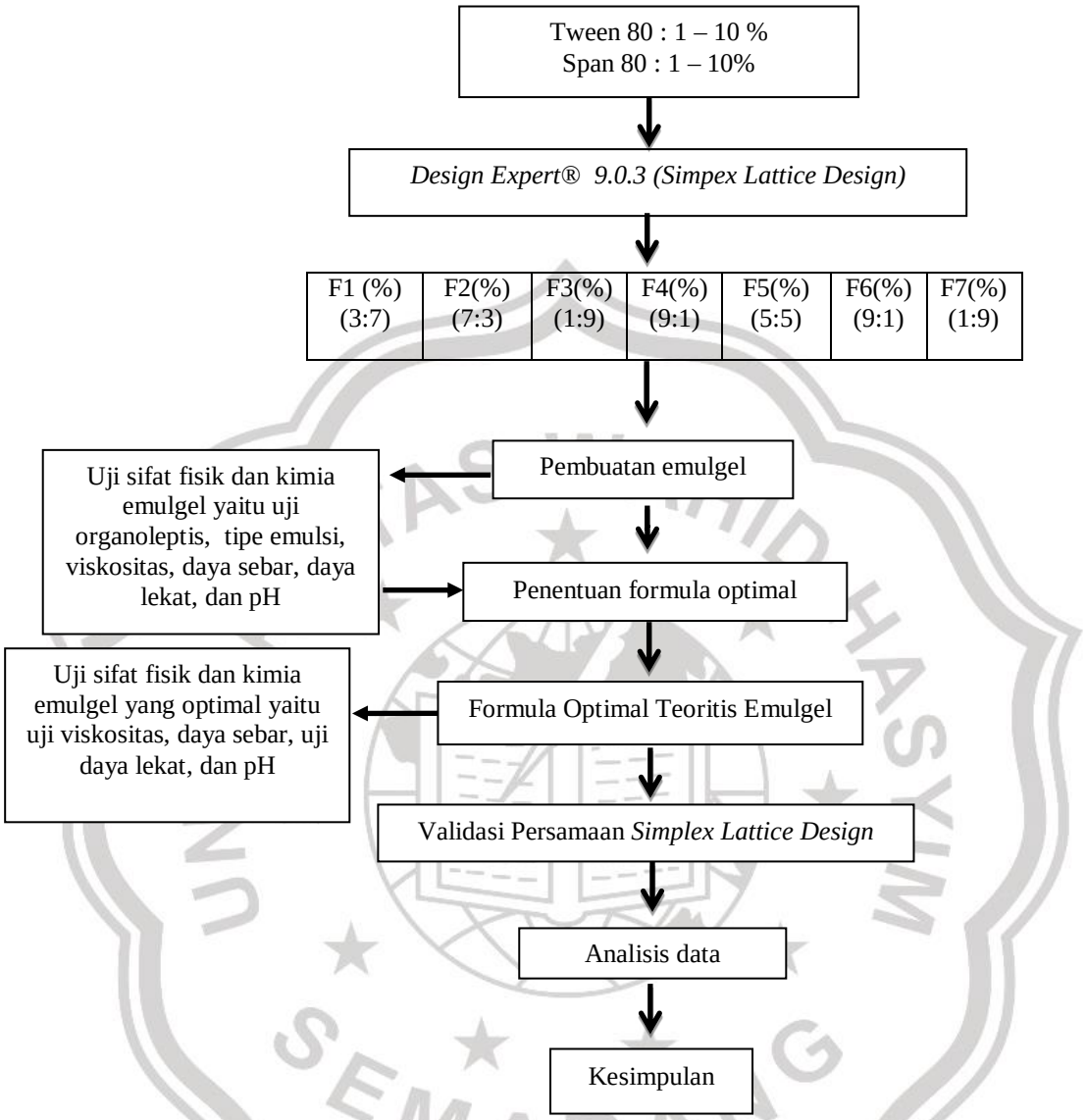
LAMPIRAN

Lampiran 1. Skema Jalannya Penelitian



Lampiran 2. Surat Keterangan Penelitian

SEKOLAH TINGGI ILMU FARMASI "YAYASAN PHARMASI"
PUSAT LABORATORIUM
Jalan Letnan Jendral Sarwo Edie Wibowo Km. 1 Plamongansari - Pucanggading - Semarang - 50193
Telepon : 024 - 6706147 ; 6725272 ; Faksimile : 024 - 6706148
Email : stifar_yaphar@yahoo.com
stifar_yaphar@hotmail.com

Nomor : 017/ENA/ Pusat Laboratorium/XII/2016
Hal : Surat Keterangan Penelitian

SURAT KETERANGAN

Beserta surat ini kami sampaikan bahwa mahasiswa tersebut di bawah ini:

Nama	**: Fatmawati**
Institusi Asal	**: Universitas Wahid Hasyim**
Judul	**: Optimasi Tween 80 Dan Span 80 Dalam Sediaan Emulgel Ketoprofen Secara *Simplex Lattice Design***

Telah melakukan penelitian di Laboratorium Tekhnologi Farmasi Sekolah Tinggi Ilmu Farmasi (STIFAR) "Yayasan Pharmasi Semarang" pada bulan November 2016

Demikian surat keterangan ini kami sampaikan, agar dapat digunakan sebagaimana mestinya.

Atas perhatian dan kerjasamanya kami ucapkan terima kasih.

Semarang, 7 Desember 2016

Kepala Pusat Laboratorium STIFAR

Ebta Narasukma A., M.Sc., Apt.

NIY:YP. 040509009

UNIVERSITAS WAHID HASYIM
FAKULTAS FARMASI
BAGIAN FARMASETIKA
Jl. Menoreh Tengah X / 22 Sampangan – Semarang 50236 Telp. (024) 8505680 – 8505681 fax. (024) 8505680

SURAT KETERANGAN
No. 041 /Lab. Farmasetika/C.05/UWH/XII/2016

Assalamu'alaikum Wr. Wb.

Yang bertanda tangan dibawah ini, Kepala Bagian Farmasi Fisika & Farmasetika Fakultas Farmasi Universitas Wahid Hasyim Semarang menerangkan bahwa :

Nama	: Fatmawati
NIM	: 125010863
Fakultas	: Farmasi

Telah melakukan formulasi di Laboratorium Teknologi Farmasi dalam rangka penelitian dengan judul :
"Optimasi Tween 80 dan Span 80 dalam Sediaan Emulgel Ketoprofen Secara *Simplex Lattice Design*".

