200 mg SLN fisetin = 0,0908% x 200 mg = 9,08 mg
- Perhitungan kadar fisetin terjerap menggunakan persamaan regresi linier :

  y = a + bx

  0,548 = 0,014 + 0,0636x

  0,0636x = 0,534

X = 8,396 ppm

- % kadar $= \frac{8,396}{20000} \times 100\% = 0,04198\%$
- Kadar dalam 200 mg SLN fisetin = 0,04198% x 200 mg = 4,198 mg
- % efisiensi penjerapan $= \frac{kadar\ terjerap}{kadar\ teoritis} \times 100\%$

  $= \frac{4,198\ mg}{9,08\ mg}\ x\ 100\%$

  = 46,23%

c. Formula 3 (Setil Alkohol 0,15%)

- Larutan induk → 200 mg SLN fisetin / 10 ml etanol p.a = 20.000 ppm
- Perhitungan teoritis

  Fisetin = 10 mg

  Eksipien (tween 80 + setil alcohol) = 10750 mg

  % kadar fisetin $= \frac{10}{10750+10} \times 100\% = 0.09294\%$
- Kadar dalam 200 mg SLN fisetin = 0,09294% x 200 mg = 9,294 mg
- Perhitungan kadar fisetin terjerap menggunakan persamaan regresi linier :

  y = a + bx

  0,448 = 0,014 + 0,0636x

  0,0636x = 0,434

  X = 6,824 ppm
- % kadar $= \frac{6,824}{20000} \times 100\% = 0,03412\%$
- Kadar dalam 200 mg SLN fisetin = 0,03412% x 200 mg = 3,412 mg
- % efisiensi penjerapan $= \frac{kadar\ terjerap}{kadar\ teoritis} \times 100\%$

  $= \frac{3,412\ mg}{9,294\ mg}\ x\ 100\%$

  = 36,71%

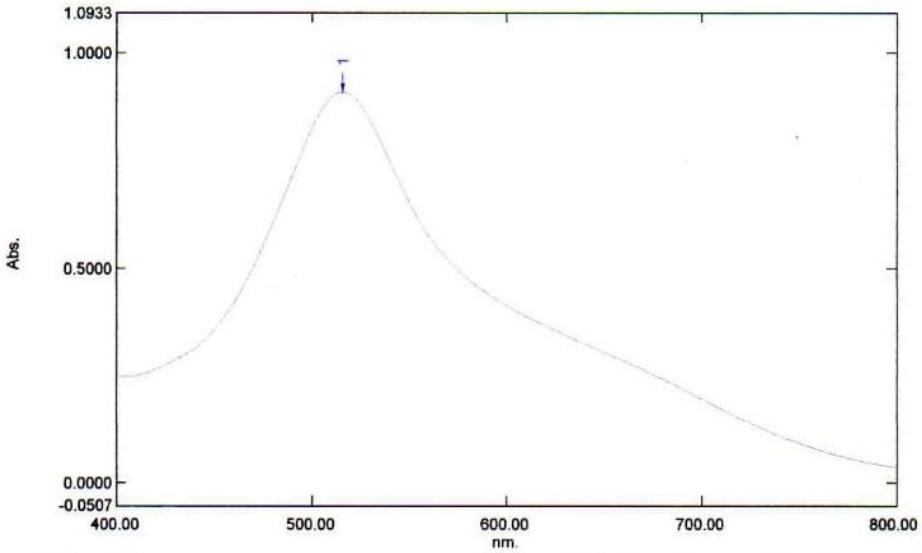
Lampiran 13. Hasil uji aktifitas antioksidan (penelitian Putri ER, 2019)

a. Penentuan panjang gelombang maks dpph

Spectrum Peak Pick Report

05/10/2019 10:03:42 AM

Data Set: lamda maks dpph fix 1 - RawData



No.	P/V	Wavelength	Abs.	Description
1		516.00	0.9096	
2		405.00	0.2479	

[Measurement Properties]
Wavelength Range (nm.): 400.00 to 800.00
Scan Speed: Medium
Sampling Interval: 1.0
Auto Sampling Interval: Disabled
Scan Mode: Auto

