BAB 5
SIMPULAN DAN ALUR PENELITIAN SELANJUTNYA

5.1 Simpulan

Pengaruh matriks etil selulose dalam sediaan *patch* transdermal terhadap karakteristik pelepasan dan penetrasi ternyata dapat meningkatkan pelepasan dan penetrasi natrium diklofenak, sebaliknya pengaruh polimer PVP K 30 dalam sediaan *patch* transdermal natrium diklofenak terhadap karakteristik pelepasan dan penetrasi natrium diklofenak mempunyai sifat dapat menurunkan pelepasan natrium diklofenak, ini dikarenakan polimer PVP K 30 dan natrium diklofenak memiliki sifat kelarutan yang sama.

Dari hasil analisis berdasarkan *design expert*, dengan perbandingan etil selulose sebanyak 350 mg dan PVP K 30 sebanyak 100 mg memberikan hasil yang optimal ditinjau dari pelepasan, penetrasi bahan obat dan ketahanan lipat *patch* natrium diklofenak.

5.2 Alur Penelitian Selanjutnya

Dari hasil kesimpulan penelitian kali ini, maka saran untuk penelitian selanjutnya adalah sediaan *patch* natrium diklofenak dengan sistem matrik yang menggunakan 2 macam polimer sebagai pengontrol pelepasan natrium diklofenak dapat dimodifikasi menjadi sistem reservoir, dengan begitu kecepatan pelepasan dari bahan aktif natrium diklofenak dapat lebih dikendalikan dan sediaan *patch* transdermal yang telah dibuat di uji secara in vivo pada kulit hewan.

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LAMPIRAN A

PERHITUNGAN *MOISTURE CONTENT (MC)*

Formula -1			
W (g)	Wp (g)	Wa (g)	MC (%)
0,0538	0,0504	0, 0034	6,32
0,0507	0,0463	0,0044	8,61
0,0588	0,0542	0,0046	7,88
		Rata - rata	7,60 ± 1,17

Formula a			
W (g)	Wp (g)	Wa (g)	MC (%)
0,0561	0,0523	0,0038	6,77
0,0738	0,0677	0,0061	8,27
0,0699	0,0652	0,0047	6,72
		Rata - rata	7,25 ± 0,88

Formula b			
W (g)	Wp (g)	Wa (g)	MC (%)
0,0459	0,0424	0,0035	7,55
0,0427	0,0389	0,0038	8,98
0,0396	0,0372	0,0024	5,98
		Rata - rata	7,50 ± 1,50

Formula ab			
W (g)	Wp (g)	Wa (g)	MC (%)
0,0466	0,0432	0,0034	7,22
0,0471	0,0433	0,0038	8,14
0,0707	0,0657	0,0050	7,07
		Rata - rata	7,48 ± 0,58

Keterangan :

W = berat mula mula

Wp = berat kering (setelah dimasukkan desikator selama 24 jam)

Wa = selisih antara W dan Wp

MC = $\frac{Wa}{Wp}$ x 100

LAMPIRAN B

HASIL UJI ANAVA *MOISTURE CONTENT*

Descriptives

Moisture_content

	N	Mean	Std. Dev	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
formula -1	3	7.6033	1.16980	.67538	4.6974	10.5093	6.32	8.61
Formula a	3	7.2533	.88081	.50854	5.0653	9.4414	6.72	8.27
formula b	3	7.5033	1.50054	.86634	3.7758	11.2309	5.98	8.98
formula ab	3	7.4767	.57934	.33448	6.0375	8.9158	7.07	8.14
Total	12	7.4592	.93708	.27051	6.8638	8.0546	5.98	8.98

ANOVA

Moisture_content

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.196	3	.065	.055	.982
Within Groups	9.463	8	1.183		
Total	9.659	11			

Multiple Comparisons

Dependent Variable:Moisture_content

	(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	formula -1	Formula a	.35000	.88803	.978	-2.4938	3.1938
		formula b	.10000	.88803	.999	-2.7438	2.9438
		formula ab	.12667	.88803	.999	-2.7171	2.9704
	Formula a	formula -1	-.35000	.88803	.978	-3.1938	2.4938
		formula b	-.25000	.88803	.992	-3.0938	2.5938
		formula ab	-.22333	.88803	.994	-3.0671	2.6204
	formula b	formula -1	-.10000	.88803	.999	-2.9438	2.7438
		Formula a	.25000	.88803	.992	-2.5938	3.0938
		formula ab	.02667	.88803	1.000	-2.8171	2.8704
	formula ab	formula -1	-.12667	.88803	.999	-2.9704	2.7171
		Formula a	.22333	.88803	.994	-2.6204	3.0671
		formula b	-.02667	.88803	1.000	-2.8704	2.8171
LSD	formula -1	Formula a	.35000	.88803	.704	-1.6978	2.3978
		formula b	.10000	.88803	.913	-1.9478	2.1478

		formula ab	.12667	.88803	.890	-1.9211	2.1745
	Formula a	formula -1	-.35000	.88803	.704	-2.3978	1.6978
		formula b	-.25000	.88803	.785	-2.2978	1.7978
		formula ab	-.22333	.88803	.808	-2.2711	1.8245
	formula b	formula -1	-.10000	.88803	.913	-2.1478	1.9478
		Formula a	.25000	.88803	.785	-1.7978	2.2978
		formula ab	.02667	.88803	.977	-2.0211	2.0745
	formula ab	formula -1	-.12667	.88803	.890	-2.1745	1.9211
		Formula a	.22333	.88803	.808	-1.8245	2.2711
		formula b	-.02667	.88803	.977	-2.0745	2.0211

Moisture_content

			Subset for alpha = 0.05
	Formula	N	1
Tukey HSD[a]	Formula a	3	7.2533
	formula ab	3	7.4767
	formula b	3	7.5033
	formula -1	3	7.6033
	Sig.		.978

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 3,000.