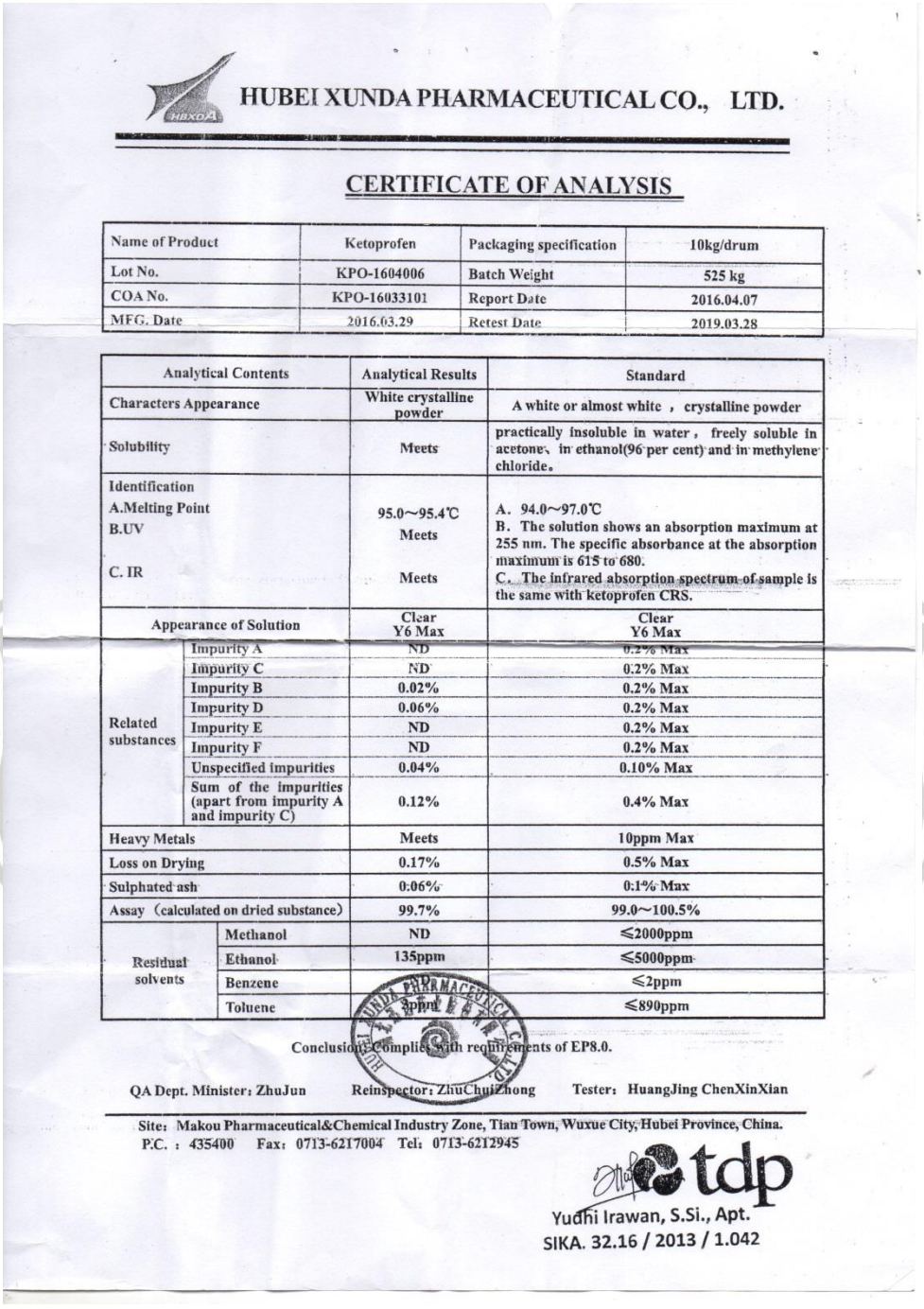
Demikian surat keterangan ini dibuat untuk dipergunakan semestinya.

Wassalamu'alaikum Wr. Wb.

Semarang, Desember 2016
Ka.Bag Farmasi Fisika & Farmasetika

Elya Zulfa, M.Sc, Apt

Lampiran 3. Sertifikat Analisis Ketoprofen



HUBEI XUNDA PHARMACEUTICAL CO., LTD.

CERTIFICATE OF ANALYSIS

Name of Product	Ketoprofen	Packaging specification	10kg/drum
Lot No.	KPO-1604006	Batch Weight	525 kg
COA No.	KPO-16033101	Report Date	2016.04.07
MFG. Date	2016.03.29	Retest Date	2019.03.28

Analytical Contents		Analytical Results	Standard
Characters Appearance		White crystalline powder	A white or almost white , crystalline powder
Solubility		Meets	practically insoluble in water , freely soluble in acetone、in ethanol(96 per cent) and in methylene chloride。
Identification A.Melting Point B.UV C. IR		95.0～95.4℃ Meets Meets	A. 94.0～97.0℃ B. The solution shows an absorption maximum at 255 nm. The specific absorbance at the absorption maximum is 615 to 680. C. The infrared absorption spectrum of sample is the same with ketoprofen CRS.
Appearance of Solution		Clear Y6 Max	Clear Y6 Max
Related substances	Impurity A	ND	0.2% Max
	Impurity C	ND	0.2% Max
	Impurity B	0.02%	0.2% Max
	Impurity D	0.06%	0.2% Max
	Impurity E	ND	0.2% Max
	Impurity F	ND	0.2% Max
	Unspecified impurities	0.04%	0.10% Max
	Sum of the impurities (apart from impurity A and impurity C)	0.12%	0.4% Max
Heavy Metals		Meets	10ppm Max
Loss on Drying		0.17%	0.5% Max
Sulphated ash		0.06%	0.1% Max
Assay（calculated on dried substance）		99.7%	99.0～100.5%
Residual solvents	Methanol	ND	≤2000ppm
	Ethanol	135ppm	≤5000ppm
	Benzene	ND	≤2ppm
	Toluene	3ppm	≤890ppm

Conclusion: Complies with requirements of EP8.0.

