L A M P I R A N

Lampiran 1. Kurva kalibrasi dan verifikasi metode analisis

- **Pembuatan larutan induk furosemide pada pelarut metanol**

  Berat Furosemide = 49,2 mg

  Volume metanol p.a = 100 ml

  Larutan stok = 49,2 mg/ 100 ml = 492 ppm

  Larutan induk 492 ppm dibuat dalam 50 ml, dengan memipet 2 ml dari larutan stok, diperoleh kadar furosemide :

  V1 x C1 = V2 x C2

  2 ml x 492 ppm = 50 ml x C2

  C2 = 984 ppm/50 ml

  C2 = 19,68 ppm (Larutan furosemide)

  - **Perhitungan dalam kurva baku**

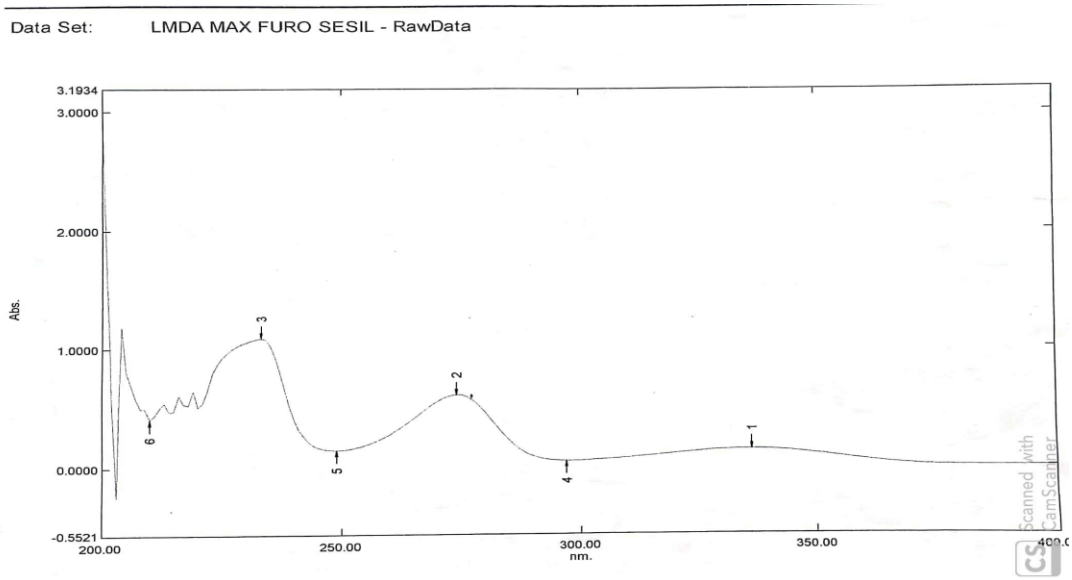
    1) V1 x C1 = V2 x C2
       1 ml x 19,68 ppm = 10 ml x C2
       C2 = 1,968 ppm
    2) V1 x C1 = V2 x C2
       1,5 ml x 19,68 ppm = 10 ml x C2
       C2 = 2,952 ppm
    3) V1 x C1 = V2 x C2
       2 ml x 19,68 ppm = 10 ml x C2
       C2 = 3,936 ppm
    4) V1 x C1 = V2 x C2
       2,5 ml x 19,68 ppm = 10 ml x C2
       C2 = 4,92 ppm
    5) V1 x C1 = V2 x C2
       3 ml x 19,68 ppm = 10 ml x C2
       C2 = 5,904 ppm
    6) V1 x C1 = V2 x C2
       3,5 ml x 19,68 ppm = 10 ml x C2
       C2 = 6,888 ppm

7) V1 x C1 = V2 x C2

4 ml x 19,68 ppm = 10 ml x C2

C2 = 7,872 ppm

a. Penentapan panjang gelomang maksimun dalam metanol

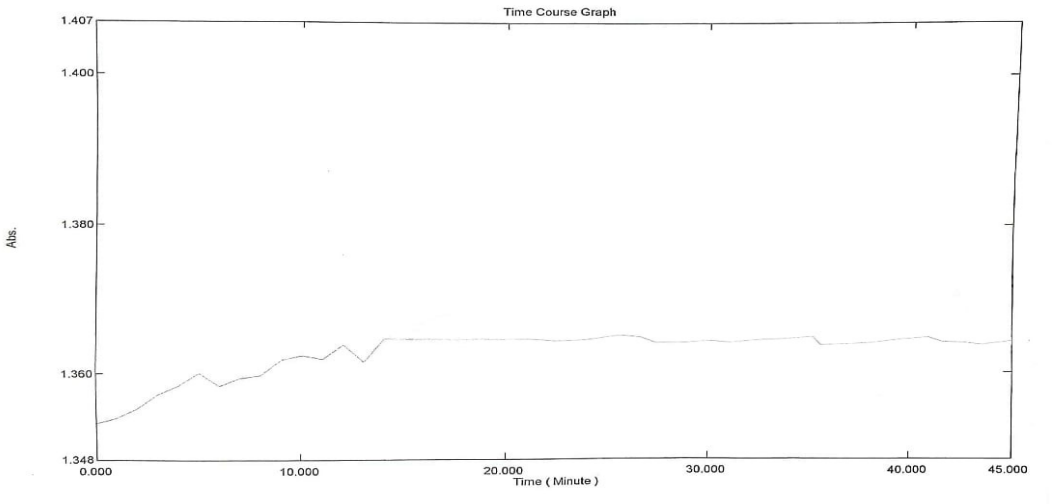


Wavelength nm.	RawData ...
251.00	0.1511
252.00	0.1573
253.00	0.1651
254.00	0.1751
255.00	0.1869
256.00	0.2004
257.00	0.2164
258.00	0.2341
259.00	0.2533
260.00	0.2743
261.00	0.2980
262.00	0.3234
263.00	0.3502
264.00	0.3783
265.00	0.4082
266.00	0.4390
267.00	0.4695
268.00	0.4990
269.00	0.5265
270.00	0.5516
271.00	0.5734
272.00	0.5903
273.00	0.6017
274.00	0.6063
275.00	0.6043
276.00	0.5916
277.00	0.5695
278.00	0.5367

b. Penetapan *operating time* pada metanol

Time (Minute)	RawData ...
1.000	1.354
2.000	1.355
3.000	1.357
4.000	1.358
5.000	1.360
6.000	1.358
7.000	1.359
8.000	1.360
9.000	1.362
10.000	1.362
11.000	1.362
12.000	1.364
13.000	1.364
14.000	1.367
15.000	1.367
16.000	1.367
17.000	1.367
18.000	1.367
19.000	1.367
20.000	1.367
21.000	1.367
22.000	1.366
23.000	1.363
24.000	1.365
25.000	1.365
26.000	1.367
27.000	1.361
28.000	1.361
29.000	1.360
30.000	1.362
31.000	1.364
32.000	1.365
33.000	1.367
34.000	1.369
35.000	1.361
36.000	1.369
37.000	1.361
38.000	1.363
39.000	1.366
40.000	1.368
41.000	1.368
42.000	1.369
43.000	1.369
44.000	1.362
45.000	1.361

Data Set: Storage 085339 - RawData - D:\sinta y\OT metanol sesil furo.kin



c. Kurva kalibrasi

Konsentrasi (ppm)	Serapan
1.968	0.223
2.952	0.274
3.936	0.331
4.92	0.383
5.904	0.43
6.888	0.481
7.872	0.538

Persamaan regresi linear antara konsentrasi (ppm) dan serapan diperoleh nilai:

a = 0.1196

b = 0.0529

r = 0.9997

$y = 0.1196 + 0.0529x$

keterangan x = konsentrasi (ppm), y = serapan

d. Verifikasi metode analisis pada pelarut metanol

- **Penetapan akurasi**

No	Konsentrasi (ppm)		Serapan	x	Konsentrasi (%)	Rata rata	Recovery
1		4.72	0.367	4.67434	99%		
2	80%	4.72	0.369	4.71213	100%	100%	
3		4.72	0.37	4.73103	100%		
4		5.90	0.422	5.71368	97%		
5	100%	5.90	0.427	5.80816	98%	98%	99%
6		5.90	0.429	5.84596	99%		
7		7.08	0.494	7.07427	100%		
8	120%	7.08	0.49	6.99868	99%	100%	
9		7.08	0.497	7.13096	101%		

Akurasi yang diperoleh dari metode yang digunakan dengan pelarut metanol sebesar 99%.