LAMPIRAN C

DATA KURVA BAKU AQUA DEST DENGAN TIGA KALI REPLIKASI

Pengujian hari 1

Konsentrasi (µg/ml)	Absorbansi
2,008	0,052
8,032	0,203
14,056	0,344
20,080	0,498
26,104	0,649
a	0,0017
b	0,0247
r hitung	0,9998

Pengujian hari 2

Konsentrasi (µg/ml)	Absorbansi
2,024	0,063
8,096	0,269
14,168	0,457
20,240	0,555
26,312	0,703
a	0,0440
b	0,0258
r hitung	0,9834

Pengujian hari 3

Konsentrasi (µg/ml)	Absorbansi
2,012	0,070
8,048	0,222
14,084	0,390
20,120	0,534
26,156	0,670
a	0,0233
b	0,0251
r hitung	0,9988

LAMPIRAN D

HASIL UJI ANAVA DATA KURVA BAKU AQUA DEST

Descriptives

VAR00001

	N	Mean	Std. Dev	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Replikasi_1	5	.34920	.235452	.105297	.05685	.64155	.052	.649
Replikasi_2	5	.40940	.249685	.111663	.09937	.71943	.063	.703
Replikasi_3	5	.37720	.239239	.106991	.08015	.67425	.070	.670
Total	15	.37860	.225062	.058111	.25397	.50323	.052	.703

ANOVA

VAR00001

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.009	2	.005	.078	.926
Within Groups	.700	12	.058		
Total	.709	14			

Multiple Comparisons

Dependent Variable:VAR00001

	(I) Replikas	(J) Replikas	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Replikasi_1	Replikasi_2	-.060200	.152759	.919	-.46774	.34734
		Replikasi_3	-.028000	.152759	.982	-.43554	.37954
	Replikasi_2	Replikasi_1	.060200	.152759	.919	-.34734	.46774
		Replikasi_3	.032200	.152759	.976	-.37534	.43974
	Replikasi_3	Replikasi_1	.028000	.152759	.982	-.37954	.43554
		Replikasi_2	-.032200	.152759	.976	-.43974	.37534
LSD	Replikasi_1	Replikasi_2	-.060200	.152759	.700	-.39303	.27263
		Replikasi_3	-.028000	.152759	.858	-.36083	.30483
	Replikasi_2	Replikasi_1	.060200	.152759	.700	-.27263	.39303
		Replikasi_3	.032200	.152759	.837	-.30063	.36503
	Replikasi_3	Replikasi_1	.028000	.152759	.858	-.30483	.36083
		Replikasi_2	-.032200	.152759	.837	-.36503	.30063

VAR00001

	Replikas	N	Subset for alpha = 0.05
			1
Tukey HSD[a]	Replikasi_1	5	.34920
	Replikasi_3	5	.37720
	Replikasi_2	5	.40940
	Sig.		.919

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5,000.

LAMPIRAN E

DATA KURVA BAKU DAPAR PHOSPHAT ISOTONIS PH 7,4 DENGAN TIGA KALI REPLIKASI

Pengujian hari 1

Konsentrasi (µg/ml)	Absorbansi
2,092	0,095
8,368	0,224
14,644	0,392
20,920	0,581
27,196	0,851
a	- 0,0075
b	0,0298
r hitung	0,9808

Pengujian hari 2

Konsentrasi (µg/ml)	Absorbansi
2,084	0,068
8,336	0,216
14,588	0,398
20,840	0,547
27,092	0,705
a	0,0123
b	0,0257
r hitung	0,9990

Pengujian hari 3

Konsentrasi (μg/ml)	Absorbansi
2,108	0,067
8,432	0,210
14,756	0,362
21,080	0,516
27,404	0,725
a	-0,0025
b	0,0256
r hitung	0,9941

LAMPIRAN F

DATA ANAVA KURVA BAKU DAPAR PHOSPHAT ISOTONIS PH 7,4

Descriptives

VAR00001

	N	Mean	Std. Dev	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
dapar1	5	.42860	.298386	.133442	.05810	.79910	.095	.851
dapar2	5	.38680	.253893	.113544	.07155	.70205	.068	.705
dapar3	5	.37600	.257213	.115029	.05663	.69537	.067	.725
Total	15	.39713	.251614	.064967	.25779	.53647	.067	.851

ANOVA

VAR00001

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.008	2	.004	.053	.949
Within Groups	.879	12	.073		
Total	.886	14			

Multiple Comparisons

Dependent Variable:VAR00001

	(I) dapar	(J) dapar	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	dapar1	dapar2	.041800	.171135	.811	-.33107	.41467
		dapar3	.052600	.171135	.764	-.32027	.42547
	dapar2	dapar1	-.041800	.171135	.811	-.41467	.33107
		dapar3	.010800	.171135	.951	-.36207	.38367
	dapar3	dapar1	-.052600	.171135	.764	-.42547	.32027
		dapar2	-.010800	.171135	.951	-.38367	.36207

VAR00001

	baku_dapar	N	Subset for alpha = 0.05
			1
Tukey B[a]	baku_dapar3	5	.37600
	baku_dapar2	5	.38680
	baku_dapar1	5	.42860

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 5,000.

LAMPIRAN G

HASIL AKURASI PRESISI UJI PENETAPAN KADAR PATCH NATRIUM DIKLOFENAK

Hasil uji akurasi dan presisi uji penetapan kadar patch natrium diklofenak dalam aqua dest.

	C (µg/ml)	Abs	C (ppm)	C teoritis (ppm)	% perolehan kembali
1	14	0,398	13,726	13,916	98,63
2	14	0,403	13,920	14,000	99,43
3	14	0,399	13,765	13,944	98,71
4	14	0,408	14,114	14,140	99,81
5	14	0,409	14,168	14,168	99,89
6	14	0,406	14,084	14,084	99,66
				X (%) ± SD	99,36 ± 0,55
				KV	0,0055

Contoh perhitungan :

Dari hasil serapan dimasukkan ke dalam persamaan kurva baku yang terpilih yaitu :

Y= 0,0257x + 0,044

Dimana : y = serapan x = konsentrasi yang teramati

kemudian hitung % perolehan kembali dengan rumus :

$$\% \text{ perolehan kembali} = \frac{konsentrasi\ teramati}{konsentrasi\ teoritis} \text{ X } 100\%$$

Misal data replikasi 1 : y = 0,0257x + 0,044

0,398 = 0,0257x + 0,044

x = 13,726

$$\% \text{ perolehan kembali} = \frac{13,726}{13,916} \text{ X } 100\ \%$$

= 98,63

LAMPIRAN H

HASIL AKURASI PRESISI UJI PELEPASAN DAN PENETRASI PATCH NATRIUM DIKLOFENAK

Hasil uji akurasi dan presisi uji pelepasan dan penetrasi patch natrium diklofenak dalam dapar phosphat isotonis pH 7,4.