QA Dept. Minister: ZhuJun Reinspector: ZhuChuiZhong Tester: HuangJing ChenXinXian

Site: Makou Pharmaceutical&Chemical Industry Zone, Tian Town, Wuxue City, Hubei Province, China.
P.C. : 435400 Fax: 0713-6217004 Tel: 0713-6212945

tdp

Yudhi Irawan, S.Si., Apt.
SIKA. 32.16 / 2013 / 1.042

Lampiran 4. Perhitungan dan Penimbangan Bahan

Bahan	Formula (gram)						
	I	II	III	IV	V	VI	VII
Ketoprofen	1	1	1	1	1	1	1
Tween 80	3	7	1	9	5	9	1
Span 80	7	3	9	1	5	1	9
CMC-Na	1	1	1	1	1	1	1
Paraffin cair	7,5	7,5	7,5	7,5	7,5	7,5	7,5
Propilen glikol	5	5	5	5	5	5	5
Metil paraben	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Propil paraben	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Etanol	2,5	2,5	2,5	2,5	2,5	2,5	2,5
Aquades	72,9	72,9	72,9	72,9	72,9	72,9	72,9

Bahan	Formula Optimal (gram)
Ketoprofen	1
Tween 80	6,3
Span 80	3,7
CMC-Na	1
Paraffin cair	7,5
Propilen glikol	5
Metil paraben	0,05
Propil paraben	0,05
Etanol	2,5
Aquades	72,9

Lampiran 5. Perhitungan HLB

Formula	Tween 80 (gram)	Span 80 (gram)	Jumlah (gram)
1	3	7	10
2	7	3	10
3	1	9	10
4	9	1	10
5	5	5	10
6	9	1	10
7	1	9	10
optimal	6,3	3,7	10

HLB tween 80 = 15

HLB span 80 = 4,3

$$\text{HLB formula} = \left(\frac{\text{gram tween 80}}{\text{gram jumlah}} \times \text{HLB tween 80}\right) + \left(\frac{\text{gram span 80}}{\text{gram jumlah}} \times \text{HLB span 80}\right)$$

1. **Formula 1**

$$\text{HLB} = \left(\frac{3\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{7\ \text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 7{,}51$$

2. **Formula 2**

$$\text{HLB} = \left(\frac{7\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{3\ \text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 11{,}79$$

3. **Formula 3 dan Formula 7**

$$\text{HLB} = \left(\frac{1\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{9\ \text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 5{,}37$$

4. **Formula 4 dan Formula 6**

$$\text{HLB} = \left(\frac{9\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{1\ \text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 13{,}93$$

5. **Formula 5**

$$\text{HLB} = \left(\frac{5\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{5\ \text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 9{,}65$$

6. **Formula Optimal**

$$\text{HLB} = \left(\frac{6{,}3\ \text{gram}}{10\ \text{gram}} \times 15\right) + \left(\frac{3{,}7\text{gram}}{10\ \text{gram}} \times 4{,}3\right) = 11{,}04$$

Lampiran 6. Penentuan Kadar tween 80 dan span 80 Formula Optimal Berdasarkan *Design Expert*® 9.0.3

Criteria | Solutions | Graphs

Solutions 1 2 3 4

Constraints

Name	Goal	Lower Limit	Upper Limit	Lower Weight	Upper Weight	Importance
A:tween 80	is in range	1	9	1	1	4
B:span 80	is in range	1	9	1	1	4
viskositas	is target = 170	308	3201	1	1	4
daya sebar	is in range	7.52	11.37	1	1	4
daya lekat	is in range	0.62	3.17	1	1	4
pH	maximize	3.51	5	1	1	4

Solutions

Number	tween 80	span 80	viskositas	daya sebar	daya lekat	pH	Desirability	
1	6.316	3.684	1699.998	9.348	1.300	5.026	1.000	Selected
2	4.377	5.623	1700.003	9.678	1.510	4.943	0.981	
3	9.000	1.000	1271.000	9.465	0.905	4.443	0.658	
4	1.306	8.694	1699.998	9.421	2.001	3.945	0.541	

4 Solutions found

Number of Starting Points: 105

tween 80	span 80
7	3
1	9
3	7
9	1
5	5
2.26839	7.73161
7.43368	2.56632
8.13721	1.86279

Lampiran 7. Hasil Uji Normalitas dan *One Sample T-Test*

1. Viskositas

a. Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Viskositas (cP)
N		2
Normal Parameters[a]	Mean	1776.5000
	Std. Deviation	108.18734
Most Extreme Differences	Absolute	.260
	Positive	.260
	Negative	-.260
Kolmogorov-Smirnov Z		.368
Asymp. Sig. (2-tailed)		.999

a. Test distribution is Normal.

b. Uji *One Sampe T-Test*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Viskositas (cP)	2	1.7765E3	108.18734	76.50000

One-Sample Test

	Test Value = 1853					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Viskositas (cP)	-1.000	1	.500	-76.50000	-1048.5247	895.5247

2. Daya Sebar

a. Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Daya Sebar (cm)
N		2
Normal Parameters[a]	Mean	9.5800
	Std. Deviation	.32527
Most Extreme Differences	Absolute	.260
	Positive	.260
	Negative	-.260
Kolmogorov-Smirnov Z		.368
Asymp. Sig. (2-tailed)		.999

a. Test distribution is Normal.

b. Uji *One Sample T-Test*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Daya Sebar (cm)	2	9.5800	.32527	.23000

One-Sample Test

	Test Value = 9.81					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Daya Sebar (cm)	-1.000	1	.500	-.23000	-3.1524	2.6924

3. Daya Lekat

a. Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		Daya Lekat (detik)
N		2
Normal Parameters[a]	Mean	1.1850
	Std. Deviation	.16263
Most Extreme Differences	Absolute	.260
	Positive	.260
	Negative	-.260
Kolmogorov-Smirnov Z		.368
Asymp. Sig. (2-tailed)		.999

a. Test distribution is Normal.

b. Uji *One Sample T-Test*

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Daya Lekat (detik)	2	1.1850	.16263	.11500

One-Sample Test

	Test Value = 1.07					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Daya Lekat (detik)	1.000	1	.500	.11500	-1.3462	1.5762

4. pH

a. Uji Normalitas

One-Sample Kolmogorov-Smirnov Test

		pH
N		2
Normal Parameters[a]	Mean	4.9800
	Std. Deviation	.07071
Most Extreme Differences	Absolute	.260
	Positive	.260
	Negative	-.260
Kolmogorov-Smirnov Z		.368
Asymp. Sig. (2-tailed)		.999

a. Test distribution is Normal.

