

## **BAB 5**

### **SIMPULAN**

#### **5.1. Simpulan**

Berdasarkan data penelitian yang telah diinterpretasikan, dapat ditarik kesimpulan :

- Pembuatan granul pembawa campuran interaktif piroksikam dengan menggunakan pembawa larut air manitol dan *superdisintegrant AcDiSol* dapat meningkatkan laju disolusi piroksikam.
- Jumlah manitol dan jumlah *AcDiSol* berpengaruh signifikan terhadap *Hausner Ratio* dan *Carr's Index*, namun tidak berpengaruh signifikan terhadap sudut diam dan ukuran partikel.
- Formula optimum granul pembawa campuran interaktif piroksikam dapat diperoleh dengan jumlah pembawa larut air manitol sejumlah hingga 200 g dan jumlah *superdisintegrant AcDiSol* sejumlah 3 g. Pemilihan formula optimum tersebut akan memberikan prediksi hasil respon *Hausner Ratio* 1,209; *Carr's Index* 17,32 %; sudut diam  $30,45^0$ ; dan ukuran partikel  $307,423 \mu\text{m}$ .

#### **5.2. Alur Penelitian Selanjutnya**

Dapat dilakukan penelitian lebih lanjut mengenai granul pembawa campuran interaktif piroksikam dengan mencari dan membuktikan formula optimum terpilih, kemudian dibandingkan dengan hasil yang secara teoritis.

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**LAMPIRAN A**  
**HASIL UJI MUTU FISIK GRANUL PEMBAWA CAMPURAN**  
**INTERAKTIF PIROKSIKAM**

Mutu fisik yang diuji	Replikasi	Formula Granul Pembawa untuk Campuran Interaktif				Persyaratan
		FA	FB	FC	FD	
Sudut Diam (Derajat)	I	31,267	30,013	31,618	33,186	30 – 40 cukup baik
	II	31,453	31,505	32,110	30,723	
	III	31,593	30,700	27,623	31,167	
	Rata-rata	31,437	30,739	30,450	31,692	
	SD	0,164	0,747	2,46	1,313	
<i>Hausner Ratio</i>	I	1,26	1,20	1,23	1,32	1,19 – 1,25 cukup baik
	II	1,21	1,22	1,19	1,28	
	III	1,22	1,19	1,22	1,26	
	Rata-rata	1,23	1,20	1,16	1,25	
	SD	0,027	0,015	0,017	0,028	
<i>Carr's Index (%)</i>	I	20,99	16,98	18,00	23,86	16 – 20 cukup baik
	II	17,92	17,99	15,98	21,99	
	III	17,96	15,99	17,98	20,34	
	Rata-rata	18,956	16,986	17,32	22,063	
	SD	1,761	1,00	1,1605	1,7611	
Ukuran Partikel ( $\mu\text{m}$ )	I	390,52	230,05	559,82	281,77	
	II	236,21	262,03	503,65	260,88	
	III	273,92	387,60	307,92	216,83	
	Rata-rata	300,21	293,22	457,13	253,16	
	SD	80,445	83,279	132,23	33,151	

## UKURAN PARTIKEL FORMULA A

### REPLIKASI 1

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	11.19	11.20	88.80	1.22	dg 50% = 376,908	2,33
40	425	31.68	31.72	57.08	0.18	dg 84% = 879,189	
60	250	21.59	21.62	35.46	-0.37		
80	180	16.62	16.64	18.82	-0.88		
100	150	5.65	5.66	13.17	-2.26		
120	125	5.95	5.96	7.21	-2.54		
pan	0	7.20	7.21	0.00			

### REPLIKASI 2

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	1.05	1.05	98.95	2.32	dg 50% = 236,21	1,77
40	425	19.41	19.43	79.52	0.83	dg 84% = 419,28	
60	250	22.98	23.01	56.51	0.17		
80	180	24.01	24.04	32.47	-0.45		
100	150	9.49	9.50	22.97	-0.74		
120	125	10.45	10.46	12.51	-1.15		
pan	0	12.49	12.51	0.00			

### REPLIKASI 3

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	6.80	6.25	93.75	1.53	dg 50% = 273,29	2,07
40	425	23.98	22.03	71.72	0.57	dg 84% = 565,93	
60	250	24.61	22.61	49.10	-0.01		
80	180	21.01	19.31	29.80	-0.53		
100	150	9.49	8.72	21.08	-0.81		
120	125	10.45	9.60	11.48	-1.20		
pan	0	12.49	11.48	0.00			

Rata-rata ± SD = 300,21 ± 80,445

**UKURAN PARTIKEL FORMULA B  
REPLIKASI 1**

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	3.77	3.78	96.22	1.78	dg 50% = 230,05 dg 84% = 480,02	2,086
40	425	19.07	19.10	77.12	0.74		
60	250	17.42	17.45	59.67	0.24		
80	180	20.88	20.92	38.76	-0.29		
100	150	9.48	9.50	29.26	-0.55		
120	125	11.87	11.89	17.37	-0.94		
pan	0	17.34	17.37	0.00			

**REPLIKASI 2**

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	2.67	2.67	97.33	1.93	dg 50% = 262,03 dg 84% = 453,05	1,729
40	425	16.50	6.48	80.85	0.87		
60	250	20.17	20.15	60.70	0.27		
80	180	24.56	24.54	36.16	-0.35		
100	150	10.41	10.40	25.76	-0.65		
120	125	11.30	11.29	14.48	-2.18		
pan	0	14.49	14.48	0.00			

**REPLIKASI 3**

No. Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	6.02	6.02	93.98	1.55	dg 50% = 387,6 dg 84% = 607,06	1,566
40	425	32.64	32.65	61.33	0.31		
60	250	25.25	25.26	36.08	-0.36		
80	180	18.54	18.54	17.53	-2.11		
100	150	5.78	5.78	11.75	-2.26		
120	125	5.58	5.58	6.17	-2.50		
pan	0	6.17	6.17	0.00			