- **Penetapan Presisi**

Konsentrasi (ppm)	Serapan	x	X rat rata	SD	CV
5.095	0.383	4.976			
5.095	0.385	5.014			
5.095	0.384	4.995	5.008	0.025	1%
5.095	0.385	5.014			
5.095	0.387	5.052			
5.095	0.384	4.995			

$$\text{CV} = \frac{SD}{X\ rata\ rata} = \frac{0,025}{5,008}\ x\ 100\% = 1\%$$

- **Penetapan LOD LOQ**

No	Konsentrasi (ppm)	Serapan	Y	Y-Y^	(Y-Y^)²	X rata rata
1	1.968	0.223	0.223	-0.00078	6.17347E-07	
2	2.952	0.274	0.275	-0.00185	3.44898E-06	
3	3.936	0.331	0.327	0.00307	9.43367E-06	
4	4.92	0.383	0.38	0.003	9E-06	4.92
5	5.904	0.43	0.432	-0.00207	4.29082E-06	
6	6.888	0.481	0.484	-0.00314	9.87755E-06	
7	7.872	0.538	0.536	0.00178	3.18878E-06	
			Jumlah total	(Σ|Y-Y^|)²	3.98571E-05	

Nilai ŷ diperoleh dari substitusi konsentrasi (x) dalam persamaan y = a+bx, yaitu 0.1196

+ 0.0529*x* sehingga didapatkan nilai y.

$S_{x/y} = \sqrt{\frac{(\Sigma|Y-Y^|)^2}{N-2}}$

$S_{x/y}$ = simpangan baku residual

N = jumlah data

Σ|y-ŷ|2 = jumlah kuadrat total residual

$S_{x/y}$ = 0.002823372

LOD $= 3{,}3 \frac{S_{x/y}}{b}$

$= 3{,}3 \frac{0.002823372}{0.0529}$

= 0.160 ppm

Y = 0.1196+ (0.0529 x 0.160)

Serapan = 0, 1289

LOQ $= 10 \frac{S_{x/y}}{b}$

$= 10 \frac{0.002823372}{0.0529}$

= 0.533 ppm

Y = 0.1196+ (0.0529 x 0.533)

Serapan = 0,1503

- **Pembuatan larutan induk furosemide pada pelarut HCl 0,1 N**

Berat furosemide = 51,1 mg

Volume HCl 0,1 N = 100 ml

Larutan stok = 51,1 mg/ 100 ml = 511 ppm

Larutan induk 511 ppm dibuat dalam 50 ml, dengan memipet 2 ml dari larutan stok, diperoleh kadar furosemide :

V1 x C1 = V2 x C2

2 ml x 511 ppm = 50 ml x C2

C2 = 1022 ppm/50 ml

C2 = 20,44 ppm (Larutan furosemid)

- **Perhitungan dalam kurva baku**

1) V1 x C1 = V2 x C2

1,5 ml x 20,44 ppm = 10 ml x C2

C2 = 3,066 ppm

2) V1 x C1 = V2 x C2

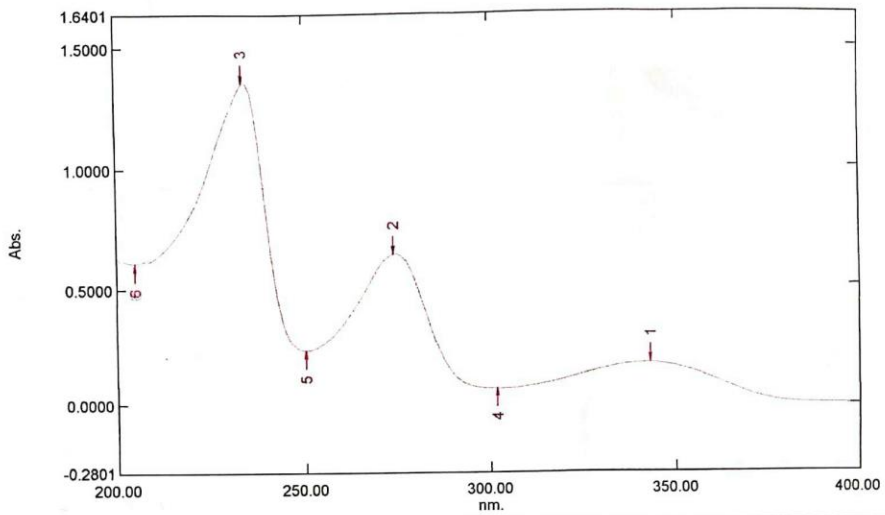
2 ml x 20,44 ppm = 10 ml x C2

C2 = 4,088 ppm

3) V1 x C1 = V2 x C2
   2,5 ml x 20,44 ppm = 10 ml x C2
   C2 = 5,11 ppm
4) V1 x C1 = V2 x C2
   3 ml x 20,44 ppm = 10 ml x C2
   C2 = 6,132 ppm
5) V1 x C1 = V2 x C2
   3,5 ml x 20,44 ppm = 10 ml x C2
   C2 = 7,15 ppm
6) V1 x C1 = V2 x C2
   4ml x 20,44 ppm = 10 ml x C2
   C2 = 8,176 ppm
7) V1 x C1 = V2 x C2
   4,5 ml x 20,44 ppm = 10 ml x C2
   C2 = 9,198 ppm

a. Penentuan panjang gelombang maksimum furosemid dalam pelarut HCl 0,1 N

Data Set: lamda furo sc - RawData



No.	P/V	Wavelength	Abs.	Description
1	↑	343.00	0.1719	
2	↑	274.00	0.6444	
3	↑	234.00	1.3583	
4	↓	302.00	0.0674	
5	↔	250.00	0.2310	
6	↓	205.00	0.5963	

[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:

b. Penetapan operating time

Time (Minute)	RawData ...
1.000	1.891
2.000	1.898
3.000	1.893
4.000	1.899
5.000	1.894
6.000	1.895
7.000	1.896
8.000	1.890
9.000	1.888
10.000	1.889
11.000	1.889
12.000	1.889
13.000	1.887
14.000	1.894
15.000	1.890
16.000	1.890
17.000	1.890
18.000	1.890
19.000	1.890
20.000	1.890
21.000	1.890
22.000	1.886
23.000	1.887
24.000	1.888
25.000	1.889
26.000	1.885
27.000	1.885
28.000	1.890
29.000	1.885
30.000	1.880
31.000	1.884
32.000	1.884
33.000	1.885
34.000	1.889
35.000	1.881
36.000	1.884
37.000	1.882
38.000	1.883
39.000	1.884
40.000	1.882
41.000	1.885
42.000	1.885
43.000	1.884
44.000	1.883
45.000	1.887

c. Kurva kalibrasi

Konsentrasi (ppm)	Serapan
3.066	0.234
4.088	0.285
5.11	0.336
6.132	0.389
7.154	0.448
8.176	0.487
9.198	0.543