b. Uji *One Sampe T-Test*

One-Sample Statistics

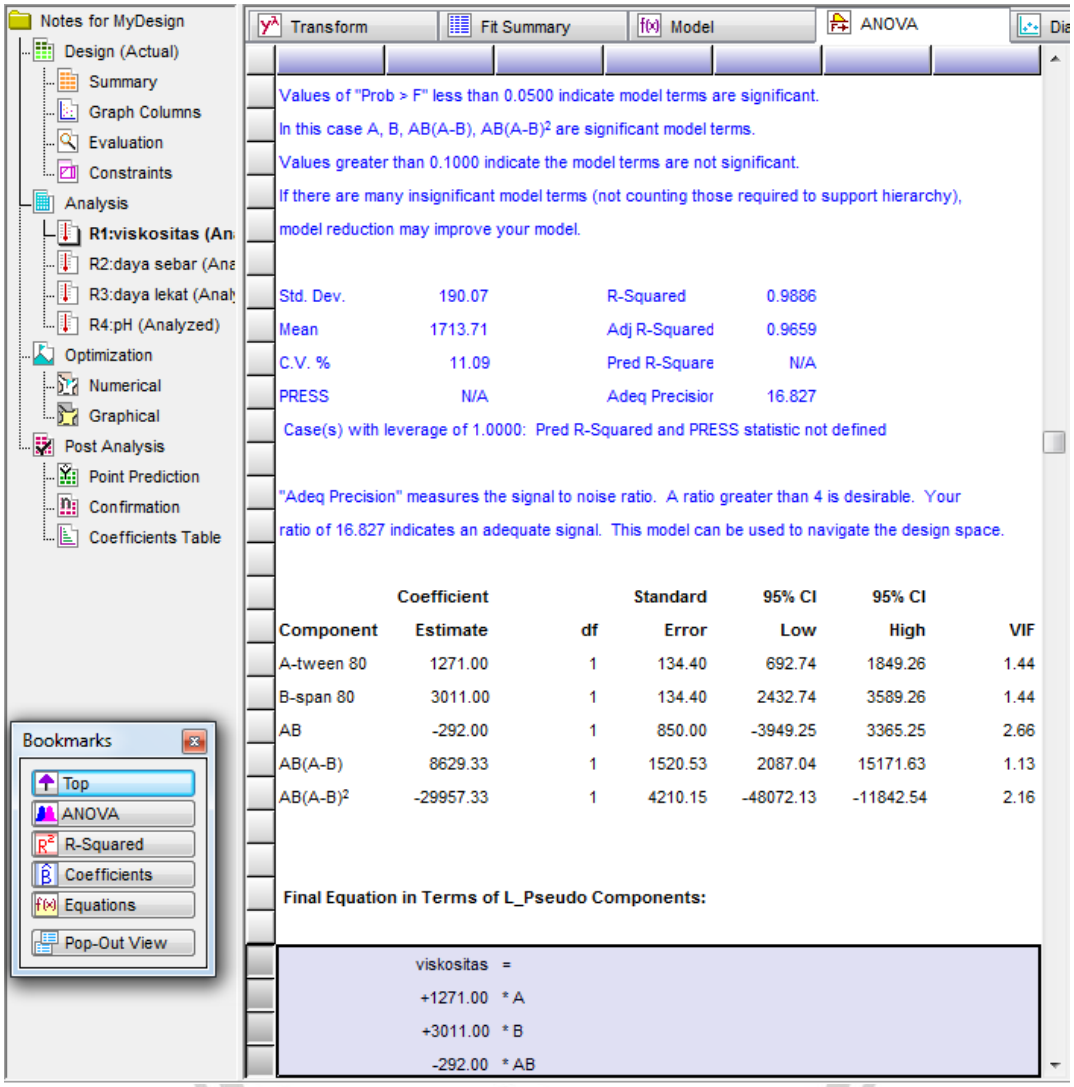
	N	Mean	Std. Deviation	Std. Error Mean
pH	2	4.9800	.07071	.05000

One-Sample Test

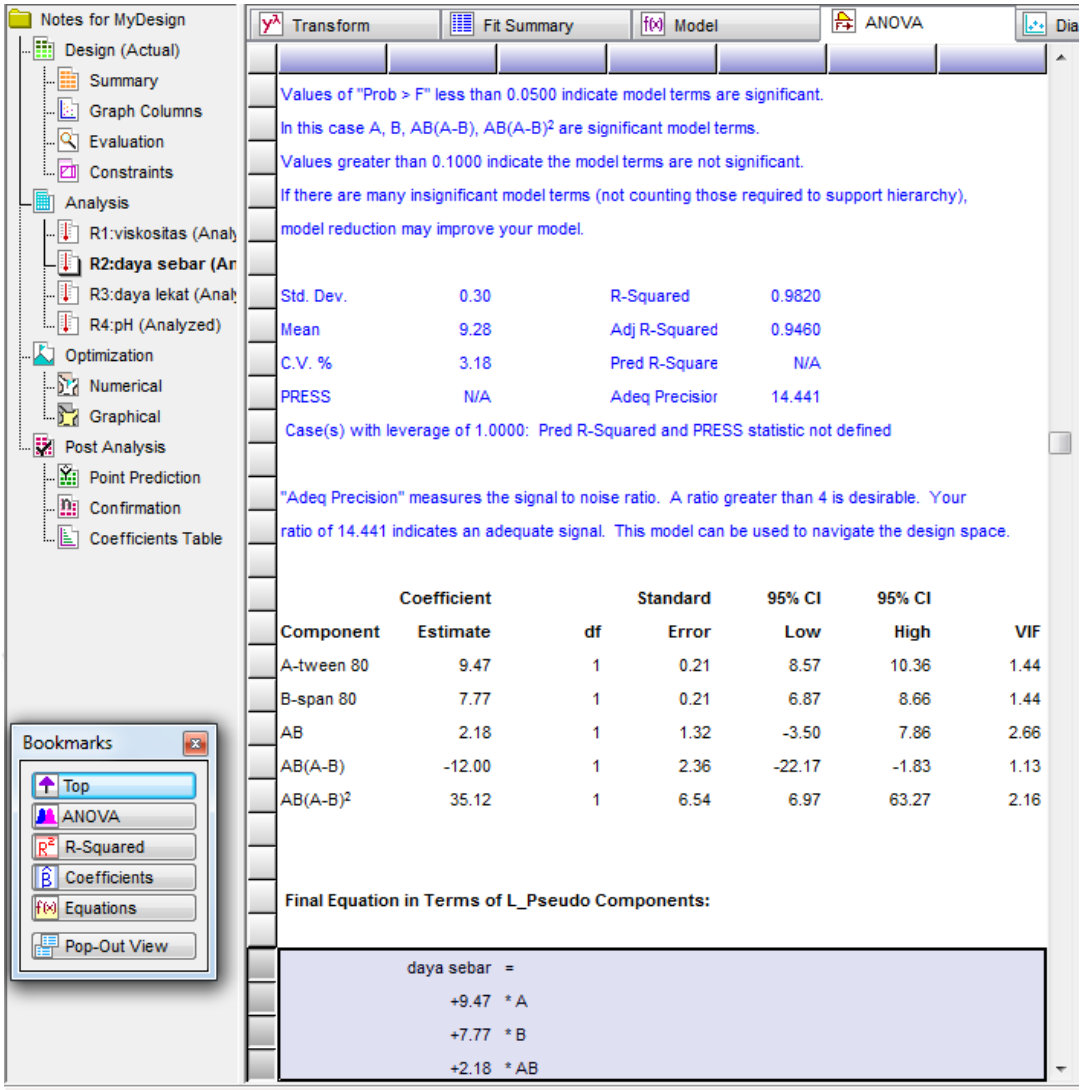
	Test Value = 4.93					
					95% Confidence Interval of the Difference	
	T	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
pH	1.000	1	.500	.05000	-.5853	.6853