Rata-rata ± SD = 293,22 ± 83,279

## UKURAN PARTIKEL FORMULA C

### REPLIKASI 1

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	24.82	24.90	75.10	0.68	dg 50% = 559,82	1,735
40	425	28.63	28.73	46.37	-0.09	dg 84% = 971,67	
60	250	18.78	18.84	27.52	-1.92		
80	180	13.10	13.14	14.38	-2.19		
100	150	4.17	4.18	10.19	-2.32		
120	125	4.56	4.58	5.62	-2.53		
pan	0	5.60	5.62	0.00			

### REPLIKASI 2

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	29.57	29.61	70.39	0.54	dg 50% = 503,65	1,885
40	425	26.91	26.95	43.44	-0.16	dg 84% = 949,31	
60	250	17.85	17.88	25.57	-0.66		
80	180	12.21	12.23	13.34	-1.11		
100	150	3.87	3.88	9.46	-2.35		
120	125	3.96	3.97	5.50	-2.54		
pan	0	5.49	5.50	0.00			

### REPLIKASI 3

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	3.09	3.10	96.90	1.87	dg 50% = 287,92	1,715
40	425	23.50	23.54	73.36	0.62	dg 84% = 493,7	
60	250	21.04	21.08	52.28	0.03		
80	180	22.77	22.81	29.47	-0.55		
100	150	9.02	9.04	20.44	-0.83		
120	125	9.57	9.59	10.85	-2.30		
pan	0	10.83	10.85	0.00			

Rata-rata ± SD = 457,13 ± 132,23



## UKURAN PARTIKEL FORMULA D

### REPLIKASI 1

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	3.07	3.07	96.93	1.82	dg 50% = 281,77	1,705
40	425	17.83	17.84	79.09	0.82	dg 84% = 480,3	
60	250	23.83	23.84	55.25	0.13		
80	180	25.67	25.68	29.56	-0.53		
100	150	9.88	9.88	19.68	-0.85		
120	125	9.38	9.38	10.30	-2.32		
pan	0	10.29	10.30	0.00			

### REPLIKASI 2

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	3.98	3.98	96.02	1.76	dg 50% = 260,88	1,965
40	425	20.77	20.76	75.27	0.59	dg 84% = 512,88	
60	250	21.05	21.04	54.23	0.11		
80	180	23.28	23.26	30.97	-0.52		
100	150	9.28	9.27	21.69	-0.78		
120	125	10.36	10.35	11.34	-1.21		
pan	0	11.35	11.34	0.00			

### REPLIKASI 3

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	0.17	0.17	99.83	2.93	dg 50% = 216,83	1,609
40	425	15.01	15.05	84.78	1.03	dg 84% = 349,03	
60	250	14.05	14.08	70.70	0.44		
80	180	19.24	19.29	51.41	0.04		
100	150	10.45	10.48	40.94	-0.23		
120	125	14.95	14.99	25.95	-1.95		
pan	0	25.89	25.95	0.00			

Rata-rata ± SD = 253,16 ± 33,151

**LAMPIRAN B**

**HASIL UJI MUTU FISIK FORMULA OPTIMUM GRANUL  
PEMBAWA CAMPURAN INTERAKTIF PIROKSIKAM**

<b>Mutu fisik yang diuji</b>	<b>Replikasi</b>	<b>Formula Granul Pembawa Optimum untuk Campuran Interaktif</b>	<b>Persyaratan</b>
Sudut Diam (Derajat)	I	33,382	30 – 40 cukup baik (Lannie dan Achmad 2013)
	II	31,98	
	III	33,1	
	Rata-rata	32,82	
	SD	0,7415	
<i>Hausner Ratio</i>	I	1,23	1,19 – 1,25 cukup baik (Lannie dan Achmad 2013)
	II	1,22	
	III	1,19	
	Rata-rata	1,213	
	SD	0,021	
<i>Carr's Index (%)</i>	I	19	16 – 20 cukup baik (Lannie dan Achmad 2013)
	II	17,96	
	III	15,9	
	Rata-rata	17,62	
	SD	1,578	
Ukuran Partikel ( $\mu\text{m}$ )	I	298,77	250-350
	II	334,96	
	III	339,53	
	Rata-rata	324,42	
	SD	22,33	

## UKURAN PARTIKEL FORMULA OPTIMUM

### REPLIKASI 1

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	10.29	10.31	89.69	1.26	dg 50% = 298,77	2,276
40	425	26.41	26.47	63.21	0.35	dg 84% = 680,17	
60	250	16.96	17.00	46.21	-0.09		
80	180	17.20	17.24	28.97	-0.55		
100	150	8.15	8.17	20.80	-0.81		
120	125	9.02	9.04	11.76	-1.19		
pan	0	11.73	11.76	0.00			

### REPLIKASI 2

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	12.08	12.11	87.89	1.17	dg 50% = 334,96	2,1611
40	425	26.73	26.79	61.10	0.28	dg 84% = 723,9	
60	250	20.38	20.43	40.67	-0.25		
80	180	18.30	18.34	22.32	-0.76		
100	150	7.13	7.15	15.18	-1.03		
120	125	7.10	7.12	8.06	-1.40		
pan	0	8.04	8.06	0.00			

### REPLIKASI 3

No, Ayakan	Diameter	Berat Tertinggal	% Berat	FKB	Nilai Z	dg (µm)	σ <sub>g</sub>
20	850	9.90	9.90	90.10	1.29	dg 50% = 339,53	2,018
40	425	29.62	29.63	60.47	0.27	dg 84% = 685,19	
60	250	23.20	23.21	37.26	-0.32		
80	180	18.31	18.32	18.95	-0.88		
100	150	6.24	6.24	12.70	-1.14		
120	125	6.25	6.25	6.45	-1.52		
pan	0	6.45	6.45	0.00			

Rata-rata ± SD = 324,42 ± 22,33

## LAMPIRAN C

### CARA PERHITUNGAN

#### MUTU FISIK GRANUL PEMBAWA

Misalnya formula optimum replikasi 1,

1. Sudut diam

Luas kertas A4 = 623,7 cm<sup>2</sup>, berat kertas A4= 4,60 gram

Tinggi puncak gundukan granul yang dialirkan lewat corong adalah 4,25 cm; kemudian dibuat lingkaran berdasarkan lingkaran yang terbentuk dari gundukan granul tersebut dan digunting mengikuti bentuk lingkaran tersebut, lalu kertas yang berbentuk lingkaran ditimbang,