Persamaan regresi linear antara konsentrasi (ppm) dan serapan diperoleh nilai:

a = 0.0796

b = 0.0505

r = 0.9991

$y = 0.0796 + 0.0505x$

keterangan x = konsentrasi (ppm), y = serapan

d. Verifikasi metode analisis furosemide pada pelarut HCl 0,1 N

- **Penetapan Akurasi**

No	Konsentrasi (ppm)		Serapan	x	Konsentrasi (%)	Rata rata	Recovery
1		5.723	0.378	5.90605	103%	103%	
2	80%	5.723	0.381	5.96543	104%		
3		5.723	0.374	5.82687	102%		
4		7.154	0.451	7.35110	103%	104%	
5	100%	7.154	0.459	7.50946	105%		101%
6		7.154	0.461	7.54905	106%		
7		8.585	0.495	8.22209	96%	95%	
8	120%	8.585	0.482	7.96475	93%		
9		8.585	0.499	8.30127	97%		

Akurasi yang diperoleh dari metode yang digunakan dengan pelarut HCl 0,1 N sebesar 101%

- **Penetapan Presisi**

Konsentrasi (ppm)	Serapan	x	X rat rata	SD	CV
7.154	0.459	7.5094			
7.154	0.458	7.4896			
7.154	0.453	7.3906	7.5094	0.0719	1%
7.154	0.459	7.5094			
7.154	0.464	7.6084			
7.154	0.461	7.5490			

$$\text{CV} = \frac{SD}{X\ rata\ rata} = \frac{0{,}0719}{7{,}5094}\ x\ 100\% = 1\%$$

- **Penetapan LOD dan LOQ**

No	Konsentrasi (ppm)	Serapan	Y	Y-Y^	(Y-Y^)²	X rata rata
1	3.066	0.234	0.234	-0.00053	2.79E-07	
2	4.088	0.285	0.286	-0.00116	1.34E-06	
3	5.11	0.336	0.337	-0.00179	3.19E-06	
4	6.132	0.389	0.389	-0.00041	1.72E-07	6.132
5	7.154	0.448	0.441	0.006957	4.84E-05	
6	8.176	0.487	0.492	-0.00567	3.22E-05	
7	9.198	0.543	0.544	-0.0013	1.69E-06	
			Jumlah total (Σ|Y-Y^|)²		8.72357E-05	

Nilai ŷ diperoleh dari substitusi konsentrasi (x) dalam persamaan y = a+bx, yaitu 0.07964 + 0.05052x sehingga didapatkan nilai y.

$S_{x/y} = \sqrt{\frac{(\Sigma|Y-Y^|)^2}{N-2}}$

$S_{x/y}$ = simpangan baku residual

N = jumlah data

Σ|y-ŷ|2 = jumlah kuadrat total residual

$S_{x/y}$ = 0.004177

LOD = 3,3 $\frac{S_{x/y}}{b}$

= 3,3 $\frac{0,004177}{0.05052}$

= 0.272858 ppm

Y = 0.07964 + (0.050520 x 0.272858)

Serapan = 0,0938

LOQ = = 10 $\frac{S_{x/y}}{b}$

= 10 $\frac{0,004177}{0.05052}$

= 0.826843 ppm

Y = 0.07964 + (0.050520 x 0.826843)

Serapan = 0,1214

Lampiran 2. Pembuatan formula SNEDDS furosemide Visualisasi formula SNEDDS yang di buat

Formula 1

(jernih)

formula 2

(jernih)

formula 3

(jernih)

Formula 4

(jernih)

formula 5

(jernih)

formula 6

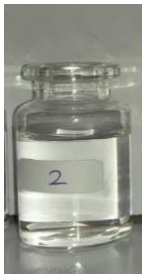
(jernih)

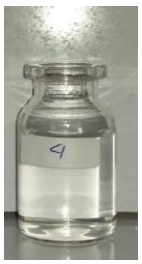
Formula 7

(jernih)

Lampiran 3. Karakterisasi SNEDDS furosemide

a. Waktu emulsifikasi





b. **Penentuan *drug loading***

FORMULA	SERAPAN	FP	KADAR	RATA RATA KADAR
	0.544	5000	40095.64	
1	0.522	5000	38016.95	**39056.2963**
	0.533	5000	39056.3	
	0.625	5000	47748.97	
2	0.644	5000	49544.2	**49481.20713**
	0.661	5000	51150.45	
	0.739	5000	58520.33	
3	0.735	5000	58142.39	**58583.31962**
	0.745	5000	59087.24	
	0.65	5000	50111.11	
4	0.577	5000	43213.66	**44882.90809**
	0.557	5000	41323.95	
	0.557	5000	41323.95	
5	0.54	5000	39717.7	**40001.15226**
	0.532	5000	38961.81	
	0.552	5000	40851.52	
6	0.598	5000	45197.86	**43056.18656**
	0.576	5000	43119.18	
	0.553	5000	40946.01	
7	0.551	5000	40757.04	**41575.91221**
	0.575	5000	43024.69	

Penentuan *drug loading* ditentukan dengan membaca nilai serapan dari 3 replikasi yang dibuat dan di hitung dalam persamaan:

$$y = (a + bx)\ fx$$

dimana:

y = nilai serapan

x = kadar

fx = faktor pengencer

c. Ukuran partikel

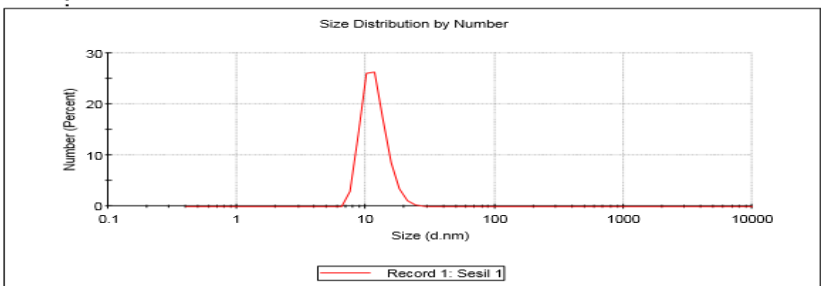
System

Temperature (°C):	25,0	Duration Used (s):	80
Count Rate (kcps):	137,9	Measurement Position (mm):	4,65
Cell Description:	Disposable sizing cuvette	Attenuator:	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	100,6	Peak 1:	11,79	100,0	2,746
PdI:	0,531	Peak 2:	0,000	0,0	0,000
Intercept:	0,962	Peak 3:	0,000	0,0	0,000