Lampiran 8. Persamaan *Simplex Lattice Design* Berdasarkan *Design Expert*® 9.0.3

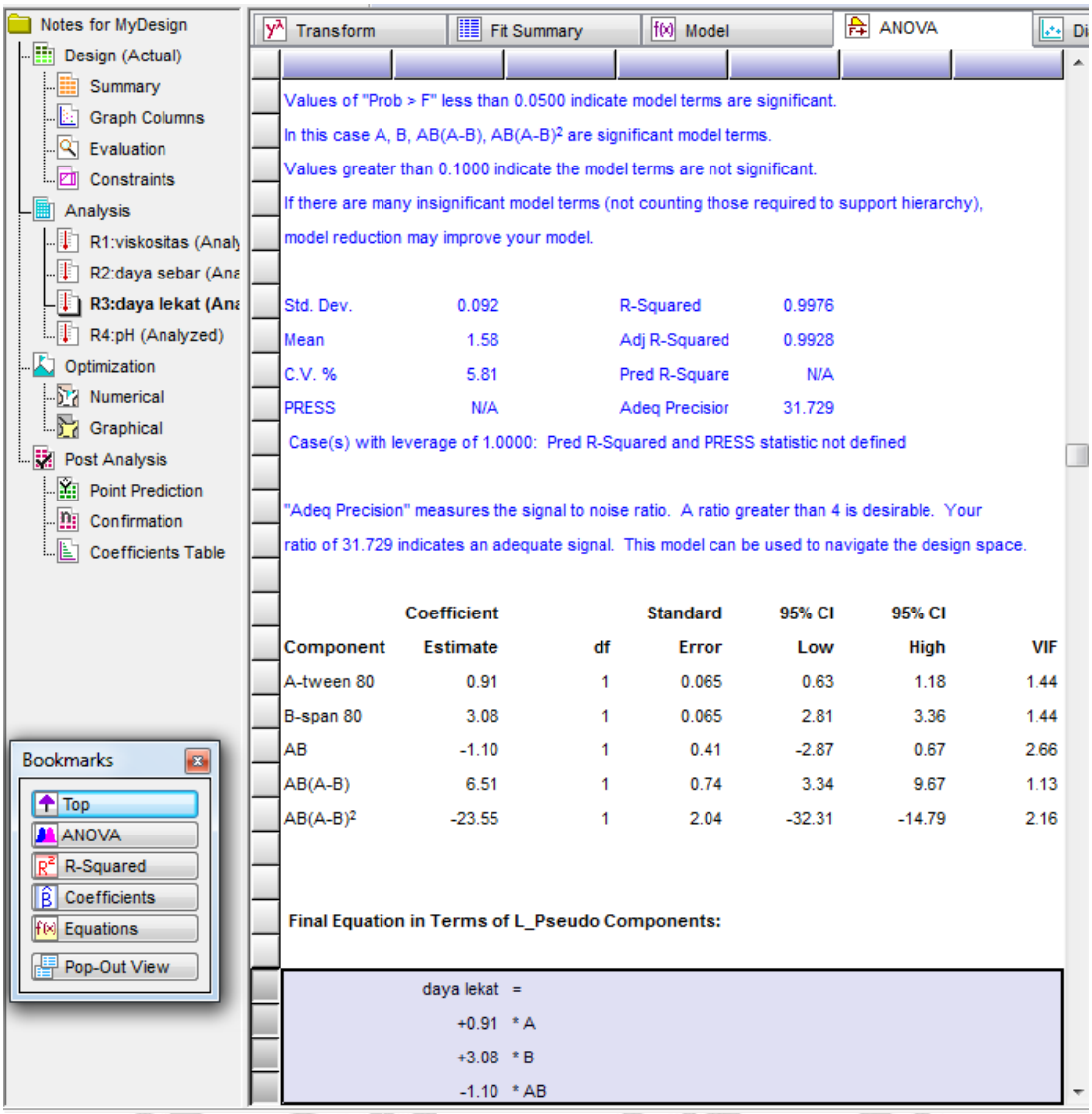
1. Viskositas



2. Daya Sebar


Notes for MyDesign
Design (Actual)
Summary
Graph Columns
Evaluation
Constraints
Analysis
R1:viskositas (Analy
R2:daya sebar (An
R3:daya lekat (Analy
R4:pH (Analyzed)
Optimization
Numerical
Graphical
Post Analysis
Point Prediction
Confirmation
Coefficients Table
Bookmarks
Top
ANOVA
R-Squared
Coefficients
Equations
Pop-Out View
Transform
Fit Summary
Model
ANOVA
Values of "Prob > F" less than 0.0500 indicate model terms are significant.
In this case A, B, AB(A-B), AB(A-B)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. 0.30 R-Squared 0.9820
Mean 9.28 Adj R-Squared 0.9460
C.V. % 3.18 Pred R-Square N/A
PRESS N/A Adeq Precisior 14.441
Case(s) with leverage of 1.0000: Pred R-Squared and PRESS statistic not defined
"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 14.441 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
A-tween 80 9.47 1 0.21 8.57 10.36 1.44
B-span 80 7.77 1 0.21 6.87 8.66 1.44
AB 2.18 1 1.32 -3.50 7.86 2.66
AB(A-B) -12.00 1 2.36 -22.17 -1.83 1.13
AB(A-B)² 35.12 1 6.54 6.97 63.27 2.16
Final Equation in Terms of L_Pseudo Components:
daya sebar =
+9.47 * A
+7.77 * B
+2.18 * AB