Luas lingkaran = (berat kertas lingkaran : berat kertas A4) X luas kertas A4

$$(1,05 : 4,60) \times 623,7 = 142,367 \text{ cm}^2$$

$$\text{Jari-jari lingkaran} = (\text{luas} / \pi)^{1/2} = 6,73 \text{ cm},$$

$$\tan \alpha = \text{tinggi} : \text{jari-jari} = 3,6 : 6,73 = 0,53$$

$$\text{inv, } \tan \alpha = 32,2^\circ,$$

Pada pengujian sudut diam dilakukan sebanyak 3 replikasi dengan hasil replikasi 1 = 32,2; 30,11; 31,8 rata-rata dari ketiga data tersebut adalah 31,37,

2. Carr's index

Berat gelas ukur 100 mL kosong = 112,75gram,

Berat gelas ukur 100 mL + granul pembawa = 159,92 gram,

Berat granul pembawa = 47,17 gram,

Setelah di *tapped* diperoleh hasil pemampatan granul pembawa pada 83 mL,

$$\rho_{\text{bulk}} = 47,17 : 100 = 0,47 \text{ g/mL}$$

$$\rho_{\text{tapped}} = 47,17 : 83 = 0,57 \text{ g/mL}$$

$$\text{Carr's Index} = (\rho_{\text{tapped}} - \rho_{\text{bulk}}) : \rho_{\text{tapped}} \times 100\% = (0,57 - 0,47) : 0,57 \times 100\% = 17,54\%$$

### 3. Hausner Ratio

$$\text{Hausner ratio} = \rho_{\text{tapped}} : \rho_{\text{bulk}} = 0,57 : 0,47 = 1,21$$

### 4. Ukuran Partikel

Ditimbang berat granul yang tertinggal di masing-masing pengayak, lalu dijumlahkan beratnya, Dihitung % berat, contoh (2,74 : 99,49) X 100% = 2,7540 %,

FKA dihitung dengan cara % berat dikumulatifkan, contoh 2,75; 2,75 + 16,9967 = 19,7507; dan seterusnya.

FKB dihitung dengan cara 100 kurang masing-masing nilai FKA, contoh 100 - 2,7540 = 97,2460; dan seterusnya.

Nilai FKB masing-masing kemudian dibagi 100, dan dilihat di tabel Z, Contoh :97,2460 : 100 = 0,9725; angka ini dilihat di tabel Z dengan nilai yang sama atau mendekati nilai tersebut, Carilah angka 0,9725 pada deretan angka, Apabila tidak dapat menemukan angka yang persis sebesar 0,945, maka carilah angka yang paling mendekati angka 0,9725, jika telah menemukan angka yang mendekati angka 0,9725 tariklah garis ke kiri terlebih dahulu hingga mencapai deretan angka pada kolom paling kiri dan catatlah angkanya, Dalam kasus ini adalah 1,9, Kemudian kembali ke posisi angka sebelumnya, tariklah garis ke atas hingga mencapai deretan ujung kolom bagian atas dan catatlah angkanya, dalam kasus ini adalah 0,02,

Nilai Z yang dicari adalah 1,9 + 0,02 = 1,92.

Di regresikan antara diameter dan nilai z, dengan diameter sebagai sumbu x dan nilai z sebagai sumbu y, lalu akan diperoleh persamaan  $y = a + bx$ ,

$dg_{50\%}$  diperoleh dari : angka 0 dimasukkan kedalam persamaan  $y = a + bx$ ,  
 $dg_{84\%}$  diperoleh dari : angka 1 dimasukkan ke dalam persamaan  $y = a + bx$ ,  
 $\sigma_g$  diperoleh dari  $dg_{84\%}$  dibagi  $dg_{50\%}$ ,

## LAMPIRAN D

### HASIL SCAN BLANKO

Hasil *scan* panjang gelombang serapan larutan baku kerja konsentrasi 20 µg/mL pada panjang gelombang 200 – 300 nm,

Panjang gelombang (nm)	Absorbansi	Panjang gelombang (nm)	Absorbansi	Panjang gelombang (nm)	Absorbansi
300	0,686	266	0,316	232	0,542
298	0,633	264	0,328	230	0,511
296	0,583	262	0,344	228	0,492
294	0,536	260	0,364	226	0,487
292	0,494	258	0,391	224	0,498
290	0,458	256	0,424	222	0,535
288	0,429	254	0,465	220	0,605
286	0,406	252	0,516	218	0,708
284	0,385	250	0,576	216	0,842
282	0,366	248	0,630	214	0,990
280	0,349	246	0,670	212	1,119
278	0,334	244	0,693	210	1,219
276	0,321	242	0,697	208	1,289
274	0,311	240	0,684	206	0,349
272	0,305	238	0,657	204	0,438
270	0,304	236	0,621	202	1,632
268	0,308	234	0,580	200	10,000

## LAMPIRAN E

### KURVA BAKU

Baku	No	Konsentrasi ( $\mu\text{g/mL}$ )	Absorbansi	Persamaan garis
I	1	10,6	0,328	$Y = 0,0354X - 0,0424$ $r = 0,9994$
	2	15,9	0,536	
	3	21,2	0,697	
	4	26,5	0,893	
	5	31,8	1,088	
II	1	10,6	0,336	$Y = 0,0334X - 0,008$ $r = 0,9988$
	2	15,9	0,527	
	3	21,2	0,708	
	4	26,5	0,895	
	5	31,8	1,038	
III	1	10,5	0,369	$Y = 0,0346X - 0,003$ $r = 0,9997$
	2	15,75	0,534	
	3	21	0,715	
	4	26,25	0,904	
	5	31,5	1,091	