Result quality : Refer to quality report



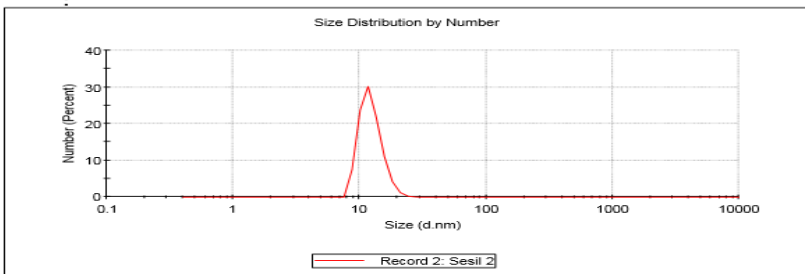
System

Temperature (°C):	25,0	Duration Used (s):	80
Count Rate (kcps):	134,4	Measurement Position (mm):	4,65
Cell Description:	Disposable sizing cuvette	Attenuator:	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	131,7	Peak 1:	12,37	100,0	2,577
PdI:	0,384	Peak 2:	0,000	0,0	0,000
Intercept:	0,958	Peak 3:	0,000	0,0	0,000

Result quality : Refer to quality report



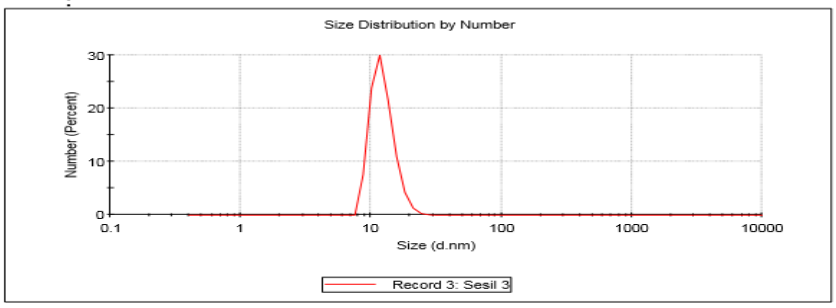
System

Temperature (°C):	25,0	**Duration Used (s):**	80
Count Rate (kcps):	129,1	**Measurement Position (mm):**	4,65
Cell Description:	Disposable sizing cuvette	**Attenuator:**	7

Results

			Size (d.n...	% Number:	St Dev (d.n...
Z-Average (d.nm):	144,5	**Peak 1:**	12,38	100,0	2,629
PdI:	0,286	**Peak 2:**	0,000	0,0	0,000
Intercept:	0,956	**Peak 3:**	0,000	0,0	0,000

Result quality : **Refer to quality report**



d. Zeta potensial

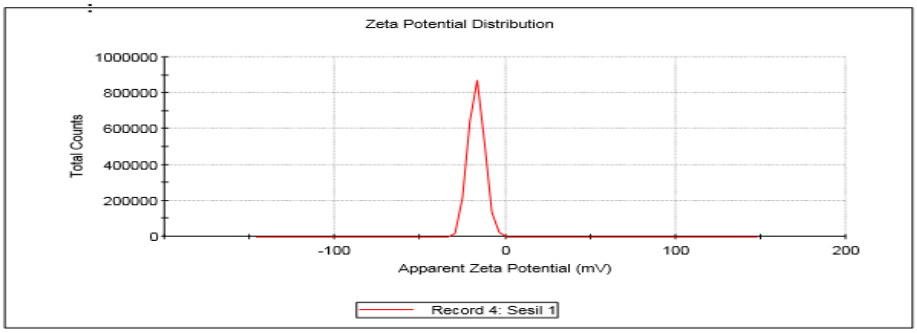
System

Temperature (°C):	25,0	**Zeta Runs:**	12
Count Rate (kcps):	685,5	**Measurement Position (mm):**	4,50
Cell Description:	Zeta dip cell	**Attenuator:**	8

Results

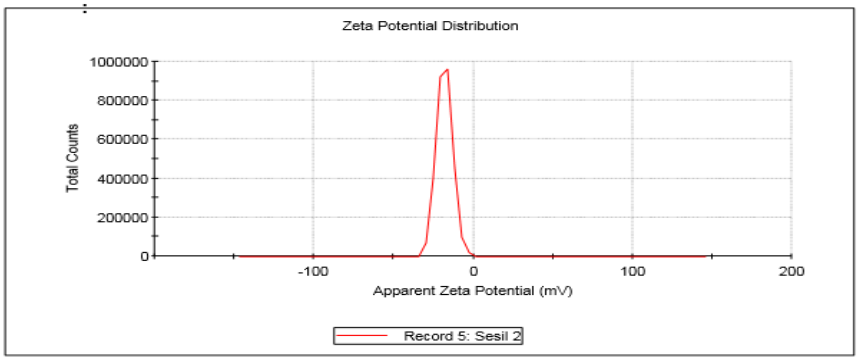
			Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-17,1	**Peak 1:**	-17,1	100,0	4,78
Zeta Deviation (mV):	4,78	**Peak 2:**	0,00	0,0	0,00
Conductivity (mS/cm):	0,0486	**Peak 3:**	0,00	0,0	0,00

Result quality : **Good**



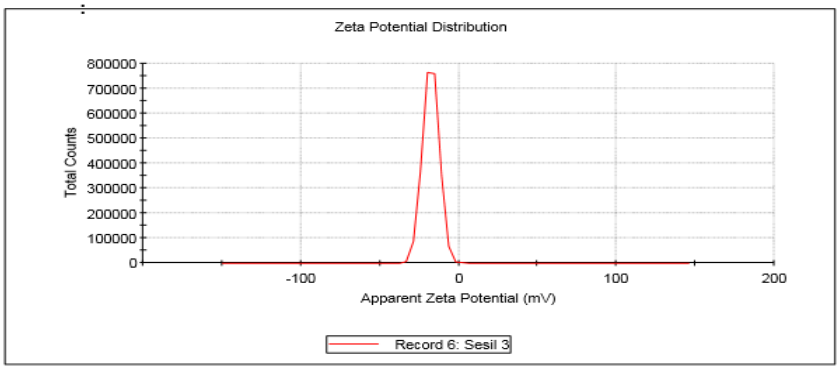
Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-18,1	Peak 1: -18,1	100,0	5,06
Zeta Deviation (mV):	5,06	Peak 2: 0,00	0,0	0,00
Conductivity (mS/cm):	0,0512	Peak 3: 0,00	0,0	0,00
Result quality :	Good			



Results

		Mean (mV)	Area (%)	St Dev (mV)
Zeta Potential (mV):	-17,6	Peak 1: -17,6	100,0	5,14
Zeta Deviation (mV):	5,14	Peak 2: 0,00	0,0	0,00
Conductivity (mS/cm):	0,0515	Peak 3: 0,00	0,0	0,00
Result quality :	Good			



e. Penetapan disolusi

- **Perhitungan volume SNEDDS untuk uji disolusi**

absorbansi	Rata-rata serapan	Kadar ppm	Kadar mg
0,684			
0,582	0,650	50132,33	50,132 mg
0,683			

Dosis furosemide 1 kali pakai = 40 mg

Volume SNEDDS $= \frac{50,132}{40}$

= 0,8 mL

- **Data disolusi SNEDDS furosemide**

Waktu (menit)	Serapan	Faktor pengencer	Konsentrasi (ppm)
5	0.322	10	38.261
10	0.355	10	44.499
15	0.368	10	46.956
20	0.343	10	42.231
25	0.35	10	43.554
30	0.345	10	42.609
35	0.331	10	39.962
60	0.333	10	40.340

Konsentrasi didapat dari persamaan regresi linier y = (a + bx) fp , y sebagai nilai serapan, x sebagai konsentrasi dan fp sebagai faktor pengencer