3. Daya Lekat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R3:daya lekat (Ana
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Coefficients Table
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Fit Summary
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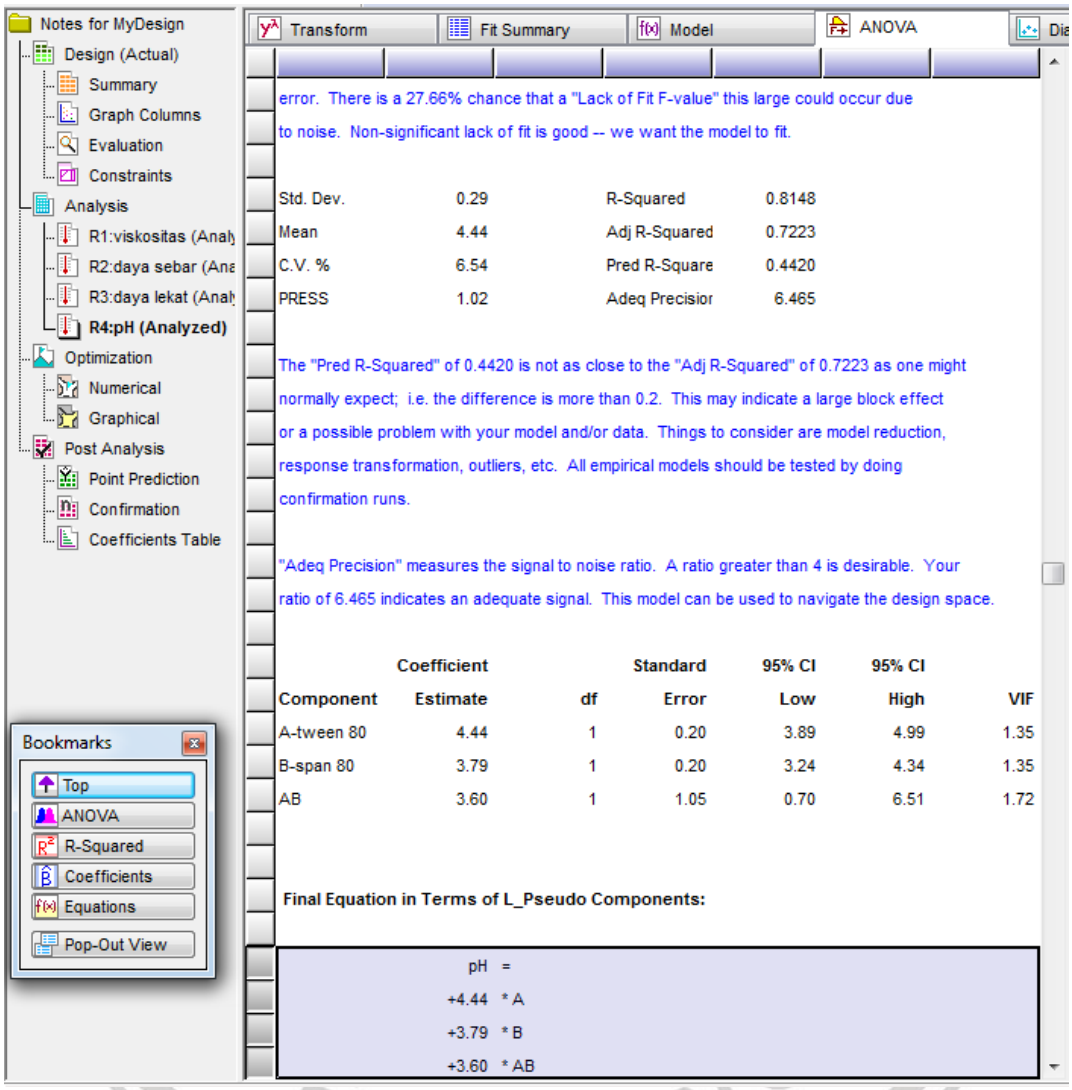
ANOVA
Values of "Prob > F" less than 0.0500 indicate model terms are significant.
In this case A, B, AB(A-B), AB(A-B)² are significant model terms.
Values greater than 0.1000 indicate the model terms are not significant.
If there are many insignificant model terms (not counting those required to support hierarchy),
model reduction may improve your model.
Std. Dev. 0.092 R-Squared 0.9976
Mean 1.58 Adj R-Squared 0.9928
C.V. % 5.81 Pred R-Square N/A
PRESS N/A Adeq Precisior 31.729
Case(s) with leverage of 1.0000: Pred R-Squared and PRESS statistic not defined
"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 31.729 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
A-tween 80 | 0.91 | 1 | 0.065 | 0.63 | 1.18 | 1.44
B-span 80 | 3.08 | 1 | 0.065 | 2.81 | 3.36 | 1.44
AB | -1.10 | 1 | 0.41 | -2.87 | 0.67 | 2.66
AB(A-B) | 6.51 | 1 | 0.74 | 3.34 | 9.67 | 1.13
AB(A-B)² | -23.55 | 1 | 2.04 | -32.31 | -14.79 | 2.16
Final Equation in Terms of L_Pseudo Components:
daya lekat =
+0.91 * A
+3.08 * B
-1.10 * AB