## LAMPIRAN F

### CARA PERHITUNGAN $F_{\text{HITUNG}}$

	Baku	No	Konsentrasi ( $\mu\text{g/mL}$ )	Abs.	X <sup>2</sup>	XY	Y <sup>2</sup>	n	Residual SS	Residual DF
08	<b>I</b>	1	10,6	0,328	112,36	3,4768	0,1076	5	$1,415 \times 10^{-3}$	3
		2	15,9	0,536	252,81	8,5224	0,2873			
		3	21,2	0,697	449,44	14,7764	0,4858			
		4	26,5	0,893	702,25	23,6645	0,7975			
		5	31,8	1,088	1011,24	34,5984	1,1837			
		<b>Total</b>				2528,1	85,0385			
	<b>II</b>	1	10,6	0,336	112,36	3,5616	0,1129	5	$7,01 \times 10^{-4}$	3
		2	15,9	0,527	252,81	8,3793	0,2777			
		3	21,2	0,690	449,44	15,0096	0,4761			
		4	26,5	0,895	702,25	23,7175	0,8010			
		5	31,8	1,061	1011,24	33,0084	1,1257			
		<b>Total</b>				2528,1	83,6764			
	<b>III</b>	1	10,5	0,369	110,25	3,8745	0,1362	5	$2,31 \times 10^{-4}$	3
		2	15,8	0,534	248,0625	8,4105	0,2852			
		3	21,0	0,715	441	15,015	0,5112			
4		26,3	0,904	689,0625	23,73	0,8172				
5		31,5	1,091	992,25	34,3665	1,1903				
<b>Total</b>				2480,625	85,3965	2,94003				
<i>Pooled Regression</i>								$2,435 \times 10^{-3}$	9	

$$SS = \sum Y^2 - (\sum XY)^2 / \sum X^2$$

$$Pooled Regression = SS_1 + SS_2 + SS_3$$

$$Common Regression = total \sum Y^2 - (total (\sum XY))^2 / total \sum X^2$$

$$F_{hitung} = \{(Common Regression - Pooled Regression) / 3-1\} : (Pooled Regression / 9)$$

$$81 \quad = \{(4,175 \times 10^{-3} - 2,435 \times 10^{-3}) / 2\} : (2,435 \times 10^{-3} / 9) = 3,506 < F_{tabel 0,05 (2;9)} = 4,26.$$

**LAMPIRAN G**  
**CARA PERHITUNGAN AKURASI PRESISI**

Dari hasil pembacaan absorbansi terhadap larutan sampel akurasi presisi kemudian di ekstrapolasikan ke dalam persamaan kurva baku sehingga diperoleh konsentrasi obat, Untuk mendapatkan % perolehan kembali maka konsentrasi obat ang diperoleh di bagi dengan knsentrasi teoritis dari penimbangan bahan aktif,

Contoh : akurasi presisi pada penetapan kadar (Tabel 4.7)

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Rep	Kons	Penimbangan Piroksikam (mg)	Abs	Kons, ( $\mu\text{g/mL}$ )	Teoritis ( $\mu\text{g/mL}$ )	Perolehan Kembali (%)	Rata- rata	SD	KV (%)
I	50%	10,8	0,375	10,94	10,8	101,29	99,92	1,46	1,46
II	50%	10,5	0,354	10,33	10,5	98,38			
III	50%	10,7	0,367	10,71	10,7	100,09			

$$Y = 0,0345X - 0,00224$$

$$0,375 = 0,0345X - 0,00224$$

$$X = 10,94 \mu\text{g/mL},$$

$$\text{Konsentrasi teoritis} = 10,8 \mu\text{g/mL},$$

$$\% \text{ perolehan kembali} = (10,94 / 10,8) \times 100\% = 101,29\%,$$

Masing-masing replikasi dihitng % perolehan kembali, kemudian cari rata-rata, standar deviasi, dan koefisien variasi (KV),

## LAMPIRAN H

### HASIL UJI DISOLUSI FORMULA OPTIMUM CAMPURAN INTERAKTIF PIROKSIKAM

#### Replikasi 1

No	Waktu (menit)	Abs	Kons, ( $\mu\text{g/mL}$ )	Jumlah obat lepas	% Obat terlepas	Jumlah obat sisa	% Obat sisa
1	2	0.71	20.52023	18.46821	92.99133	1.401734	7.008671
2	5	0.70	20.26012	18.2341	90.52023	1.895954	9.479769
3	10	0.71	20.66474	18.59827	81.6763	3.66474	18.3237
4	15	0.69	19.88439	17.89595	81.15607	3.768786	18.84393
5	30	0.67	19.42197	17.47977	79.72543	4.054913	20.27457
6	45	0.67	19.56647	17.60983	78.94509	4.210983	21.05491
7	60	0.60	17.36994	15.63295	78.2948	4.34104	21.7052

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#### Replikasi 2

No	Waktu (menit)	Abs	Kons, ( $\mu\text{g/mL}$ )	Jumlah obat lepas	% Obat terlepas	Jumlah obat sisa	% Obat sisa
1	2	0.73	21.06936	18.96243	94.81214	1.037572	5.187861
2	5	0.69	19.88439	17.89595	89.47977	2.104046	10.52023
3	10	0.70	20.26012	18.2341	91.17052	1.765896	8.82948
4	15	0.70	20.20231	18.18208	90.9104	1.817919	9.089595
5	30	0.68	19.62428	17.66185	88.30925	2.33815	11.69075
6	45	0.63	18.15029	16.33526	81.6763	3.66474	18.3237
7	60	0.62	18.06358	16.25723	81.28613	3.742775	18.71387

**Replikasi 3**

<b>No</b>	<b>Waktu (menit)</b>	<b>Abs</b>	<b>Kons, (<math>\mu\text{g/mL}</math>)</b>	<b>Jumlah obat lepas</b>	<b>% Obat terlepas</b>	<b>Jumlah obat sisa</b>	<b>% Obat sisa</b>
1	2	0.71	20.66474	18.59827	92.99133	1.401734	7.008671
2	5	0.69	20.11561	18.10405	90.52023	1.895954	9.479769
3	10	0.63	18.15029	16.33526	81.6763	3.66474	18.3237
4	15	0.62	18.03468	16.23121	81.15607	3.768786	18.84393
5	30	0.61	17.71676	15.94509	79.72543	4.054913	20.27457
6	45	0.60	17.54335	15.78902	78.94509	4.210983	21.05491
7	60	0.60	17.39884	15.65896	78.2948	4.34104	21.7052