Regresi linier

a = 0,1196

b = 0,0529

r = 0,9997

1. Y = (a + bx) fp
   0,322 = (0,1196 + 0,0529x) 10
   X = 38,261

2. Y = (a + bx) fp
   0,355 = (0,1196 + 0,0529x) 10
   X = 44,499

3. Y = (a + bx) fp
   0,368 = (0,1196 + 0,0529x) 10
   X = 46,956

4. Y = (a + bx) fp
   0,343 = (0,1196 + 0,0529x) 10
   X = 42,231

5. Y = (a + bx) fp
   0,35 = (0,1196 + 0,0529x) 10
   X = 43,554

6. Y = (a + bx) fp
   0,345 = (0,1196 + 0,0529x) 10
   X = 42,609

7. Y = (a + bx) fp
   0,331 = (0,1196 + 0,0529x) 10
   X = 39,962

8. Y = (a + bx) fp
   0,333 = (0,1196 + 0,0529x) 10

X = 40,340

- Perhitungan kadar disolusi SNEDDS furosemid

waktu	kadar(ppm)	faktor Koreksi	kadar terkoreksi	kadar terkoreksi(mg)	kadar (%)
5	38.261		38.261	34.4349	86.08725
10	44.499	0.2126	44.7116	40.240405	100.6010125
15	46.956	0.4734	47.4294	42.68646	106.71615
20	42.231	0.708	42.939	38.6451	96.61275
25	43.554	0.9499	44.5039	40.05351	100.133775
30	42.6087	1.218	43.8267	39.44403	98.610075
35	39.96219	1.461	41.42319	37.280871	93.2021775
60	40.34026	1.6956	42.03586	37.832274	94.580685
				rata rata kadar	97.06798438

t

faktor koreksi di dapat dari perhitungan :

$$\left\{\frac{volume\ sampling}{volume\ disolusi} x kadar\ \ sebelum\right\} + faktor\ koreksi\ sebelumnya +$$

1. $\left\{\frac{5}{900}\ x\ 0\right\} + 0 = 0$
2. $\left\{\frac{5}{900}\ x\ 38{,}261\right\} + 0 = 0{,}2126$
3. $\left\{\frac{5}{900}\ x\ 44{,}499\right\} + 0{,}2126 = 0{,}4734$
4. $\left\{\frac{5}{900}\ x\ 46{,}956\right\} + 0{,}4734 = 0{,}708$
5. $\left\{\frac{5}{900}\ x\ 42{,}231\right\} + 0{,}708 = 0{,}9499$
6. $\left\{\frac{5}{900}\ x\ 43{,}554\right\} + 0{,}9499 = 1{,}218$
7. $\left\{\frac{5}{900}\ x\ 42{,}6087\right\} + 1{,}218 = 1{,}461$
8. $\left\{\frac{5}{900}\ x\ 39{,}96216\right\} + 1{,}461 = 1{,}6956$

Nilai kadar terkoreksi (ppm) didapatkan dari perhitungan:

Kadar + faktor koreksi

1. 38,261+0 = 38,261
2. 44,499 + 0,2126 = 44,7716

3. 46,956 + 0,4734 = 47,4294
4. 42,231 + 0,708 = 42,939
5. 43,554 + 0,9499 = 44,5039
6. 42,6087 + 1,218 = 43,8267
7. 39,96219 + 1,461 = 41,42319
8. 40,34026 + 1,6956 = 42,03586

Nilai kadar terkoreksi (mg) diperoleh dari perhitungan:

$$\frac{kadar terkoreksi\ (ppm)}{1000\ mL}\ x\ vol\ disolusi$$

1. $\frac{38,261}{1000\ mL}\ x\ 900\ mL\ = 34,4349$
2. $\frac{44,7716}{1000\ mL}\ x\ 900\ mL\ = 40,240$
3. $\frac{47,4294}{1000\ mL}\ x\ 900\ mL\ = 42,6864$
4. $\frac{42,939}{1000\ mL}\ x\ 900\ mL\ = 38,6451$
5. $\frac{44,5039}{1000\ mL}\ x\ 900\ mL\ = 40,0535$
6. $\frac{43,8267}{1000\ mL}\ x\ 900\ mL\ = 39,4440$
7. $\frac{41,4231}{1000\ mL}\ x\ 900\ mL\ = 37,2808$
8. $\frac{42,0358}{1000\ mL}\ x\ 900\ mL\ = 37,8322$

Nilai kadar (%) diperoleh dari perhitungan:

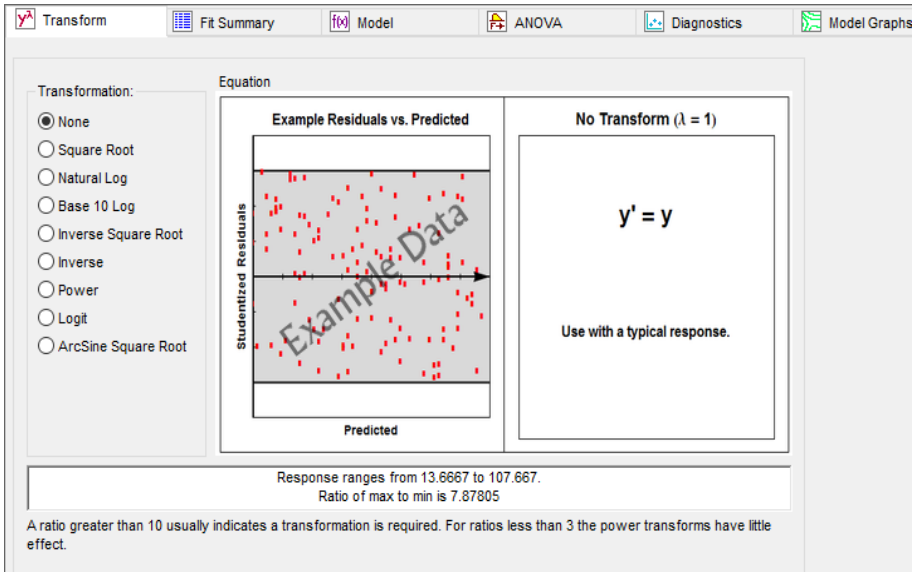
$$\frac{kadar terkoreksi\ (mg)}{dosis\ lazim}\ x\ 100\ \%$$

1. $\frac{34,4349\ mg}{40\ mg}\ x\ 100\%\ = 86,08\%$
2. $\frac{40,2404\ mg}{40\ mg}\ x\ 100\%\ = 100,60\ \%$
3. $\frac{42,6864\ mg}{40\ mg}\ x\ 100\%\ = 106,716\ \%$
4. $\frac{38,6451\ mg}{40\ mg}\ x\ 100\%\ = 96,61\ \%$
5. $\frac{40,0535\ mg}{40\ mg}\ x\ 100\%\ = 100,13\ \%$
6. $\frac{39,4440\ mg}{40\ mg}\ x\ 100\%\ = 98,61\ \%$
7. $\frac{37,2808\ mg}{40\ mg}\ x\ 100\%\ = 93,20\ \%$
8. $\frac{37,8322\ mg}{40\ mg}\ x\ 100\%\ = 94,58\ \%$