4. pH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R1:viskositas (Anal
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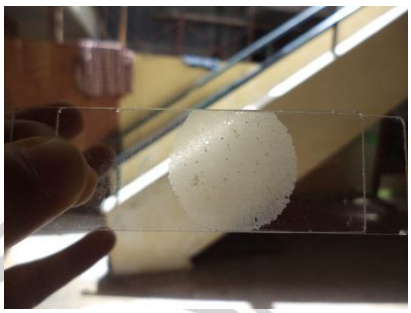
Point Prediction
Confirmation
Coefficients Table
Bookmarks
Top
ANOVA
R-Squared
Coefficients
Equations
Pop-Out View
Transform
Fit Summary
Model
ANOVA
error. There is a 27.66% chance that a "Lack of Fit F-value" this large could occur due to noise. Non-significant lack of fit is good -- we want the model to fit.
Std. Dev. 0.29 R-Squared 0.8148
Mean 4.44 Adj R-Squared 0.7223
C.V. % 6.54 Pred R-Square 0.4420
PRESS 1.02 Adeq Precisior 6.465
The "Pred R-Squared" of 0.4420 is not as close to the "Adj R-Squared" of 0.7223 as one might 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 6.465 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
A-tween 80 | 4.44 | 1 | 0.20 | 3.89 | 4.99 | 1.35
B-span 80 | 3.79 | 1 | 0.20 | 3.24 | 4.34 | 1.35
AB | 3.60 | 1 | 1.05 | 0.70 | 6.51 | 1.72
Final Equation in Terms of L_Pseudo Components:
pH =
+4.44 * A
+3.79 * B
+3.60 * AB

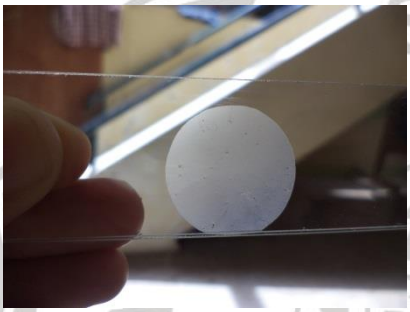
Lampiran 9. Data Sifat Fisik dan Kimia Formula Emulgel Ketoprofen

1. Homogenitas

F1

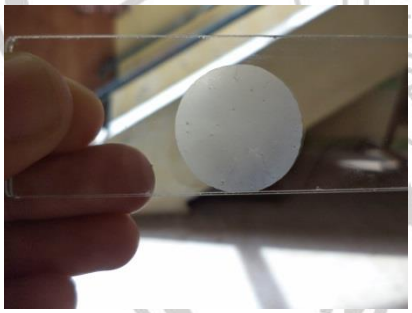


F2

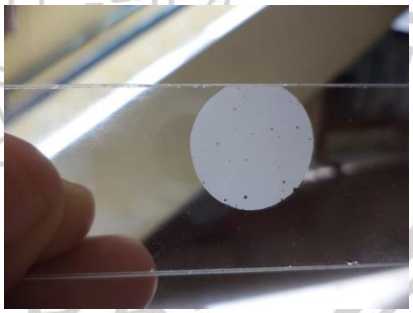


F3

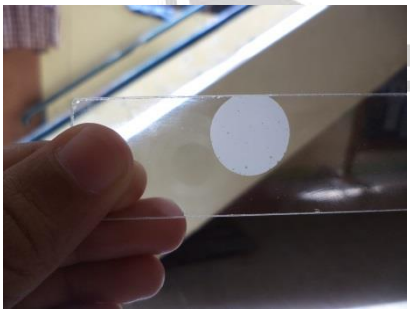
F4



F5



F6



F7

2. Daya Sebar

Beban (gram)		Diameter (cm)							
		0	**50**	**100**	**150**	**200**	**250**	**300**	**1000**
F1	Repetisi 1	7,90	9,24	10,03	10,38	10,63	10,76	10,85	10,94
	Repetisi 2	7,43	8,96	9,83	10,51	10,90	11,18	11,33	11,55
	Repetisi 3	7,53	8,90	9,65	10,38	10,95	11,38	11,53	11,63
	Total	22,86	27,10	29,51	31,27	32,48	33,32	33,71	34,12
								Rata-rata	11,37
								SD	0,38
F2	Repetisi 1	6,14	7,40	7,90	8,36	8,81	9,19	9,49	10,08
	Repetisi 2	6,25	7,05	7,74	8,25	8,48	8,90	9,26	9,75
	Repetisi 3	6,30	7,23	7,73	8,43	8,89	9,19	9,65	10,08
	Total	18,69	21,68	23,37	25,04	26,18	27,28	28,40	29,91
								Rata-rata	9,97
								SD	0,19
F3	Repetisi 1	6,68	7,20	7,50	7,90	8,15	8,36	8,73	8,90
	Repetisi 2	4,69	5,14	5,61	5,98	6,15	6,31	6,51	6,95
	Repetisi 3	4,50	4,95	5,35	5,48	5,73	5,84	6,13	6,72
	Total	15,87	17,29	18,46	19,36	20,03	20,51	21,37	22,57
								Rata-rata	7,52
								SD	1,20
F4	Repetisi 1	5,55	6,43	7,03	7,51	7,96	8,54	8,89	9,50
	Repetisi 2	5,41	6,11	6,74	7,13	7,64	8,06	8,45	9,16
	Repetisi 3	5,48	6,34	7,04	7,51	7,81	8,24	8,60	9,24
	Total	16,44	18,88	20,81	22,15	23,41	24,84	25,94	27,90
								Rata-rata	9,30
								SD	0,18
F5	Repetisi 1	5,90	6,78	7,40	7,90	8,18	8,46	8,85	9,28
	Repetisi 2	6,00	6,65	7,23	7,69	8,03	8,38	8,68	9,10
	Repetisi 3	6,00	6,80	7,28	7,73	8,00	8,34	8,63	9,09
	Total	17,90	20,23	21,91	23,32	24,21	25,18	26,16	27,47
								Rata-rata	9,16
								SD	0,11
F6	Repetisi 1	6,88	7,75	8,40	8,90	9,21	9,50	9,75	10,20
	Repetisi 2	6,14	7,10	7,95	8,36	8,83	9,25	9,49	9,95
	Repetisi 3	5,85	6,51	7,04	7,45	7,73	8,05	8,58	8,75
	Total	18,87	21,36	23,39	24,71	25,77	26,80	27,82	28,90
								Rata-rata	9,63
								SD	0,78
F7	Repetisi 1	4,30	5,00	5,50	6,33	6,55	6,88	7,20	8,00
	Repetisi 2	4,93	5,48	5,86	6,48	6,74	6,93	7,50	8,03
	Repetisi 3	4,90	5,23	5,66	6,03	6,48	6,78	7,01	7,99
	Total	14,13	15,71	17,02	18,84	19,77	20,59	21,71	24,02
								Rata-rata	8,01
								SD	0,02