[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:

b. Penentuan operating time

OT Fisetin DPPH 4/5 19
60 MENIT

Kinetics Data Print Report

05/04/2019 12:24:22 PM

Time (Minute)	RawData ...
0.000	0.199
1.000	0.199
2.000	0.198
3.000	0.198
4.000	0.199
5.000	0.198
6.000	0.198
7.000	0.198
8.000	0.198
9.000	0.199
10.000	0.198
11.000	0.199
12.000	0.198
13.000	0.199
14.000	0.198
15.000	0.199
16.000	0.199
17.000	0.199
18.000	0.199
19.000	0.199
20.000	0.199
21.000	0.199
22.000	0.199
23.000	0.199
24.000	0.199
25.000	0.199
26.000	0.199
27.000	0.199
28.000	0.199
29.000	0.199
30.000	0.199
31.000	0.199
32.000	0.199
33.000	0.199
34.000	0.200
35.000	0.200
36.000	0.199
37.000	0.200
38.000	0.200
39.000	0.200
40.000	0.200
41.000	0.200
42.000	0.200
43.000	0.200
44.000	0.200
45.000	0.200
46.000	0.200
47.000	0.200
48.000	0.200
49.000	0.200
50.000	0.200

Kinetics Data Print Report 05/04/2019 12:24:22 PM

Time (Minute)	RawData ...
51.000	0.201
52.000	0.200
53.000	0.200
54.000	0.201
55.000	0.201
56.000	0.201
57.000	0.201
58.000	0.201
59.000	0.201
60.000	0.201

c. DPPH Fisetin murni

- **Perhitungan bahan fisetin :**

  50 mg/ 100 ml = 500 mg / 1000 ml = 500 ppm

  Yang ditimbang 49,8 mg sehingga didapat konsentrasi 498 ppm

- **Perhitungan konsentrasi (ppm)**

  - **$V_1 \times N_1 = V_2 \times N_2$**

    500 ppm x 0,3112 ml = V_2 x 10 ml

    V_2 = 15,56 ppm

  - **$V_1 \times N_1 = V_2 \times N_2$**

    500 ppm x 0,1556 ml = V_2 x 10 ml

    V_2 = 7,78 ppm

  - **$V_1 \times N_1 = V_2 \times N_2$**

    500 ppm x 0,0778 ml = V_2 x 10 ml

    V_2 = 3,89 ppm

  - **$V_1 \times N_1 = V_2 \times N_2$**

    500 ppm x 0,039 ml = V_2 x 10 ml

    V_2 = 1,95 ppm

  - **$V_1 \times N_1 = V_2 \times N_2$**

    500 ppm x 0,0194 ml = V_2 x 10 ml

    V_2 = 0,97 ppm

DPPH	Konsentrasi (ppm)	Volume (ml)	Etanol (ml)	Absorbansi replikasi 1	Absorbansi replikasi 2	Absorbansi replikasi 3
1 ml	160		4	0,909		
1 ml	15,56	1	3	0,212	0,221	0,224
1ml	7,78	1	3	0,405	0,416	0,418
1ml	3,89	1	3	0,507	0,509	0,511
1ml	1,95	1	3	0,555	0,557	0,559
1ml	0,97	1	3	0,578	0,578	0,588

$$\%\boldsymbol{inhibisi} = \frac{\boldsymbol{absorbansi\ DPPH - absorbansi\ sampel}}{\boldsymbol{absorbansi\ DPPH}}\ \boldsymbol{X100}\%$$

- **Konsentrasi 15,56 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,212}{0,909} x\ 100\% = 76,68\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,221}{0,909} x\ 100\% = 75,69\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,224}{0,909} x\ 100\% = 75,36\ \%$

- **Konsentrasi 7,78 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,405}{0,909} x\ 100\% = 55,45\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,416}{0,909} x\ 100\% = 54,24\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,418}{0,909} x\ 100\% = 54,02\ \%$

- **Konsentrasi 3,89 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,507}{0,909} x\ 100\% = 44,22\%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,509}{0,909} x\ 100\% = 44,00\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,511}{0,909} x\ 100\% = 43,78\ \%$

- **Konsentrasi 1,95 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,555}{0,909} x\ 100\% = 38,94\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,557}{0,909} x\ 100\% = 38,72\%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,559}{0,909} x\ 100\% = 38,50\ \%$

- **Konsentrasi 0,97 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,578}{0,909} x\ 100\% = 36,41\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,578}{0,909} x\ 100\% = 36,41\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,588}{0,909} x\ 100\% = 35,31\ \%$