## LAMPIRAN I

### HASIL ANAVA DENGAN *DESIGN EXPERT* DENGAN RESPON *HAUSNER RATIO*

#### Response 1 Hausner Ratio

#### 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	0.012	3	4.154E-003	8.34	0.0076	significant
<i>A-Jumlah Manitol</i>	<i>2.883E-003</i>	<i>1</i>	<i>2.883E-003</i>	<i>5.79</i>	<i>0.0428</i>	
<i>B-Jumlah AcDiSol</i>	<i>1.776E-003</i>	<i>1</i>	<i>1.776E-003</i>	<i>3.57</i>	<i>0.0957</i>	
<i>AB7.803E-003</i>	<i>1</i>	<i>7.803E-003</i>	<i>15.66</i>	<i>0.0042</i>		
Pure Error	3.985E-003	8	4.982E-004			
Cor Total	0.016	11				

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The Model F-value of 8.34 implies the model is significant. There is only a 0.76% 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, 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.	0.022	R-Squared	0.7577
Mean	1.23	Adj R-Squared	0.6668
C.V. %	1.81	Pred R-Squared	0.4548
PRESS	8.967E-003	Adeq Precision	6.363

The "Pred R-Squared" of 0.4548 is not as close to the "Adj R-Squared" of 0.6668 as one might normally expect. 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.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your ratio of 6.363 indicates an adequate signal. This model can be used to navigate the design space.

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<b>Factor</b>	<b>Coefficient Estimate</b>	<b>df</b>	<b>Standard Error</b>	<b>95% CI Low</b>	<b>95% CI High</b>
Intercept	1.23	1	6.443E-003	1.22	1.25
A-Jumlah Manitol	0.015	1	6.443E-003	6.421E-004	0.030
B-Jumlah AcDiSol	0.012	1	6.443E-003	-2.691E-003	0.027
AB	0.026	1	6.443E-003	0.011	0.040



**Final Equation in Terms of Coded Factors:**

$$\begin{aligned} \text{Hausner Ratio} &= \\ +1.23 & \\ +0.015 & \quad * A \\ +0.012 & \quad * B \\ +0.026 & \quad * A * B \end{aligned}$$

**Final Equation in Terms of Actual Factors:**

$$\begin{aligned} \text{Hausner Ratio} &= \\ +1.23183 & \\ +0.015500 & \quad * \text{Jumlah Manitol} \\ +0.012167 & \quad * \text{Jumlah AcDiSol} \\ +0.025500 & \quad * \text{Jumlah Manitol} * \text{Jumlah AcDiSol} \end{aligned}$$

∞

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.  
In the Diagnostics Node, Select Case Statistics from the View Menu.

## LAMPIRAN J

### HASIL ANAVA DENGAN *DESIGN EXPERT* DENGAN RESPON *CARR'S INDEX*

Response	2	Carr's Index				
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	48.45	3	16.15	7.56	0.0101	significant
<i>A-Jumlah Manitol</i>	8.88	1	8.88	4.15	0.0759	
<i>B-Jumlah AcDiSol</i>	5.77	1	5.77	2.70	0.1390	
<i>AB33.80</i>	1	33.80	15.81	0.0041		
Pure Error	17.10	8	2.14			
Cor Total	65.54	11				

The Model F-value of 7.56 implies the model is significant. There is only a 1.01% 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 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.	1.46		R-Squared	0.7391
Mean	18.83	Adj R-Squared	0.6413	
C.V. %	7.76		Pred R-Squared	0.4130
PRESS	38.47		Adeq Precision	6.014

The "Pred R-Squared" of 0.4130 is not as close to the "Adj R-Squared" of 0.6413 as one might normally expect. 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.

"Adeq Precision" measures the signal to noise ratio. A ratio greater than 4 is desirable. Your ratio of 6.014 indicates an adequate signal. This model can be used to navigate the design space.

Factor	Coefficient		df	Standard Error	95% CI		VIF
	Estimate				Low	High	
Intercept	18.83		1	0.42	17.86	19.80	
A-Jumlah Manitol	0.86		1	0.42	-0.11	1.83	1.00
B-Jumlah AcDiSol	0.69		1	0.42	-0.28	1.67	1.00
AB	1.68		1	0.42	0.71	2.65	1.00

**Final Equation in Terms of Coded Factors:**

$$\begin{aligned} \text{Carr's Index} &= \\ +18.83 & \\ +0.86 & * A \\ +0.69 & * B \\ +1.68 & * A * B \end{aligned}$$

**Final Equation in Terms of Actual Factors:**

$$\begin{aligned} \text{Carr's Index} &= \\ +18.83167 & \\ +0.86000 & * \text{Jumlah Manitol} \\ +0.69333 & * \text{Jumlah AcDiSol} \\ +1.67833 & * \text{Jumlah Manitol} * \text{Jumlah AcDiSol} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.  
In the Diagnostics Node, Select Case Statistics from the View Menu.

## LAMPIRAN K

### HASIL ANAVA DENGAN *DESIGN EXPERT* DENGAN RESPON SUDUT DIAM

Response	3	Sudut Diam				
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	3.05	3	1.02	0.49	0.7017	not significant
<i>A-Jumlah Manitol</i>	<i>9.013E-004</i>	<i>1</i>	<i>9.013E-004</i>	<i>4.311E-004</i>	<i>0.9839</i>	
<i>B-Jumlah AcDiSol</i>	<i>0.22</i>	<i>1</i>	<i>0.22</i>	<i>0.11</i>	<i>0.7532</i>	
<i>AB</i>	<i>2.82</i>	<i>1</i>	<i>2.82</i>	<i>1.35</i>	<i>0.2788</i>	
Pure Error	16.73	8	2.09			
Cor Total	19.77	11				

The "Model F-value" of 0.49 implies the model is not significant relative to the noise. There is a 70.17 % 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 there are no 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.	1.45		R-Squared	0.1540
Mean	31.08	Adj R-Squared	-0.1632	
C.V. %	4.65		Pred R-Squared	-0.9035
PRESS	37.64		Adeq Precision	1.487

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 1.49 indicates an inadequate signal and we should not use this model to navigate the design space.