3. Viskositas

Formula	Viskositas (cP)						
	F1	F2	F3	F4	F5	F6	F7
Repetisi 1	300	1056	3211	1272	2058	1254	2807
Repetisi 2	306	1050	3191	1276	2076	1266	2827
Repetisi 3	318	1062	3201	1280	2070	1278	2830
Total	924	3168	9603	3828	6204	3798	8463
Rata-rata	308	1056	3201	1276	2068	1266	2821
SD	9,17	6,00	10,00	4,00	9,17	12,00	12,50

4. Daya Lekat

Formula	Daya Lekat (detik)						
	F1	F2	F3	F4	F5	F6	F7
Repetisi 1	0,59	0,59	1,53	1,15	1,83	1,10	1,83
Repetisi 2	0,63	1,13	4,98	0,91	1,81	0,77	4,35
Repetisi 3	0,65	0,54	2,99	0,76	1,51	0,74	2,81
Total	1,87	2,26	9,50	2,82	5,15	2,61	8,99
Rata-rata	0,62	0,75	3,17	0,94	1,72	0,87	3,00
SD	0,03	0,33	1,73	0,20	0,18	0,20	1,27

5. pH

Formula	pH						
	F1	F2	F3	F4	F5	F6	F7
Repetisi 1	5,00	4,99	3,65	4,51	4,71	4,41	3,93
Repetisi 2	4,90	5,00	3,45	4,53	4,75	4,31	3,98
Repetisi 3	5,10	4,98	3,44	4,49	4,67	4,51	3,88
Total	15	14,97	10,54	13,53	14,13	13,23	11,79
Rata-rata	5,00	4,99	3,51	4,51	4,71	4,41	3,93
SD	0,10	0,01	0,12	0,02	0,04	0,10	0,05

Lampiran 10. Data Sifat Fisik dan Kimia Formula Optimal Emulgel Ketoprofen

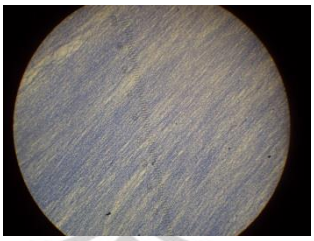
Beban (gram)	Daya Sebar (cm)							
	0	**50**	**100**	**150**	**200**	**250**	**300**	**1000**
Replikasi I	6,60	7,45	8,05	8,43	8,86	9,05	9,30	9,83
Replikasi II	6,01	7,03	7,75	8,19	8,61	8,93	9,25	9,80
Replikasi III	6,25	7,10	7,65	8,18	8,55	8,98	9,43	9,81
							Total	29,44
							Rata-Rata	9,81
							SD	0,02

Formula	Viskositas (cP)	Daya Lekat (detik)	pH
Replikasi I	1865	0,95	4,96
Replikasi II	1845	1,05	4,95
Replikasi III	1850	1,20	4,89
Total	5560	3,20	14,80
Rata-rata	1853	1,07	4,93
SD	10,41	0,13	0,04

Lampira 11. Penentuan Tipe Emulsi Formula Optimal Emulgel Ketoprofen

a. Metode Pewarnaan dengan Metilen Biru

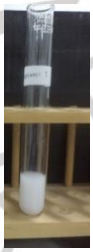
Replikasi I (M/A)



Replikasi II (M/A)

Replikasi III (M/A)

b. Metode Pengenceran dengan Air



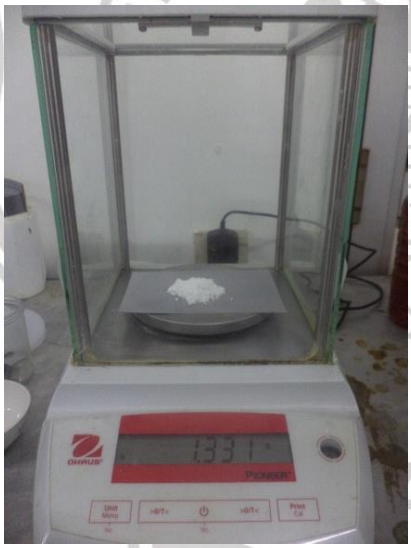
Replikasi I (M/A)

Replikasi II (M/A)

Replikasi III (M/A)

Lampiran 12. Bahan dan Alat yang Digunakan dalam Penelitian

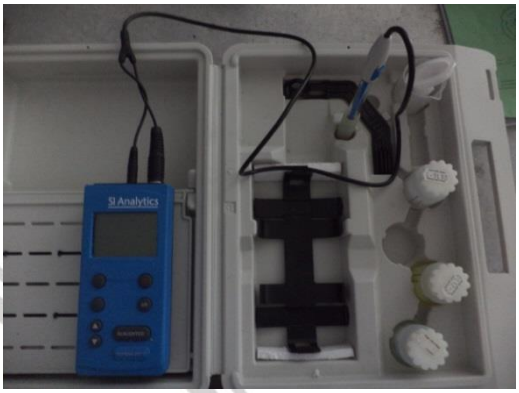
Bahan yang Digunakan



Timbangan Digital Analitik (Ohaus)

Viskosimeter Brookfield (Brookfield DV-E Viscometer)

Alat Uji Daya Lekat

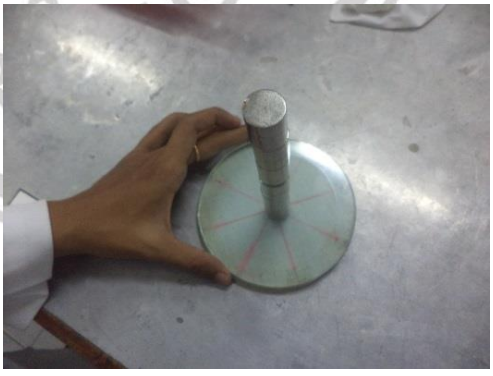


pH meter
(Schott Instrument)

Mikroskop

Mixer (Vitara)

Alat Uji Homogenitas



Alat Uji Daya Sebar

Lampiran 13. Sediaan Emulgel Ketoprofen

Formula Optimal Emulgel Ketoprofen