LAMPIRAN A

PERCOBAAN VALIDASI METODE ANALISA PROPRANOLOL HCL

1. Penentuan Kurva Baku

Berikut ini adalah data dari kurva baku selama tiga hari berturut – turut

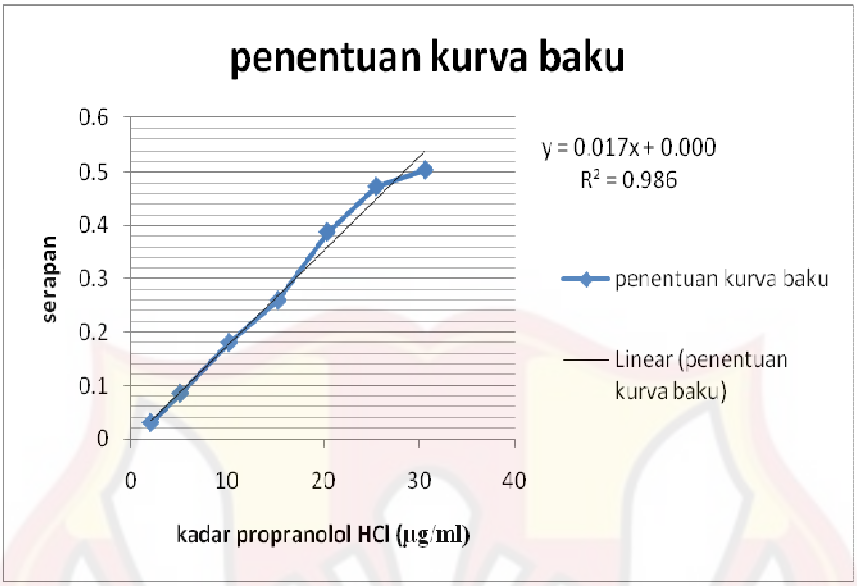
C_1 (µg/ml)	A_1	C_2 (µg/ml)	A_2	C_3 (µg/ml)	A_3
5,1	0,085	5	0,002	5	0,09
10,2	0,18	10	0,088	10	0,173
15,3	0,259	15	0,185	15	0,253
20,4	0.387	20	0,272	20	0,362
25,5	0,472	25	0,375	25	0,466
30,6	0,503	30	0,528	30	0,643
		35	0,622	35	0,698
		40	0,697	40	0,815
		45	0,794	45	0,877
		50	0,883	50	0,925

		55	0,999	55	1,024
a =	0,000214	a =	-0,1098	a =	- 0,00789
b =	0,0175	b =	0,02016	b =	0,0194
r =	0,9934	r =	0,9986	r =	0,9943

Dari data tersebut, diketahui bahwa data – data tersebut setelah diuji anava tidak berbeda bermakna sehingga dipilih salah satu dari data tersebut yaitu data yang pertama sebagai kurva baku terpilih.

Tabel Kurva Baku

Konsentrasi (µg/ml)	Serapan
2,04	0,03
5,1	0,085
10,2	0,18
15,3	0,259
20,4	0.387
25,5	0,472
30,6	0,503


penentuan kurva baku
0.6
0.5
0.4
0.3
0.2
0.1
0
serapan
0
10
20
30
40
kadar propranolol HCl (µg/ml)
y = 0.017x + 0.000
R² = 0.986
penentuan kurva baku
Linear (penentuan kurva baku)

1. Perhitungan LOD dan LOQ

LOD diperoleh dari rumus Q = 3 $S_{y/x}$ / b, sedangkan LOQ diperoleh dari rumus Q = 10 $S_{y/x}$ / b.

C	A	Y_i	$Y_i - Y_t$	$(Y_i - Y_t)^2$
2,04	0,03	0,03599	0,00599	3,588E-05
5,1	0,085	0,08968	0,00468	2,19E-05
10,2	0,18	0,1791	-0,0009	8,1E-07
15,3	0,259	0,2686	0,0096	9,216E-05
20,4	0.387	0,3581	-0,0289	8,3521 E-04
25,5	0,472	0,4475	-0,0245	6,0025 E-04
30,6	0,503	0,5369	0,0339	1,1492 E-03
			Jumlah	2,73535 E-03