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<b>Factor</b>	<b>Coefficient Estimate</b>	<b>df</b>	<b>Standard Error</b>	<b>95% CI Low</b>	<b>95% CI High</b>	<b>VIF</b>
Intercept	31.08	1	0.42	30.12	32.04	
A-Jumlah Manitol	-8.667E-003	1	0.42	-0.97	0.95	1.00
B-Jumlah AcDiSol	0.14	1	0.42	-0.83	1.10	1.00
AB	0.49	1	0.42	-0.48	1.45	1.00

**Final Equation in Terms of Coded Factors:**

$$\begin{aligned} \text{Sudut Diam} &= \\ +31.08 & \\ -8.667\text{E-}003 & * A \\ +0.14 & * B \\ +0.49 & * A * B \end{aligned}$$

**Final Equation in Terms of Actual Factors:**

$$\begin{aligned} \text{Sudut Diam} &= \\ +31.07983 & \\ -8.66667\text{E-}003 & * \text{Jumlah Manitol} \\ +0.13583 & * \text{Jumlah AcDiSol} \\ +0.48500 & * \text{Jumlah Manitol} * \text{Jumlah AcDiSol} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.  
In the Diagnostics Node, Select Case Statistics from the View Menu.

## LAMPIRAN L

### HASIL ANAVA DENGAN *DESIGN EXPERT* DENGAN RESPON UKURAN PARTIKEL

Response 4 Ukuran Partikel  
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	5303.42	3	1767.81	0.47	0.7131	not significant
<i>A-Jumlah Manitol</i>	<i>810.66</i>	<i>1</i>	<i>810.66</i>	<i>0.21</i>	<i>0.6557</i>	
<i>B-Jumlah AcDiSol</i>	<i>2815.51</i>	<i>1</i>	<i>2815.51</i>	<i>0.74</i>	<i>0.4134</i>	
<i>AB1677.26</i>	<i>1</i>	<i>1677.26</i>	<i>0.44</i>	<i>0.5242</i>		
Pure Error	30259.20	8	3782.40			
Cor Total	35562.62	11				

The "Model F-value" of 0.47 implies the model is not significant relative to the noise. There is a 71.31 % 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 there are no 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.	61.50		R-Squared	0.1491
Mean	288.50	Adj R-Squared	-0.1699	
C.V. %	21.32		Pred R-Squared	-0.9145
PRESS	68083.19		Adeq Precision	1.529

A negative "Pred R-Squared" implies that the overall mean is a better predictor of your response than the current model.

"Adeq Precision" measures the signal to noise ratio. A ratio of 1.53 indicates an inadequate signal and we should not use this model to navigate the design space.

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<b>Factor</b>	<b>Coefficient</b>		<b>Standard Error</b>	<b>95% CI</b>		<b>VIF</b>
	<b>Estimate</b>	<b>df</b>		<b>Low</b>	<b>High</b>	
Intercept	288.50	1	17.75	247.56	329.44	
A-Jumlah Manitol	-8.22	1	17.75	-49.16	32.72	1.00
B-Jumlah AcDiSol	-15.32	1	17.75	-56.26	25.62	1.00
AB	-11.82	1	17.75	-52.76	29.12	1.00

**Final Equation in Terms of Coded Factors:**

$$\begin{aligned} \text{Ukuran Partikel} &= \\ +288.50 & \\ -8.22 & \quad * A \\ -15.32 & \quad * B \\ -11.82 & \quad * A * B \end{aligned}$$

**Final Equation in Terms of Actual Factors:**

$$\begin{aligned} \text{Ukuran Partikel} &= \\ +288.50250 & \\ -8.21917 & \quad * \text{Jumlah Manitol} \\ -15.31750 & \quad * \text{Jumlah AcDiSol} \\ -11.82250 & \quad * \text{Jumlah Manitol} * \text{Jumlah AcDiSol} \end{aligned}$$

The Diagnostics Case Statistics Report has been moved to the Diagnostics Node.  
In the Diagnostics Node, Select Case Statistics from the View Menu.

## LAMPIRAN M

### HASIL *ONEWAY ANOVA* DENGAN SPSS DENGAN RESPON SUDUT DIAM

#### Oneway

##### Test of Homogeneity of Variances

SudutDiam

Levene Statistic	df1	df2	Sig.
6.150	3	8	.018

#### ANOVA

SudutDiam

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.045	3	1.015	.485	.702
Within Groups	16.727	8	2.091		
Total	19.772	11			

## Post Hoc Tests

### Multiple Comparisons

SudutDiam

Tukey HSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.69833	1.18065	.932	-3.0825	4.4792
	3.00	.98733	1.18065	.836	-2.7935	4.7682
	4.00	-.25433	1.18065	.996	-4.0352	3.5265
2.00	1.00	-.69833	1.18065	.932	-4.4792	3.0825
	3.00	.28900	1.18065	.994	-3.4919	4.0699
	4.00	-.95267	1.18065	.850	-4.7335	2.8282
3.00	1.00	-.98733	1.18065	.836	-4.7682	2.7935
	2.00	-.28900	1.18065	.994	-4.0699	3.4919
	4.00	-1.24167	1.18065	.726	-5.0225	2.5392
4.00	1.00	.25433	1.18065	.996	-3.5265	4.0352
	2.00	.95267	1.18065	.850	-2.8282	4.7335
	3.00	1.24167	1.18065	.726	-2.5392	5.0225

**LAMPIRAN N**  
**HASIL ONEWAY ANAVA DENGAN SPSS DENGAN RESPON**  
**HAUSNER RATIO**

**Oneway**

**Test of Homogeneity of Variances**

HausnerRatio

Levene Statistic	df1	df2	Sig.
.709	3	8	.573

**ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.012	3	.004	7.227	.011
Within Groups	.005	8	.001		
Total	.017	11			

**Post Hoc Tests**

**Multiple Comparisons**

HausnerRatio

Tukey HSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.02667	.01958	.554	-.0360	.0894
	3.00	.01667	.01958	.829	-.0460	.0794
	4.00	-.05667	.01958	.077	-.1194	.0060
2.00	1.00	-.02667	.01958	.554	-.0894	.0360
	3.00	-.01000	.01958	.954	-.0727	.0527
	4.00	-.08333*	.01958	.012	-.1460	-.0206
3.00	1.00	-.01667	.01958	.829	-.0794	.0460
	2.00	.01000	.01958	.954	-.0527	.0727
	4.00	-.07333*	.01958	.024	-.1360	-.0106
4.00	1.00	.05667	.01958	.077	-.0060	.1194
	2.00	.08333*	.01958	.012	.0206	.1460
	3.00	.07333*	.01958	.024	.0106	.1360

\*. The mean difference is significant at the 0.05 level.