	C (µg/ml)	Abs	C (ppm)	C teoritis (ppm)	% perolehan kembali
1	14	0,368	13,856	13,888	99,77
2	14	0,370	13,934	13,916	100,13
3	14	0,372	14,011	13,972	100,28
4	14	0,378	14,245	14,112	100,94
5	14	0,383	14,440	14,168	101,92
6	14	0,373	14,050	14,084	99,76
				X (%) ± SD	100,47 ± 0,83
				KV	0,0083

Contoh perhitungan :

Dari hasil serapan dimasukkan ke dalam persamaan kurva baku yang terpilih yaitu :

Y= 0,0257x + 0,0123

Dimana : y = serapan x = konsentrasi yang teramati

kemudian hitung % perolehan kembali dengan rumus :

% perolehan kembali = $\frac{konsentrasi\ teramati}{konsentrasi\ teoritis}$ X 100%

Misal data replikasi 1 : y = 0,0257x + 0,0123

0,368 = 0,0257x + 0,0123

x = 13,856

% perolehan kembali = $\frac{13,856}{13,888}$ X 100 %

= 99,77

LAMPIRAN I

HASIL UJI PENETAPAN KADAR PATCH NATRIUM DIKLOFENAK

Formula	Uji	Absorbansi	C (ppm)	FP	C (mg/cm^2)	% kadar	X ± SD
-1	1	0,267	8,647	5	2,162	90,07	96,40% ± 5,77
	2	0,286	9,383	5	2,346	97,74	
	3	0,295	9,732	5	2,433	101,38	
a	1	0,267	8,647	5	2,162	90,07	92,49% ± 2,91
	2	0,281	9,189	5	2,297	95,72	
	3	0,271	8,802	5	2,200	91,68	
b	1	0,272	8,840	5	2,210	92,09	96,5%3 ± 4,26
	2	0,284	9,306	5	2,326	96,93	
	3	0,293	9,655	5	2,414	100,57	
ab	1	0,27	8,763	5	2,191	91,28	96,80% ± 9,56
	2	0,311	10,353	5	2,588	107,84	
	3	0,270	8,763	5	2,191	91,28	

Contoh : data formula -1 replikasi 1

C (ppm) = $\frac{absorbansi - a}{b}$

= $\frac{0,267 - 0,044}{0,02579}$ = 8,647

C (mg/cm^2) = $\frac{(C\ ppm\ x\ FP)}{1000}$ X 50

= $\frac{(8,647\ X\ 5)}{1000}$ X 50 = 2,162

% perolehan kembali = $\frac{kadar\ obat\ yang\ diperoleh}{kadar\ obat\ teoritis}$ X 100

= $\frac{2,162}{2,4}$ X 100 = 90,07 %

LAMPIRAN J

HASIL UJI HOMOGENITAS *PATCH* NATRIUM DIKLOFENAK

formula	tempat pengambilan	Abs	C (ppm)	FP	C (mg/cm²)	X ± SD
-1	1	0,267	8,647	5	2,162	2,20 ± 0,04
	2	0,270	8,763	5	2,191	
	3	0,276	8,996	5	2,249	
a	1	0,267	8,647	5	2,162	2,20 ± 0,05
	2	0,278	9,073	5	2,268	
	3	0,269	8,724	5	2,181	
b	1	0,272	8,840	5	2,210	2,22 ± 0,05
	2	0,270	8,763	5	2,191	
	3	0,280	9,151	5	2,288	
ab	1	0,27	8,763	5	2,191	2,24 ± 0,08
	2	0,272	8,840	5	2,210	
	3	0,285	9,345	5	2,336	
-1	1	0,286	9,383	5	2,346	2,31 ± 0,13
	2	0,268	8,685	5	2,171	
	3	0,294	9,693	5	2,423	
a	1	0,281	9,189	5	2,297	2,25 ± 0,06
	2	0,278	9,073	5	2,268	
	3	0,27	8,763	5	2,191	
b	1	0,284	9,306	5	2,326	2,39 ± 0,20
	2	0,272	8,840	5	2,210	
	3	0,312	10,391	5	2,598	
ab	1	0,311	10,353	5	2,588	2,35 ± 0,21
	2	0,269	8,724	5	2,181	
	3	0,28	9,151	5	2,288	
-1	1	0,295	9,732	5	2,433	2,42 ± 0,20
	2	0,272	8,840	5	2,210	
	3	0,314	10,469	5	2,617	
a	1	0,271	8,802	5	2,200	2,42 ± 0,21
	2	0,314	10,469	5	2,617	
	3	0,297	9,810	5	2,452	
b	1	0,293	9,655	5	2,414	2,46 ± 0,13
	2	0,288	9,461	5	2,365	
	3	0,313	10,430	5	2,608	
ab	1	0,27	8,763	5	2,191	2,30 ± 0,12
	2	0,279	9,112	5	2,278	
	3	0,294	9,693	5	2,423	

LAMPIRAN K

HASIL UJI DAYA LIPAT *PATCH* NATRIUM DIKLOFENAK

Batch	Formula -1	Formula a	Formula b	Formula ab
1	>300	280	220	260
2	>300	>300	230	270
3	>300	>300	250	280

LAMPIRAN L

HASIL ANAVA UJI DAYA LIPAT *PATCH* NATRIUM DIKLOFENAK BERDASARKAN FAKTORIAL DESAIN

Response 3 ketahanan lipat

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	8158.33	3	2719.44	23.31	0.0003	significant
A-EC	*675.00*	*1*	*675.00*	*5.79*	*0.0428*	
B-PVP K 30	*6075.00*	*1*	*6075.00*	*52.07*	*< 0.0001*	
AB	*1408.33*	*1*	*1408.33*	*12.07*	*0.0084*	
Pure Error	933.33	8	116.67			
Cor Total	9091.67	11				

The Model F-value of 23.31 implies the model is significant. There is only
a 0.03% 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.	10.80	R-Squared	0.8973
Mean	274.17	Adj R-Squared	0.8588
C.V. %	3.94	Pred R-Squared	0.7690
PRESS	2100.00	Adeq Precision	10.690

The "Pred R-Squared" of 0.7690 is in reasonable agreement with the "Adj R-Squared" of 0.8588.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 10.690 indicates an adequate signal. This model can be used to

navigate the design space.