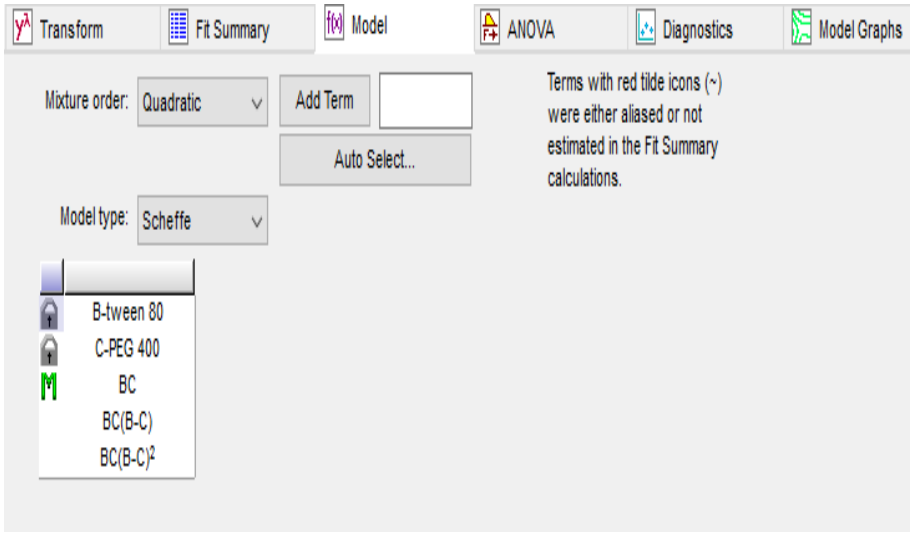
Lampiran 4. *Simplex Lattice Design*

a. Waktu emulsifikasi

Transformasi waktu emulsifikasi



Penentuan model



Anova

Transform | Fit Summary | Model | ANOVA

Use your mouse to right click on individual cells for definitions.

Response 1 WAKTU EMULSIFIKASI

ANOVA for Quadratic Mixture model

***** Mixture Component Coding is L_Pseudo. *****

Analysis of variance table [Partial sum of squares - Type III]

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F	
Model	5695.82	2	2847.91	34.16	0.0031	significant
1 Linear Mixtu	*3424.77*	*1*	*3424.77*	*41.08*	*0.0030*	
BC	*2271.05*	*1*	*2271.05*	*27.24*	*0.0064*	
Residual	333.49	4	83.37			
Cor Total	6029.30	6				

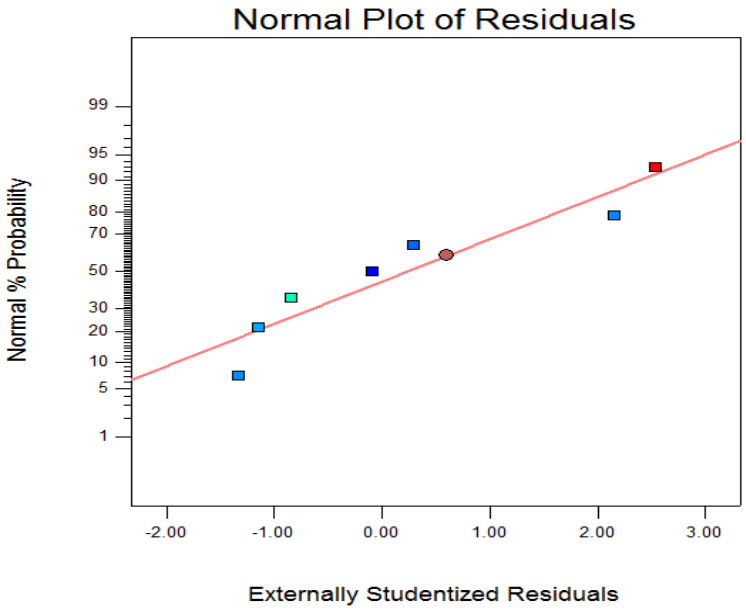
1 Inference for linear mixtures uses Type I sums of squares.

Std. Dev.	9.13	R-Squared	0.9447
Mean	38.52	Adj R-Squared	0.9170
C.V. %	23.70	Pred R-Square	0.5212
PRESS	2886.77	Adeq Precisior	14.696
-2 Log Likeliho	46.91	BIC	50.80
		AICc	53.91

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
B-tween 80	101.87	1	8.43	78.47	125.28	2.07
C-PEG 400	30.94	1	8.43	7.53	54.34	2.07
BC	-182.50	1	34.97	-279.58	-85.41	3.40

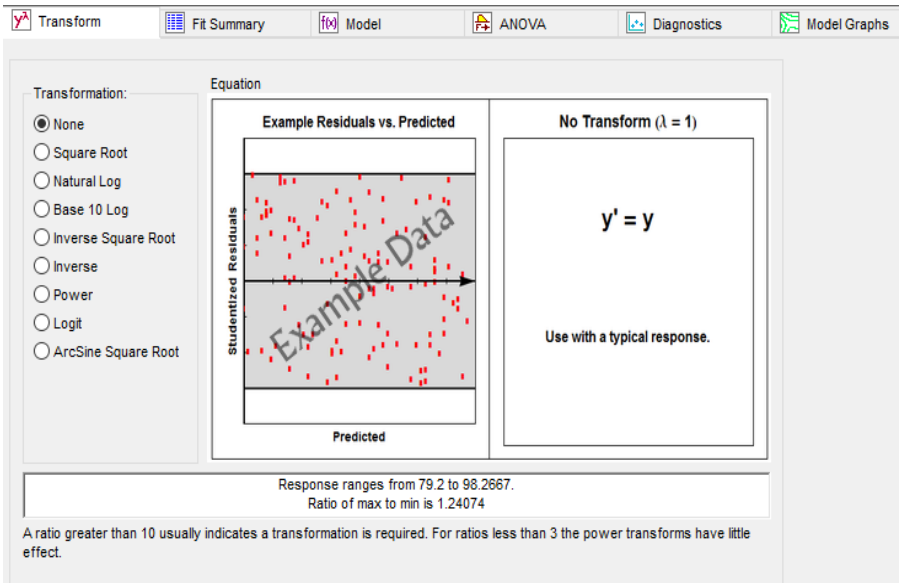
Final Equation in Terms of L_Pseudo Components:

WAKTU EMULSIFIKASI =
+101.87 * B
+30.94 * C
-182.50 * BC

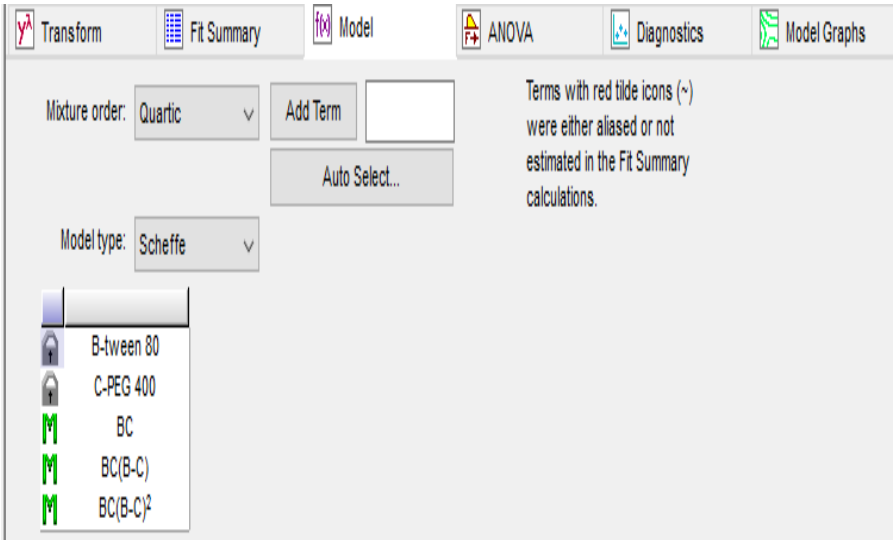


b. Persen transmitan

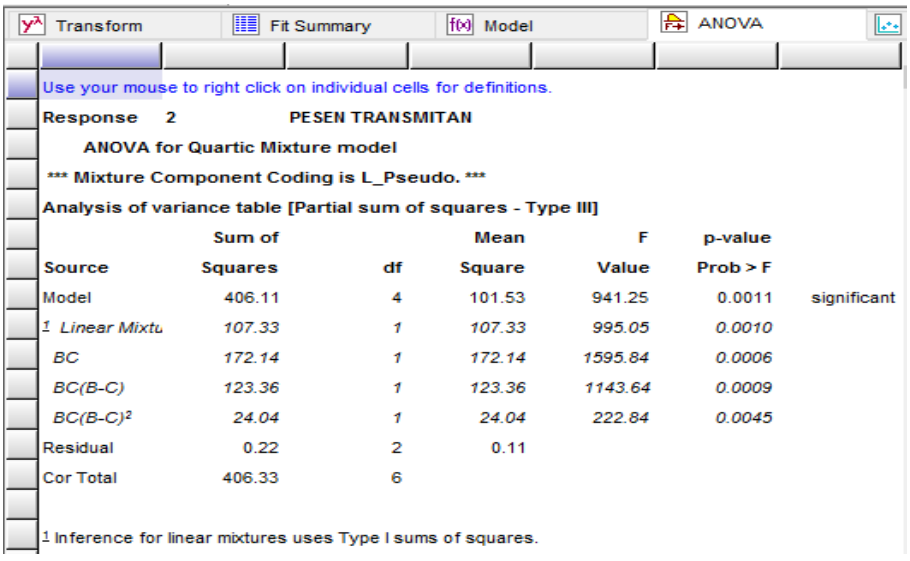
Transformasi persen transmitan



Penentuan model



Anova



Transform | Fit Summary | Model | ANOVA

Values of "Prob > F" less than 0.0500 indicate model terms are significant.
In this case B, C, BC, BC(B-C), BC(B-C)^2 are significant model terms.
Values greater than 0.1000 indicate the model terms are not significant.
If there are many insignificant model terms (not counting those required to support hierarchy),
model reduction may improve your model.

Std. Dev.	0.33	R-Squared	0.9995
Mean	89.33	Adj R-Squared	0.9984
C.V. %	0.37	Pred R-Square	0.3342
PRESS	270.54	Adeq Precisior	68.991
-2 Log Likeliho	-4.49	BIC	3.29
		AICc	23.51

Transform | Fit Summary | Model | ANOVA

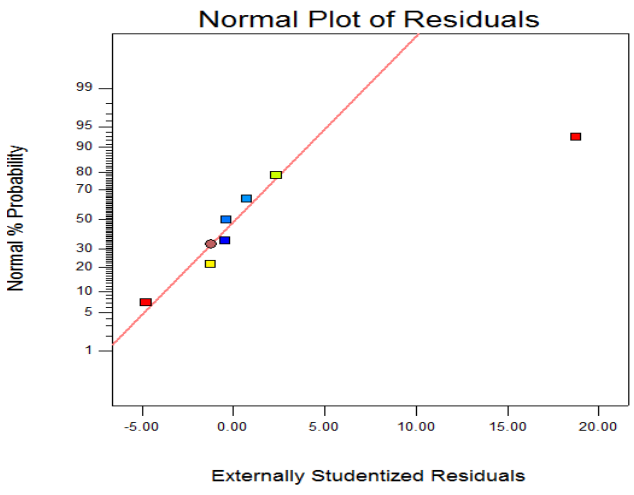
normally expect; i.e. the difference is more than 0.2. This may indicate a large block effect
or a possible problem with your model and/or data. Things to consider are model reduction,
response transformation, outliers, etc. All empirical models should be tested by doing
confirmation runs.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 68.991 indicates an adequate signal. This model can be used to navigate the design space.

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
B-tween 80	93.68	1	0.33	92.27	95.09	2.43
C-PEG 400	98.18	1	0.33	96.77	99.60	2.43
BC	-57.78	1	1.45	-64.00	-51.56	4.49
BC(B-C)	-76.60	1	2.26	-86.34	-66.85	1.36

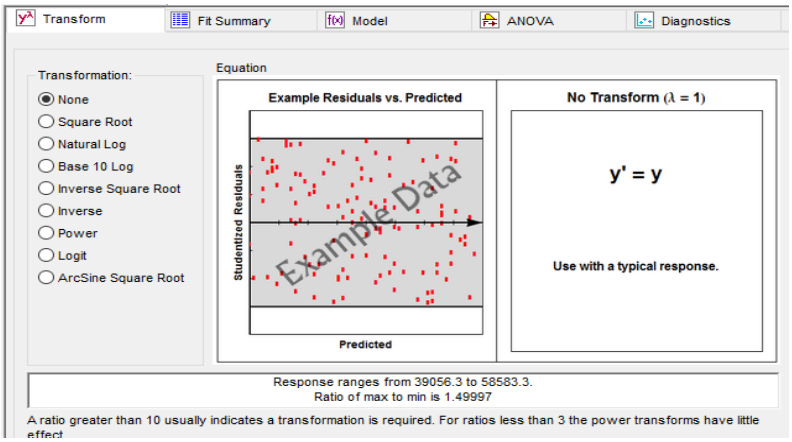
Final Equation in Terms of L_Pseudo Components:

PESEN TRANSMITAN =
+93.68 * B
+98.18 * C
-57.78 * BC
-76.60 * BC(B-C)

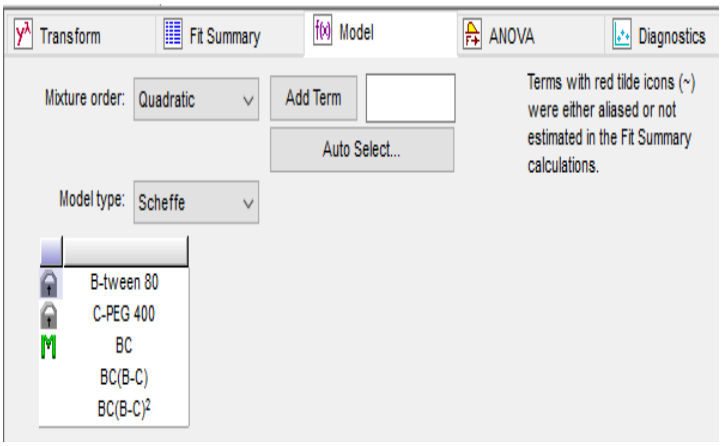


c. Penentuan *drug loading*

Transformasi *drug loading*



Penentuan model



Anova

Transform | Fit Summary | Model | ANOVA

Use your mouse to right click on individual cells for definitions.