## LAMPIRAN O

### HASIL *ONEWAY ANOVA* DENGAN SPSS DENGAN RESPON *CARR'S INDEX*

#### Oneway

#### Test of Homogeneity of Variances

CarrsIndex

Levene Statistic	df1	df2	Sig.
.639	3	8	.611

#### ANOVA

CarrsIndex

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48.445	3	16.148	7.555	.010
Within Groups	17.099	8	2.137		
Total	65.545	11			

**Post Hoc Tests**

**Multiple Comparisons**

CarrsIndex

Tukey HSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	1.97000	1.19371	.406	-1.8527	5.7927
	3.00	1.63667	1.19371	.549	-2.1860	5.4594
	4.00	-3.10667	1.19371	.116	-6.9294	.7160
2.00	1.00	-1.97000	1.19371	.406	-5.7927	1.8527
	3.00	-.33333	1.19371	.992	-4.1560	3.4894
	4.00	-5.07667*	1.19371	.012	-8.8994	-1.2540
3.00	1.00	-1.63667	1.19371	.549	-5.4594	2.1860
	2.00	.33333	1.19371	.992	-3.4894	4.1560
	4.00	-4.74333*	1.19371	.017	-8.5660	-.9206
4.00	1.00	3.10667	1.19371	.116	-.7160	6.9294
	2.00	5.07667*	1.19371	.012	1.2540	8.8994
	3.00	4.74333*	1.19371	.017	.9206	8.5660

\*. The mean difference is significant at the 0.05 level.



## LAMPIRAN P

### HASIL *ONEWAY ANOVA* DENGAN SPSS DENGAN RESPON UKURAN PARTIKEL

#### Oneway

#### Test of Homogeneity of Variances

UkuranPartikel

Levene Statistic	df1	df2	Sig.
2.316	3	8	.152

#### ANOVA

UkuranPartikel

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	72718.789	3	24239.596	3.031	.093
Within Groups	63984.879	8	7998.110		
Total	136703.668	11			

**Post Hoc Tests**

**Multiple Comparisons**

UkuranPartikel

Tukey HSD

(I) Formula	(J) Formula	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	6.99000	73.02105	1.000	-226.8491	240.8291
	3.00	-156.91333	73.02105	.217	-390.7524	76.9258
	4.00	47.05667	73.02105	.915	-186.7824	280.8958
2.00	1.00	-6.99000	73.02105	1.000	-240.8291	226.8491
	3.00	-163.90333	73.02105	.191	-397.7424	69.9358
	4.00	40.06667	73.02105	.944	-193.7724	273.9058
3.00	1.00	156.91333	73.02105	.217	-76.9258	390.7524
	2.00	163.90333	73.02105	.191	-69.9358	397.7424
	4.00	203.97000	73.02105	.089	-29.8691	437.8091
4.00	1.00	-47.05667	73.02105	.915	-280.8958	186.7824
	2.00	-40.06667	73.02105	.944	-273.9058	193.7724
	3.00	-203.97000	73.02105	.089	-437.8091	29.8691

**LAMPIRAN Q**

**HASIL *ONE-SAMPLES T-TEST* DENGAN SPSS DENGAN RESPON  
SUDUT DIAM**

**One-Sample Statistics**

	N	Mean	Std. Deviation	Std. Error Mean
sudutdiam	3	32.82	.742	.428

**One-Sample Test**

	Test Value = 30.45					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
sudutdiam	5.537	2	.031	2.371	.53	4.21

**LAMPIRAN R**

**HASIL *ONE-SAMPLES T-TEST* DENGAN SPSS DENGAN RESPON  
*HAUSNER RATIO***

**One-Sample Statistics**

	N	Mean	Std. Deviation	Std. Error Mean
HausnerRatio	3	1.2133	.02082	.01202

**One-Sample Test**

	Test Value = 1.21					
	t	df	Sig. (2- tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hausner Ratio	.277	2	.808	.00333	-.0484	.0550

**LAMPIRAN S**

**HASIL *ONE-SAMPLES T-TEST* DENGAN SPSS DENGAN RESPON  
*CARR'S INDEX***

**One-Sample Statistics**

	N	Mean	Std. Deviation	Std. Error Mean
CarrsIndex	3	17.6200	1.57772	.91090

**One-Sample Test**

	Test Value = 17.32					
	t	df	Sig. (2- tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
CarrsIndex	.329	2	.773	.30000	-3.6193	4.2193

**LAMPIRAN T**

**HASIL *ONE-SAMPLES T-TEST* DENGAN SPSS DENGAN RESPON  
UKURAN PARTIKEL**

**One-Sample Statistics**

	N	Mean	Std. Deviation	Std. Error Mean
UkuranPartikel	3	324.4200	22.33077	12.89267

**One-Sample Test**

	Test Value = 307.423					
	t	df	Sig. (2- tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
UkuranPartikel	1.318	2	.318	16.99700	-38.4757	72.4697