Coefficient Factor	Standard Estimate	95% CI df	95% CI Error	Low	High	VIF
Intercept	274.17	1	3.12	266.98	28	1.36
A-EC	7.50	1	3.12	0.31	14.69	1.00
B-PVP K 30	22.50	1	3.12	-29.69	-15.31	1.00
AB	10.83	1	3.12	3.64	18.02	1.00

Final Equation in Terms of Coded Factors:

ketahanan lipat =
+274.17
+7.50 * A
-22.50 * B
+10.83 * A * B

Final Equation in Terms of Actual Factors:

ketahanan lipat =
+274.16667
+7.50000 * konsentrasi Etil Selulose
-22.50000 * Konsentrasi PVP K 30
+10.83333 * konsentrasi Etil Selulose * Konsentrasi PVP K 30

LAMPIRAN M

HASIL UJI PELEPASAN *PATCH* NATRIUM DIKLOFENAK

Formula -1

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,137	4,857473	1	4,857472897	25,78276
	1	0,395	14,90742	1	14,90741682	79,12642
	2	0,394	14,86846	1	14,86846355	78,91966
	3	0,434	16,42659	1,5	24,63989159	130,785
	4	0,544	20,71145	1,5	31,06718131	164,9001
	5	0,432	16,34869	1,5	24,52303178	130,1647
	6	0,503	19,11437	1,5	28,67155514	152,1845
2	0,5	0,103	3,533062	2	7,066123364	37,50596
	1	0,411	15,53067	1	15,53066916	82,43455
	2	0,607	23,16551	1	23,16551028	122,9592
	3	0,242	8,947566	2	17,89513271	94,98478
	4	0,382	14,40102	2	28,8020486	152,8771
	5	0,306	11,44058	2,5	28,60143925	151,8123
	6	0,354	13,31033	2,5	33,27583178	176,6233
3	0,5	0,099	3,377249	3	10,13174579	53,77784
	1	0,063	1,974931	4	7,899723364	41,93059
	2	0,157	5,636538	3	16,90961495	89,75379
	3	0,317	11,86906	2	23,73812336	125,9985
	4	0,373	14,05044	2	28,10088972	149,1555
	5	0,250	9,259193	3	27,77757757	147,4394
	6	0,310	11,59639	2,5	28,99097196	153,8799

Formula a

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,249	9,220239	1	9,220239252	48,9397
	1	0,611	23,32132	1	23,32132336	123,7862
	2	0,639	24,41201	1	24,41201495	129,5755
	3	0,432	16,34869	1,5	24,52303178	130,1647
	4	0,235	8,674893	3	26,02468037	138,1352
	5	0,434	16,42659	2	32,85318879	174,38
	6	0,579	22,07482	1,5	33,11222804	175,7549
2	0,5	0,486	18,45216	1	18,45216449	97,94143
	1	0,460	17,43938	1,5	26,15906916	138,8486
	2	0,385	14,51788	2	29,03576822	154,1177
	3	0,532	20,24401	2	40,48802991	214,9046
	4	0,496	18,8417	2	37,68339439	200,018
	5	0,477	18,10159	2	36,20317009	192,1612
	6	0,449	17,01089	2	34,02178692	180,5827
3	0,5	0,120	4,195267	3	12,58580187	66,80362
	1	0,394	14,86846	1	14,86846355	78,91966
	2	0,258	9,570819	2	19,14163738	101,601
	3	0,388	14,63474	1,5	21,95211589	116,5187
	4	0,327	12,25859	2	24,51718879	130,1337
	5	0,244	9,025473	2,5	22,56368224	119,7648
	6	0,298	11,12895	3	33,3868486	177,2126

Formula b

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,293	10,93418	1	10,93418318	58,03707
	1	0,292	10,89523	1	10,89522991	57,83031
	2	0,502	19,07542	1	19,07541682	101,2496
	3	0,394	14,86846	1,5	22,30269533	118,3795
	4	0,239	8,830707	2	17,66141308	93,74423
	5	0,494	18,76379	2	37,52758131	199,191
	6	0,426	16,11497	2	32,22993645	171,0718
2	0,5	0,178	6,454557	1	6,454557009	34,25986
	1	0,248	9,181286	1	9,181285981	48,73294
	2	0,367	13,81673	1	13,81672523	73,33718
	3	0,541	20,59459	1	20,59459439	109,3131
	4	0,197	7,194669	3	21,58400748	114,5648
	5	0,458	17,36147	1,5	26,04220935	138,2283
	6	0,531	20,20506	1,5	30,30759252	160,8683
3	0,5	0,081	2,67609	1	2,67608972	14,2043
	1	0,127	4,46794	1	4,467940187	23,71518
	2	0,307	11,47953	1	11,47952897	60,93168
	3	0,452	17,12775	1	17,12775327	90,91164
	4	0,330	12,37545	1,5	18,56318131	98,53069
	5	0,417	15,76439	1,5	23,64658318	125,5126
	6	0,553	21,06203	1,5	31,59305047	167,6914

Formula ab

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,067	2,130744	1	2,130743925	11,30968
	1	0,113	3,922594	1	3,922594393	20,82056
	2	0,132	4,662707	1	4,662706542	24,74897
	3	0,536	20,39983	1	20,39982804	108,2793
	4	0,304	11,36267	1,5	17,04400374	90,46711
	5	0,259	9,609772	2	19,21954393	102,0146
	6	0,348	13,07661	1,5	19,61491963	104,1132
2	0,5	0,125	4,390034	1	4,390033645	23,30166
	1	0,400	15,10218	1	15,10218318	80,16021
	2	0,573	21,8411	1	21,84109907	115,9294
	3	0,348	13,07661	1,5	19,61491963	104,1132
	4	0,667	25,50271	1	25,50270654	135,3647
	5	0,630	24,06144	1	24,06143551	127,7146
	6	0,274	10,19407	3	30,58221308	162,326
3	0,5	0,254	9,415006	1	9,415005607	49,97349
	1	0,446	16,89403	1	16,89403364	89,67109
	2	0,344	12,9208	1,5	19,3812	102,8726
	3	0,428	16,19287	1,5	24,28931215	128,9242
	4	0,394	14,86846	2	29,7369271	157,8393
	5	0,361	13,58301	2	27,16601121	144,1933
	6	0,344	12,9208	2,5	32,302	171,4544