Sy/x = $\sqrt{\frac{(Yi - Yt)2}{n - 2}}$

= 0,023389527

Nilai b diperoleh dari kurva baku = 0,0175

LOD = 3 $S_{y/x}$ / b

= 4,0096 µg/ml

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

= 13,3654 µg/ml

2. Uji Akurasi

Penimbangan	C teoritis (µg/ml)	Serapan	C pengamatan (µg/ml)	% recovery
50 mg/ml	30	0,518	29,52	98,4
50 mg/ml	30	0,527	30,03	100,1
50 mg/ml	30	0,523	29,80	99,3
50 mg/ml	30	0,528	30,09	100,3
49 mg/ml	30	0,517	29,46	98,2
51 mg/ml	30	0,531	30,26	100,9

Rata – rata % recovery = (98,4 + 100,1 + 99,3 + 100,3 + 98,2 + 100,9) / 6

= 99,53 ± 1,37

3. Uji Presisi

C teoritis (µg/ml)	Serapan	C pengamatan (µg/ml)	% recovery
30	0,670	38,1825	127,275
30	0,644	36,7	122,333
30	0,671	38,2395	127,465
30	0,664	37,8404	126,1347
30	0,641	36,5292	124,2493
30	0,687	39,1516	127,946

Rata – rata % recovery = (127,275 + 122,333 + 127,465 + 126,1347 + 124,2493 + 127,946) / 6

= 125,9005

SD = 2,1922

KV = $\frac{SD}{rata-rata\ \%\ recovery}$ x 100%

= 1,74%

LAMPIRAN B

DATA – DATA DAN PERHITUNGAN *MOISTURE CONTENT*

Formula (-1)

W1 (gram)	**W2 (gram)**	**(W1 – W2)**	***% moisture content***
0,3494	0,3387	0,0107	3,06 %
0,3578	0,3462	0,0116	3,24 %
0,3542	0,3388	0,0154	4,46 %
		Rata – rata	3,58 ± 0,88 %

Formula (a)

W1 (gram)	**W2 (gram)**	**(W1 – W2)**	***% moisture content***
0,5202	0,5096	0,0106	2,04 %
0,5173	0,5064	0,0109	2,11 %
0,5187	0,5059	0,0128	2,47 %
		Rata – rata	2,21 ± 0,26 %

Formula (b)

W1 (gram)	**W2 (gram)**	**(W1 – W2)**	***% moisture content***
0,8177	0,7862	0,0315	3,85 %
0,8190	0,7845	0,0345	4,21 %
0,8219	0,7913	0,0306	3,72 %
		Rata – rata	3,93 ± 0,28 %

Formula (ab)

W1 (gram)	**W2 (gram)**	**(W1 – W2)**	***% moisture content***
0,9673	0,9417	0,0256	2,65 %
0,9513	0,9294	0,0219	2,30 %
0,9534	0,9267	0,0267	2,80 %
		Rata – rata	2,58 ± 0,28 %

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Column 1	3	10.76	3.586667	0.580133
Column 2	3	10.89	3.63	0.0889
Column 3	3	11.78	3.926667	0.064433
Column 4	3	14.03	4.676667	0.040533

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2.2887	3	0.7629	3.942636	0.053608	4.066181
Within Groups	1.548	8	0.1935			
Total	3.8367	11				

LAMPIRAN C

JUMLAH PROPRANOLOL HCL YANG MELINTASI MEMBRAN SEBAGAI FUNGSI AKAR WAKTU

Waktu (menit)	Jumlah proranolol HCl yang melintasi membran (µg/ml)			
	(-1)	(a)	(b)	(ab)
15	31,6259	23,8163	3,03539	8,61634
30	43,5116	25,0163	8,94015	9,20682
45	54,1592	26,6925	36,454	10,0259
60	63,89253	33,0354	60,7306	10,5021
90	67,14968	36,6163	71,7973	11,0735
120	71,93063	42,883	80,5973	13,5687
150	82,71158	44,1973	105,207	20,6735
180	86,02587	53,8354	111,931	32,7116
210	96,38777	56,7116	122,654	34,6354
240	104,8259	73,3402	117,073	44,6354
270	98,57825	89,4544	111,435	45,664
300	94,88301	94,4449	105,226	44,0449
360	66,5592	53,9497	71,7402	29,4354