Response 3 DRUG LOADING

ANOVA for Quadratic Mixture model

***** Mixture Component Coding is L_Pseudo. *****

Analysis of variance table [Partial sum of squares - Type III]

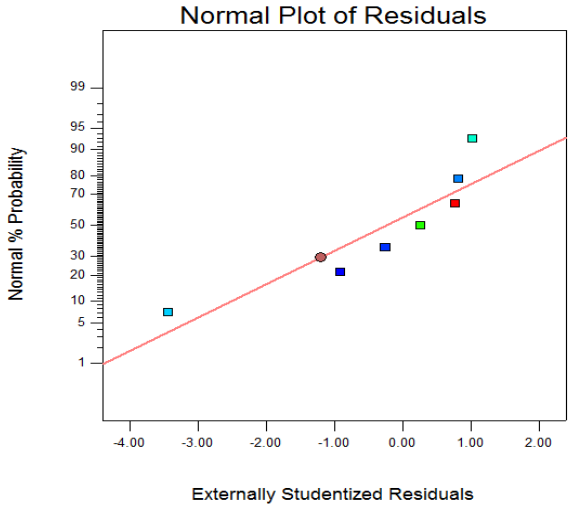
Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F	
Model	2.591E+008	2	1.296E+008	24.80	0.0056	significant
1 Linear Mixtu	*2.205E+008*	*1*	*2.205E+008*	*42.20*	*0.0029*	
BC	*3.868E+007*	*1*	*3.868E+007*	*7.40*	*0.0529*	
Residual	2.090E+007	4	5.225E+006			
Cor Total	2.800E+008	6				

Std. Dev.	2285.72	R-Squared	0.9254
Mean	45233.85	Adj R-Squared	0.8881
C.V. %	5.05	Pred R-Square	0.6789
PRESS	8.992E+007	Adeq Precisior	12.028
-2 Log Likeliho	124.23	BIC	128.12
		AICc	131.23

Component	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
B-tween 80	57871.56	1	2110.42	52012.08	63731.03	2.07
C-PEG 400	39873.01	1	2110.42	34013.54	45732.49	2.07
BC	-23815.18	1	8753.09	-48117.65	487.29	3.40

Final Equation in Terms of L_Pseudo Components:

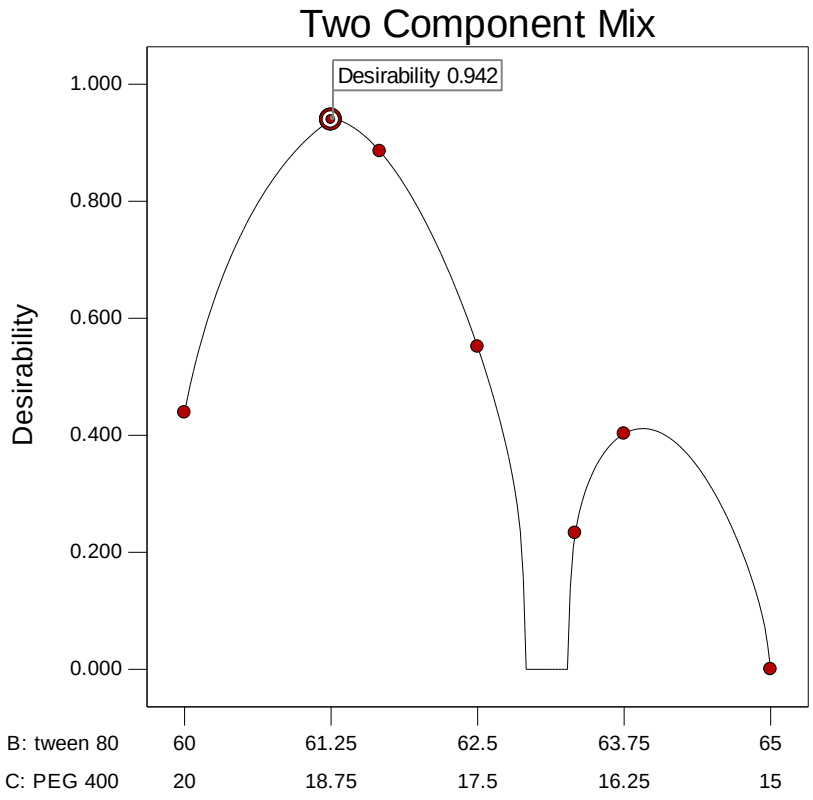
DRUG LOADING =
+57871.56 * B
+39873.01 * C
-23815.18 * BC



Lampiran 5. Penentuan formula optimum SNEDDS

Constraints

Name	Goal	Lower Limit	Upper Limit	Lower Weight	Upper Weight	Importance
B:tween 80	is in range	60	65	1	1	3
C:PEG 400	is in range	15	20	1	1	3
WAKTU EMUL!	minimize	13.6667	107.667	1	1	4
PESEN TRANS	maximize	79.2	98.2667	1	1	3
DRUG LOADIN	maximize	33670.6	58583.3	1	1	4



Hasil formula optimum berdasarkan SLD

Komponen SNEDDS	Formula optimum	Karakterisasi SNEDDS		
		Waktu emulsifikasi	Persen transmitan	*Drug loading*
Asam oleat	20			
Tween 80	61,4922	13,9 detik	95,32 %	50100,2ppm
PEG 400	18,5078			

Lampiran 6. Verifikasi formula optimum SNEDDS

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
waktu emulsifikasi	3	15.2500	.99685	14.22	16.21
persen trnsmitan	3	94.2000	1.51327	92.50	95.40
dug loading	3	50100.8200	5539.05761	43705.10	53345.94

One-Sample Kolmogorov-Smirnov Test

		waktu emulsifikasi	persen trnsmitan	dug loading
N		3	3	3
Normal Parameters[a,,b]	Mean	15.2500	94.2000	50100.8200
	Std. Deviation	.99685	1.51327	5539.05761
Most Extreme Differences	Absolute	.195	.296	.382
	Positive	.183	.214	.279
	Negative	-.195	-.296	-.382
Kolmogorov-Smirnov Z		.337	.513	.662
Asymp. Sig. (2-tailed)		1.000	.955	.774

a. Test distribution is Normal.

b. Calculated from data.

a. Waktu emulsifikasi

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Waktu emulsifikasi	3	15.2500	.99685	.57553

One-Sample Test

	Test Value = 13.9					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Waktu emulsifikasi	2.346	2	.144	1.35000	-1.1263	3.8263

b. Persen transmitan

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Persen transmitan	3	94.2000	1.51327	.87369

One-Sample Test

	Test Value = 95.32					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Persen transmitan	-1.282	2	.328	-1.12000	-4.8792	2.6392

c. Drug loading

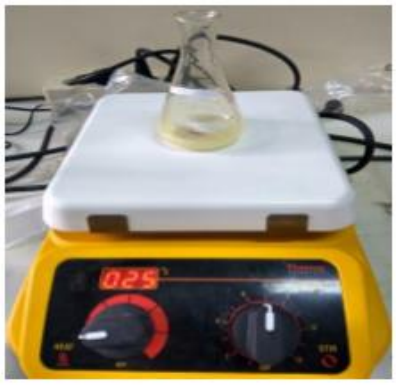
One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Drug loading	3	49890.8200	5902.77586	3407.96923

One-Sample Test

	Test Value = 52603.2					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Drug loading	-.796	2	.510	-2712.38000	-17375.6881	11950.9281

Lampiran 7. Dokumentasi penelitian



Magnetic stirrer

sentrifuge

Neraca analitik

Spektrofotometer UV-Vis