LAMPIRAN N

HASIL UJI PENETRASI PATCH NATRIUM DIKLOFENAK

Formula -1

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,183	6,6493	1	6,6493	35,2936
	1	0,152	5,4418	1,5	8,1627	43,3262
	2	0,164	5,9092	1,5	8,8638	47,0479
	3	0,196	7,1557	2	14,3114	75,9630
	4	0,236	8,7138	2	17,4277	92,5037
	5	0,269	9,9993	2	19,9986	106,1497
	6	0,284	10,5836	2	21,1672	112,3525
2	0,5	0,251	9,2981	1	9,2981	49,3532
	1	0,263	9,7656	1	9,7656	51,8343
	2	0,593	22,6202	1	22,6202	120,0646
	3	0,305	11,4016	2	22,8032	121,0363
	4	0,310	11,5964	2	23,1928	123,1039
	5	0,394	14,8685	2	29,7369	157,8393
	6	0,405	15,2969	2	30,5939	162,3880
3	0,5	0,364	13,6999	1	13,6999	72,7169
	1	0,522	19,8545	1	19,8545	105,3847
	2	0,580	22,1138	1	22,1138	117,3767
	3	0,630	24,0614	1	24,0614	127,7146
	4	0,654	24,9963	1	24,9963	132,6768
	5	0,315	11,7912	2,5	29,4779	156,4644
	6	0,330	12,3755	3	37,1264	197,0614

Formula a

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,325	12,1807	1	12,1807	64,6533
	1	0,451	17,0888	1	17,0888	90,7049
	2	0,684	26,1649	1	26,1649	138,8796
	3	0,371	13,9725	2	27,9451	148,3284
	4	0,438	16,5824	2	33,1648	176,0340
	5	0,495	18,8027	2	37,6055	199,6045
	6	0,527	20,0492	2	40,0985	212,8370
2	0,5	0,113	3,9226	1	3,9226	20,8206
	1	0,210	7,7011	1	7,7011	40,8761
	2	0,444	16,8161	1	16,8161	89,2576
	3	0,583	22,2306	1	22,2306	117,9970
	4	0,672	25,6975	1	25,6975	136,3985
	5	0,253	9,3761	2	18,7521	99,5335
	6	0,419	15,8423	2	31,6846	168,1772
3	0,5	0,068	2,1697	1	2,1697	11,5164
	1	0,098	3,3383	1	3,3383	17,7192
	2	0,262	9,7266	1	9,7266	51,6276
	3	0,251	9,2981	1	9,2981	49,3532
	4	0,443	16,7772	1	16,7772	89,0508
	5	0,556	21,1789	1	21,1789	112,4145
	6	0,600	22,8928	1	22,8928	121,5119

Formula b

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,183	6,6493	1	6,6493	35,2936
	1	0,208	7,6232	1	7,6232	40,4626
	2	0,293	10,9342	1	10,9342	58,0371
	3	0,314	11,7522	1	11,7522	62,3790
	4	0,355	13,3493	1	13,3493	70,8561
	5	0,325	12,1807	1	12,1807	64,6533
	6	0,588	22,4254	1	22,4254	119,0308
2	0,5	0,11	3,8057	1	3,8057	20,2003
	1	0,315	11,7912	1	11,7912	62,5857
	2	0,539	20,5167	1	20,5167	108,8996
	3	0,541	20,5946	1	20,5946	109,3131
	4	0,554	21,1010	1	21,1010	112,0010
	5	0,624	23,8277	1	23,8277	126,4741
	6	0,225	8,2854	2,5	20,7134	109,9437
3	0,5	0,273	10,1551	1	10,1551	53,9019
	1	0,303	11,3237	1	11,3237	60,1046
	2	0,401	15,1411	1	15,1411	80,3670
	3	0,602	22,9707	1	22,9707	121,9254
	4	0,203	7,4284	2	14,8568	78,8576
	5	0,307	11,4795	2	22,9591	121,8634
	6	0,517	19,6597	1	19,6597	104,3509

Formula ab

	t (jam)	Abs sampel	C sampel (ppm)	fp	C sebenarnya (ppm)	Q (µg/cm^2)
1	0,5	0,151	5,4028	1	5,4028	28,6774
	1	0,241	8,9086	1	8,9086	47,2856
	2	0,268	9,9604	1	9,9604	52,8681
	3	0,330	12,3755	1	12,3755	65,6871
	4	0,409	15,4528	1	15,4528	82,0210
	5	0,419	15,8423	1	15,8423	84,0886
	6	0,564	21,4905	1	21,4905	114,0686
2	0,5	0,115	4,0005	1	4,0005	21,2341
	1	0,123	4,3121	1	4,3121	22,8881
	2	0,281	10,4667	1	10,4667	55,5560
	3	0,295	11,0121	1	11,0121	58,4506
	4	0,370	13,9336	1	13,9336	73,9575
	5	0,422	15,9592	1	15,9592	84,7089
	6	0,463	17,5562	1	17,5562	93,1860
3	0,5	0,071	2,2866	1	2,2866	12,1367
	1	0,122	4,2732	1	4,2732	22,6814
	2	0,195	7,1168	1	7,1168	37,7747
	3	0,280	10,4278	1	10,4278	55,3492
	4	0,370	13,9336	1	13,9336	73,9575
	5	0,390	14,7127	1	14,7127	78,0926
	6	0,394	14,8685	1	14,8685	78,9197

LAMPIRAN O

ANALISIS ANAVA PELEPASAN DENGAN FAKTORIAL DESIGN

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	97.41	3	32.47	17.45	0.0007	significant
A-EC	*24.97*	*1*	*24.97*	*13.42*	*0.0064*	
B-PVP K 30	*72.37*	*1*	*72.37*	*38.89*	*0.0002*	
AB	*0.066*	*1*	*0.066*	*0.035*	*0.8553*	
Pure Error	14.89	8	1.86			
Cor Total	112.30	11				

The Model F-value of 17.45 implies the model is significant. There is only
a 0.07% 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 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.	1.36	R-Squared	0.8674
Mean	20.26	Adj R-Squared	0.8177
C.V. %	6.73	Pred R-Squared	0.7017
PRESS	33.50	Adeq Precision	9.899

The "Pred R-Squared" of 0.7017 is in reasonable agreement with the "Adj R-Squared" of 0.8177.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 9.899 indicates an adequate signal. This model can be used to

navigate the design space.