- **Konsentrasi dan % inhibisi**

Konsentrasi (ppm)	Replikasi 1 % inhibisi	Replikasi 2 % inhibisi	Replikasi 3 % inhibisi
15,56	76,68	75,69	75,36
7,78	55,45	54,24	54,02
3,89	44,22	44,00	43,78
1,95	38,94	38,72	38,50
0,97	36,41	36,41	35,31
A	33,625	33,533	32,969
B	2,772	2,700	2,724
R	0,9999	0,9999	0,9999

- $IC_{50} = \frac{50-a}{b}$

  Replikasi 1 IC_{50} = $\frac{(50-33,625)}{2,772} = 5,91 ppm$

  Replikasi 2 IC_{50} = $\frac{(50-33,533)}{2,700} = 6,09 ppm$

  Replikasi 3 IC_{50} = $\frac{(50-32,969)}{2,724} = 6,25 ppm$

d. DPPH formula (Setil alkohol 0,5%)

DPPH	Konsentrasi (ppm)	Volume (ml)	Etanol (ml)	Absorbansi replikasi 1	Absorbansi replikasi 2	Absorbansi replikasi 3
1 ml	100		4	0,909		
1 ml	25	1	3	0,174	0,180	0,178
1ml	12,25	1	3	0,442	0,448	0,450
1ml	6,25	1	3	0,584	0,580	0,577
1ml	1,56	1	3	0,687	0,682	0,685
1ml	0,78	1	3	0,698	0,710	0,697

$$\%\boldsymbol{inhibisi} = \frac{\boldsymbol{absorbansi\ DPPH - absorbansi\ sampel}}{\boldsymbol{absorbansi\ DPPH}}\ \boldsymbol{X100}\%$$

- **Konsentrasi 25 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,174}{0,909} x\ 100\% = 80,86\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,180}{0,909} x\ 100\% = 80,20\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,178}{0,909} x\ 100\% = 80,42\ \%$

- **Konsentrasi 12,25 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,442}{0,909} x\ 100\% = 51,38\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,448}{0,909} x\ 100\% = 50,72\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,450}{0,909} x\ 100\% = 50,50\ \%$

- **Konsentrasi 6,25 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,584}{0,909} x\ 100\% = 35,75\%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,580}{0,909} x\ 100\% = 36,19\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,577}{0,909} x\ 100\% = 36,52\ \%$

- **Konsentrasi 1,56 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,687}{0,909} x\ 100\% = 24,42\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,682}{0,909} x\ 100\% = 24,97\%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,685}{0,909} x\ 100\% = 24,64\ \%$

- **Konsentrasi 0,78 ppm**

  Replikasi 1 %inhibisi = $\frac{0,909-0,698}{0,909} x\ 100\% = 23,21\ \%$

  Replikasi 2 %inhibisi = $\frac{0,909-0,710}{0,909} x\ 100\% = 21,89\ \%$

  Replikasi 3 %inhibisi = $\frac{0,909-0,697}{0,909} x\ 100\% = 23,32\ \%$

➢ **Konsentrasi dan % inhibisi**

Konsentrasi (ppm)	Replikasi 1 %inhibisi	Replikasi 2 %inhibisi	Replikasi 3 %inhibisi
25	80,86	80,20	80,42
12,25	51,38	50,72	50,50
6,25	35,75	36,19	36,52
1,56	24,42	24,97	24,64
0,78	23,21	21,89	23,32
A	20,228	20,923	21,385
B	2,449	2,386	2,366
R	0,9993	0,9997	0,9999

➢ $IC_{50} = \frac{50-a}{b}$

Replikasi 1 $IC_{50} = \frac{(50-20{,}228)}{2{,}449} = 12{,}15ppm$

Replikasi 2 $IC_{50} = \frac{(50-20{,}923)}{2{,}386} = 12{,}18ppm$

Replikasi 3 $IC_{50} = \frac{(50-21{,}385)}{2{,}366} = 12{,}09ppm$

e. Uji T-test Fisetin Murni

T-Test

[DataSet0]

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
IC50	3	6,0700	,17521	,10116

One-Sample Test

	Test Value = 9					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
IC50	-28,964	2	,001	-2,93000	-3,3653	-2,4947

Lampiran 14. Pembuatan Serum SLN fisetin