Data merupakan rata – rata tiga kali replikasi

LAMPIRAN D

JUMLAH PROPRANOLOL HCL YANG MELINTASI MEMBRAN SEBAGAI FUNGSI WAKTU

Waktu (menit)	Jumlah proranolol HCl yang melintasi membran (µg/ml)			
	(-1)	(a)	(b)	(ab)
15	-0,01223	4.1592	3.092533	3.054438
30	3.968724	5.016343	5.606819	7.187771
45	5.149676	5.397295	7.892533	7.587771
60	6.86396	7.930629	11.68301	8.311581
90	7.62587	8.787771	12.5973	10.33063
120	8.57825	8.738248	13.60682	10.82587
150	11.0163	10.40682	16.5973	14.31158
180	12.3878	11.66396	17.30206	21.3973
210	13.3973	12.04491	18.9592	26.78777
240	16.3878	13.11158	20.73063	33.7973
270	19.6449	15.77825	24.21634	35.94968
300	26.3687	17.28301	31.28301	40.31158
330	30.2544	22.1973	31.85444	47.68301
360	33.5878	22.73063	37.56872	45.3592

Data merupakan rata – rata tiga kali replikasi

LAMPIRAN E

PERHITUNGAN ANAVA UNTUK MODEL PELEPASAN

Response 1 PELEPASAN
ANOVA for selected factorial model
Analysis of variance table [Partial sum of squares - Type III]

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob> F
Model	34.66	3	11.55	5172.82	< 0.0001
A-HPMC	*18.65*	*1*	*18.65*	*8350.81*	*< 0.0001*
B-PROPILEN GLIKOL	*1.18*	*1*	*1.18*	*527.52*	*< 0.0001*
AB	*14.83*	*1*	*14.83*	*6640.13*	*< 0.0001*
Pure Error	0.018			8	2.233E-003
Cor Total		34.68			11

The Model F-value of 5172.82 implies the model is significant. There is only a 0.01% chance that a "Model F-Value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.
In this case A, B, AB 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.	0.047	R-Squared	0.9995
Mean	5.23		
Adj R-Squared			0.9993
C.V. %	0.90	Pred R-Squared	0.9988
PRESS	0.040	Adeq Precision	172.870

The "Pred R-Squared" of 0.9988 is in reasonable agreement with the "Adj R-Squared" of 0.9993.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your ratio of 172.870 indicates an adequate signal. This model can be used to navigate the design space.

Final Equation in Terms of Coded Factors:

PELEPASAN =
+5.23
-1.25 * A
+0.31 * B
-1.11 * A * B

LAMPIRAN F

PERHITUNGAN ANAVA UNTUK MODEL PENETRASI

Response 2 PENETRASI

ANOVA for selected factorial model

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

Source	Sum of Squares	df	Mean Square	F Value	p-value Prob > F
Model	0.010	3	3.449E-003	537.43	< 0.0001
A-HPMC	*9.075E-005*	*1*	*9.075E-005*	*14.14*	*0.0055*
B-PROPILEN GLIKOL	*5.334E-00*	*1*	*5.334E-003*	*831.29*	*< 0.0001*
AB	*4.921E-003*	*1*	*4.921E-003*	*766.87*	*< 0.0001*
Pure Error	5.133E-005	8	6.417E-006		
Cor Total	0.010		11		

The Model F-value of 537.43 implies the model is significant. There is only
a 0.01% chance that a "Model F-Value" this large could occur due to noise.

Values of "Prob > F" less than 0.0500 indicate model terms are significant.
In this case A, B, AB 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.	2.533E-003	R-Squared	0.9951
Mean	0.088	Adj R-Squared	0.9932
C.V. %	2.88	Pred R-Squared	0.9889
PRESS	155E-004	Adeq Precision	56.524

The "Pred R-Squared" of 0.9889 is in reasonable agreement with the "Adj R-Squared" of 0.9932.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your ratio of 56.524 indicates an adequate signal. This model can be used to navigate the design space.

Final Equation in Terms of Coded Factors:

PENETRASI=
+0.088
+2.750E-003 * A
+0.021 * B
+0.020 * A * B

LAMPIRAN G

KONDISI UJI OPTIMAL

Name	Goal	Lower Limit	Upper Limit	Lower Weight	Upper Weight
A:HPMC	is in range	-1	1	1	1
B:PROPILEN GLIKOL	is in range	-1	1	1	1
PELEPASAN	maximize	3.18	7.95	1	1
PENETRASI	maximize	0.048	0.133	1	1

Solutions

No.	HPMC	PROPILEN GLIKOL	PELEPASAN	PENETRASI	Desirability
1	-0.82	1.00	7.48561	0.0900414	0.668
2	-0.80	1.00	7.4365	0.0905203	0.668
3	-0.86	1.00	7.58092	0.0891118	0.668
4	-0.76	1.00	7.32273	0.0916299	0.668
5	-0.90	1.00	7.66607	0.0882814	0.668