Coefficient Factor	Standard Estimate	95% CI df	95% CI Error	Low	High	VIF
Intercept	20.26	1	0.39	19.35	21.17	
A-etil selulose	1.44	1	0.39	0.53	2.35	1.00
B-PVP K 30	-2.46	1	0.39	-3.36	-1.55	1.00
AB	0.074	1	0.39	-0.83	0.98	1.00

Final Equation in Terms of Coded Factors:

pelepasan =
+20.26
+1.44 * A
-2.46 * B
+0.074 * A * B

Final Equation in Terms of Actual Factors:

pelepasan =
+20.26250
+1.44250 * etil selulose
-2.45583 * PVP K 30
+0.074167 * etil selulose * PVP K 30

LAMPIRAN P

ANALISIS ANAVA PENETRASI DENGAN FAKTORIAL DESIGN

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	230.93	3	76.98	16.05	0.0010	significant
A-EC	*29.97*	*1*	*29.97*	*6.25*	*0.0370*	
B-PVP K 30	*189.12*	*1*	*189.12*	*39.42*	*0.0002*	
AB	*11.84*	*1*	*11.84*	*2.47*	*0.1548*	
Pure Error	38.38	8	4.80			
Cor Total	269.30	11				

The Model F-value of 16.05 implies the model is significant. There is only
a 0.10% 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 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.	2.19	R-Squared	0.8575
Mean	16.69	Adj R-Squared	0.8041
C.V. %	13.13	Pred R-Squared	0.6794
PRESS	86.35	Adeq Precision	8.778

The "Pred R-Squared" of 0.6794 is in reasonable agreement with the "Adj R-Squared" of 0.8041.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your
ratio of 8.778 indicates an adequate signal. This model can be used to

navigate the design space.

Factor	Coefficient Estimate	df	Standard Error	95% CI Low	95% CI High	VIF
Intercept	16.69	1	0.63	15.23	18.15	
A-EC	1.58	1	0.63	0.12	3.04	1.00
B-PVP K 30	-3.97	1	0.63	-5.43	-2.51	1.00
AB	-0.99	1	0.63	-2.45	0.46	1.00

Final Equation in Terms of Coded Factors:

penetrasi =
+16.69
+1.58 * A
-3.97 * B
-0.99 * A * B

Final Equation in Terms of Actual Factors:

penetrasi =
+16.68725
+1.58025 * konsentrasi Etil Selulose
-3.96992 * Konsentrasi PVP K 30
-0.99325 * konsentrasi Etil Selulose *
Konsentrasi PVP K 30

LAMPIRAN Q

TABEL R

DEGREES OF FREEDOM (DF)	5 PERCENT	1 PERCENT	DEGREES OF FREEDOM (DF)	5 PERCENT	1 PERCENT
1	.997	1.000	24	.388	.496
2	.950	.990	25	.381	.487
3	.878	.959	26	.374	.478
4	.811	.917	27	.367	.470
5	.754	.874	28	.361	.463
6	.707	.834	29	.355	.456
7	.666	.798	30	.349	.449
8	.632	.765	35	.325	.418
9	.602	.735	40	.304	.393
10	.576	.708	48	.288	.372
11	.553	.684	50	.273	.354
12	.532	.661	60	.250	.325
13	.514	.641	70	.232	.302
14	.497	.623	80	.217	.283
15	.482	.606	90	.205	.267
16	.468	.590	100	.195	.254
17	.456	.575	125	.174	.228
18	.444	.561	150	.159	.208
19	.433	.549	200	.138	.181
20	.423	.537	300	.113	.148
21	.413	.526	400	.098	.128
22	.404	.515	500	.088	.115
23	.396	.505	1000	.062	.081

LAMPIRAN R

TABEL F

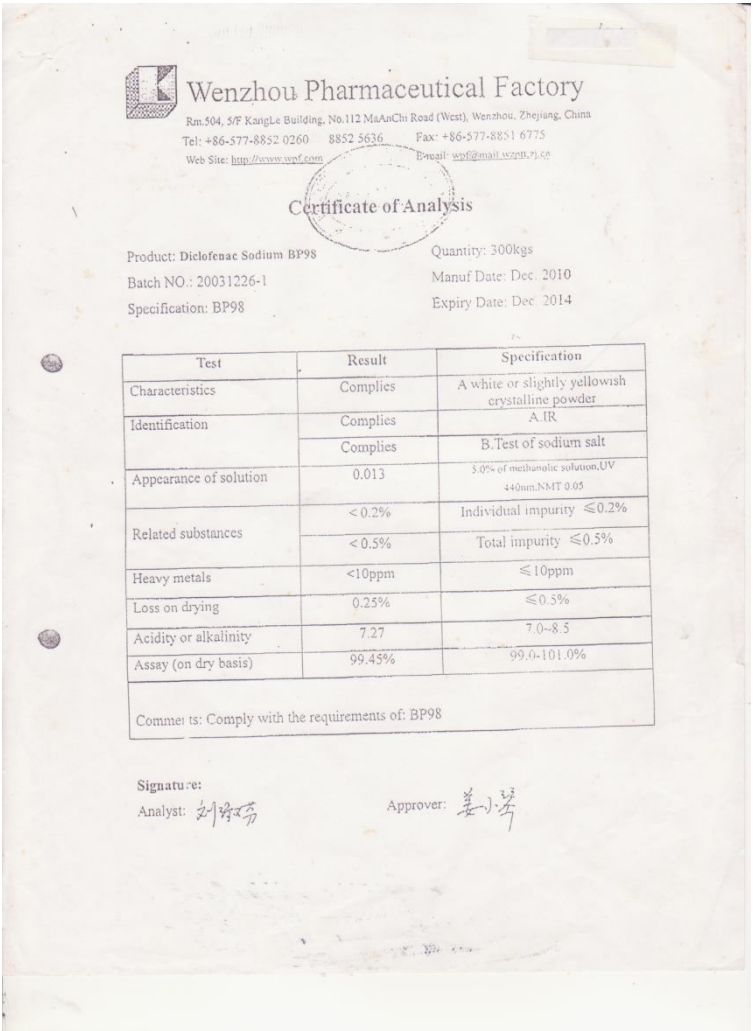
Denomins for Degrees of Freedom	Numerator Degrees of Freedom								
	1	2	3	4	5	6	7	8	9
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
2	18.81	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
3	10.73	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88

(Sumber: John E., 1992)

LAMPIRAN S

SERTIFIKASI ANALISIS BAHAN BAHAN

Natrium diklofenak



Wenzhou Pharmaceutical Factory

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Tel: +86-577-8852 0260 8852 5636 Fax: +86-577-8851 6775

Web Site: http://www.wpf.com E-mail: wpf@mail.wzpt.zj.cn

Certificate of Analysis

Product: Diclofenac Sodium BP98 Quantity: 300kgs

Batch NO.: 20031226-1 Manuf Date: Dec. 2010

Specification: BP98 Expiry Date: Dec. 2014

Test	Result	Specification
Characteristics	Complies	A white or slightly yellowish crystalline powder
Identification	Complies	A.IR
	Complies	B.Test of sodium salt
Appearance of solution	0.013	5.0% of methanolic solution,UV 440nm,NMT 0.05
Related substances	< 0.2%	Individual impurity ≤0.2%
	< 0.5%	Total impurity ≤0.5%
Heavy metals	<10ppm	≤10ppm
Loss on drying	0.25%	≤0.5%
Acidity or alkalinity	7.27	7.0~8.5
Assay (on dry basis)	99.45%	99.0~101.0%

Comments: Comply with the requirements of: BP98

Signature:

Analyst: 刘俊芳 Approver: 姜小芳

Poli Vinil Pyrrolidon (PVP K 30)

PVP K-30:

杭州南杭化工有限公司
NANHANG INDUSTRIAL CO.,LTD
地址:中国杭州市西湖区周浦乡姚家坞

CERTIFICATE OF ANALYSIS

Product	PVP K-30 USP/BP		
Batch No.	20051213	Quantity	2025KGS
Manufacture Date	DEC.,2009	Expiry Date	DEC.,2013

ITEMS	SPECIFICATIONS	TEST RESULTS
Characteristics	A white, fine powder	Complies
Identification	Positive	Positive
Water	5% max	2.8%
Residue on ignition	0.1% max	0.02%
K-Value	27-32	30.7
Heavy metals(Lead)	10ppm max	Complies
Nitrogen	11.5%-12.8%	12.2%
Vinylpyrrolidone	0.2% max	0.032%
Aldehydes	0.05% max	Complies
Ph Value	3.0-7.0	3.62
Hydrazine	1ppm max	Complies
Peroxides	400ppm max	Complies
Microbial Limits(By annual verification test)	Salmonalla	Negative
	Coli	Negative
	Coliforms <1CFU/gm	Conform
	Standard Plate Count<10,000CFU/gm	Conform
	Mold & Yeast <1,000 CFU/gm	Conform

Conclusion: IT CONFORMS USP/BP

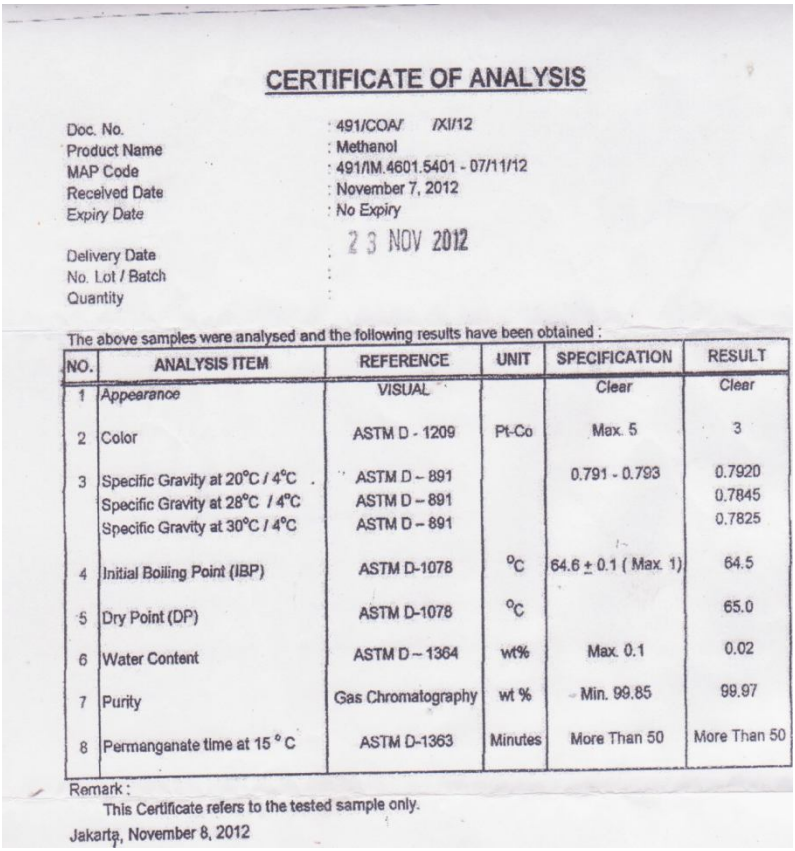
Etil Selulose

Certificate 5693427 The Dow Chemical Company
Date: 27.04.2012 Certificate of Analysis Shipped: 2
File Copy
DOW CHEMICAL PACIFIC LIMITED Fax: COA ARCHIVE
SHANGHAI PUDONG AIRPORT
SHANGHAI SG 201202 CHINA
Cust P.O.: 040/85/40211021 Dlvy Note: 71
Material: ETHOCEL* Standard 20 Premium
Ethylcellulose Spec: 0002
Cust Mtl:
Batch: 1A24013T01 Mfgd: 24.01.2012 Retest Date: 2
Ship from: THE DOW CHEMICAL COMPANY BAY CITY MI UNITED
It is hereby certified that the lot of material listed above has bee
manufactured in accordance with U.S. FDA current Good Manufacturing
Practices. In addition, the manufacturing facility and this product
been Kosher certified. Unless stated otherwise, the material complie
with all applicable sales and/or customer specifications and in addi
meets the monograph limits for ethylcellulose provided in the curren
National Formulary (USP/NF), Food Chemical Codex, European
Pharmacopoeia, and Japanese Pharmaceutical Excipients associated wit
the current Japanese Pharmacopoeia, European Parliament and Council
Directive for ethylcellulose (E462).

		Results	Limits		
Feature	Units	1A24013T01	Minimum	Maximum	Method
Viscosity	mPa.s	21.2	18.0	22.0	Current
Ethoxyl Content assay	% wt	49.0	48.0	49.5	Current
Loss on Drying moisture	% wt	0.3	----	2.0	Current
Chloride (as NaCl)	% wt	0.02	----	0.05	Current
Residue on Ignition	% wt	0.22	----	0.40	Current

This lot of material, based on quarterly audit testing of
representative lots of the product, also complies with the following
additional specification requirements: Aldehydes, 100 ppm Max; Arsen
2 ppm Max; Lead, 2 ppm Max; Cadmium, 1 ppm Max; Mercury, 1 ppm Max;
Heavy Metals, 20 ppm Max; Acidity or Alkalinity, Passes; Residual
Solvents, Passes; pH - 1% Collodial Solution, Passes; ID Test NF,
Passes; ID Test A-EP, Passes; ID Test B-EP, Passes; ID Test 1-JPE,
Passes; ID Test 2-JPE, Passes; ID FCC, Passes; ID Test A-E462,
Passes; ID Test B - E462, Passes; Total Aerobic Microbial Count,
100 CFU/g Max; Total Combined Yeast & Mold Count, 100 CFU/g Max;
Staphylococcus Aureus, Negative; Pseudomonas Aeruginosa, Negative;
Salmonella Species, negative; Escherichia Coli, Negative.

Methanol



CERTIFICATE OF ANALYSIS

Doc. No. : 491/COA/ /XI/12
Product Name : Methanol
MAP Code : 491/IM.4601.5401 - 07/11/12
Received Date : November 7, 2012
Expiry Date : No Expiry
Delivery Date : 23 NOV 2012
No. Lot / Batch :
Quantity :

The above samples were analysed and the following results have been obtained :

NO.	ANALYSIS ITEM	REFERENCE	UNIT	SPECIFICATION	RESULT
1	Appearance	VISUAL		Clear	Clear
2	Color	ASTM D - 1209	Pt-Co	Max. 5	3
3	Specific Gravity at 20°C / 4°C	ASTM D – 891		0.791 - 0.793	0.7920
	Specific Gravity at 28°C / 4°C	ASTM D – 891			0.7845
	Specific Gravity at 30°C / 4°C	ASTM D – 891			0.7825
4	Initial Boiling Point (IBP)	ASTM D-1078	°C	64.6 ± 0.1 (Max. 1)	64.5
5	Dry Point (DP)	ASTM D-1078	°C		65.0
6	Water Content	ASTM D – 1364	wt%	Max. 0.1	0.02
7	Purity	Gas Chromatography	wt %	Min. 99.85	99.97
8	Permanganate time at 15 ° C	ASTM D-1363	Minutes	More Than 50	More Than 50

Remark :
This Certificate refers to the tested sample only.

Jakarta, November 8, 2012

Kloroform

PT.BRATACO

HASIL PEMERIKSAAN

Nama Bahan : Chloroform
Batch : J 0122/11 (33685)
Ex : Biesterfeld
Grade : teknik

Jenis pemeriksaan	*Persyaratan FI III*	*Hasil*
Pemerian	Cairan jernih, tidak berwarna,mudah mengalir, mempunyai sifat khas,bau eter,rasa manis dan membakar	sesuai
Kelarutan	Sukar larut dalam air, dapat bercampur dengan etanol, eter, benzene, hexsan, dan dengan minyak lemak serta minyak menguap	sesuai
Klor bebas	Pada 10 ml tambahkan 10 ml air dan 0,1 ml *Kalium Iodida* LP,kocok selama 2 menit dan biarkan memisah,lapisan bawah tidak berwarna ungu	sesuai
Hasil Peruraian	Lapisan asam tidak menunjukkan perubahan warna	sesuai
Bobot jenis	Antara 1,476 dan 1,4886 g/ml	1,477

Kesimpulan : *Memenuhi syarat*

Cikarang, 07-05-2011
Penanggung Jawab

Pemeriksa

Tatang Suhartono
Analis

PT. BRATACO
Telp. 8936132
Fax. 8934689
JABABEKA
CIKARANG

Dra. Tri Hartati
Apoteker
S.I.K. 3836/B

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BRANCH OFFICE : • JAKARTA : Jl. Mangga Besar V No.5, Jakarta 11180 Telp. (021) 6280113 (hunting 3 lines) Fax. (021) 6292430
Jl. Boulevard Raya Blok TB2 No. 5, Jakarta 14240 Telp. (021) 45846892-94 Fax. (021) 4532615
• BANDUNG : Jl. Kesenteng No. 8, Bandung Telp. (022) 6077129, 6030802 Fax. (022) 6031979
Jl. Terusan Jakarta No. 77G, Bandung Telp. (022) 7101277, 7210308-309 Fax. (022) 7210310
• SEMARANG : Jl. Brigjen. Katamso No. 19 Telp. (024) 8415272, 8415999 Fax. (024) 8414980
• YOGYA : Jl. Bhayangkara No. 45, Yogya Telp. (0274) 543349, 515390 Fax. (0274) 543349
• SURABAYA : Jl. Tidar No. 89, Surabaya Telp. (031) 5322887, 5325057 Fax. (031) 5310465