# LAMPIRAN U

## TABEL UJI F

**TABEL DISTRIBUSI F UNTUK 5% DAN 1%**

Baris atas untuk taraf signifikan 5%  
Baris bawah untuk taraf signifikan 1%

$V_2 = dk$ penyebut	$V_1 = dk$ pembilang																									
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	$\infty$		
1	161 4052	200 4999	216 5403	225 5625	230 5764	234 5859	237 5928	239 5961	241 6022	242 6056	243 6082	244 6106	245 6142	246 6169	248 6208	249 6234	250 6258	251 6286	252 6302	253 6323	253 6334	254 6352	254 6361	254 6366		
2	18,51 98,49	19,00 99,01	19,16 99,17	19,25 99,25	19,30 99,30	19,33 99,33	19,36 99,34	19,37 99,36	19,38 97,38	19,39 99,40	19,40 99,41	19,41 99,42	19,42 99,43	19,43 99,44	19,44 99,45	19,45 99,46	19,46 99,47	19,47 99,48	19,47 99,48	19,48 99,49	19,49 99,49	19,49 99,50	19,50 99,50	19,50 99,50		
3	10,13 34,12	9,55 30,81	9,28 29,46	9,12 28,71	9,01 28,24	8,94 27,91	8,88 27,67	8,84 27,49	8,81 27,34	8,78 27,23	8,76 27,13	8,74 27,05	8,71 26,92	8,69 26,83	8,66 26,69	8,64 26,60	8,62 26,50	8,60 26,41	8,58 26,30	8,57 26,27	8,56 26,23	8,54 26,18	8,54 26,14	8,53 26,12		
4	7,71 21,20	6,94 18,00	6,59 16,69	6,39 15,98	6,26 15,52	6,16 15,21	6,09 14,98	6,04 14,80	6,00 14,66	5,96 14,54	5,93 14,45	5,91 14,37	5,87 14,24	5,84 14,15	5,80 14,02	5,77 13,93	5,74 13,83	5,71 13,74	5,70 13,69	5,68 13,61	5,66 13,57	5,65 13,52	5,64 13,48	5,53 13,46		
5	6,61 16,26	5,79 13,27	5,41 12,06	5,19 11,39	5,05 10,97	4,95 10,67	4,88 10,45	4,82 10,27	4,78 10,15	4,74 10,05	4,70 9,96	4,68 9,89	4,64 9,77	4,60 9,68	4,56 9,55	4,53 9,47	4,50 9,38	4,46 9,29	4,44 9,24	4,42 9,17	4,40 9,13	4,38 9,07	4,37 9,04	4,36 9,02		
6	5,99 13,74	5,14 10,92	4,76 9,78	4,53 9,15	4,39 8,75	4,28 8,47	4,21 8,26	4,15 8,10	4,10 7,98	4,06 7,87	4,03 7,79	4,00 7,72	3,96 7,60	3,92 7,52	3,87 7,39	3,84 7,31	3,81 7,23	3,77 7,14	3,75 7,09	3,72 7,02	3,71 6,99	3,69 6,94	3,68 6,90	3,67 6,88		
7	5,59 12,25	4,74 9,55	4,35 8,45	4,12 7,85	3,97 7,46	3,87 7,19	3,79 7,00	3,73 6,84	3,68 6,71	3,63 6,62	3,60 6,54	3,57 6,47	3,52 6,35	3,49 6,27	3,44 6,15	3,41 6,07	3,38 5,98	3,34 5,90	3,32 5,85	3,29 5,78	3,28 5,75	3,25 5,70	3,24 5,67	3,23 5,65		
8	5,32 11,26	4,46 8,65	4,07 7,59	3,84 7,01	3,69 6,63	3,58 6,37	3,50 6,19	3,44 6,03	3,39 5,91	3,34 5,82	3,31 5,74	3,28 5,67	3,23 5,56	3,20 5,48	3,15 5,36	3,12 5,28	3,08 5,20	3,05 5,11	3,03 5,06	3,00 5,00	2,98 4,96	2,96 4,91	2,94 4,88	2,93 4,86		
9	5,12 10,56	4,26 8,02	3,86 6,99	3,63 6,42	3,48 6,06	3,37 5,80	3,29 5,62	3,23 5,47	3,18 5,35	3,13 5,26	3,10 5,18	3,07 5,11	3,02 5,00	2,98 4,92	2,93 4,80	2,90 4,73	2,86 4,61	2,82 4,56	2,80 4,51	2,77 4,45	2,76 4,41	2,73 4,36	2,72 4,33	2,71 4,34		

$V_1 = dk$ penyebut	$V_2 = dk$ pembilang																																																													
	1	2	3	4	5	6	7	8	9	10	11	12	14	16	20	24	30	40	50	75	100	200	500	$\infty$																																						
10	4,96	4,10	3,71	3,48	3,33	3,22	3,14	3,07	3,02	2,97	2,94	2,91	2,86	2,82	2,77	2,74	2,70	2,67	2,64	2,61	2,59	2,56	2,55	2,54	10,04	7,56	6,55	5,99	5,64	5,39	5,21	5,06	4,95	4,85	4,78	4,71	4,60	4,52	4,41	4,33	4,25	4,17	4,12	4,05	4,01	3,96	3,93	3,91														
11	4,84	3,98	3,59	3,36	3,20	3,09	3,01	2,95	2,90	2,86	2,82	2,79	2,74	2,70	2,65	2,61	2,57	2,53	2,50	2,47	2,45	2,42	2,41	2,40	9,05	7,20	6,22	5,67	5,32	5,07	4,88	4,74	4,63	4,54	4,46	4,40	4,29	4,21	4,10	4,02	3,94	3,86	3,80	3,74	3,70	3,66	3,62	3,60														
12	4,75	3,88	3,49	3,26	3,11	3,00	2,92	2,85	2,80	2,76	2,72	2,69	2,64	2,60	2,54	2,50	2,46	2,42	2,38	2,34	2,32	2,28	2,26	2,24	8,33	6,83	5,95	5,41	5,06	4,82	4,65	4,50	4,39	4,30	4,22	4,16	4,05	3,98	3,86	3,78	3,70	3,61	3,56	3,49	3,46	3,41	3,38	3,36														
13	4,67	3,80	3,41	3,18	3,02	2,92	2,84	2,77	2,72	2,67	2,63	2,60	2,55	2,51	2,46	2,42	2,38	2,34	2,32	2,28	2,26	2,24	2,22	2,21	7,61	6,70	5,74	5,20	4,86	4,62	4,44	4,30	4,19	4,10	4,02	3,96	3,85	3,78	3,67	3,59	3,51	3,42	3,37	3,30	3,27	3,21	3,18	3,16														
14	4,60	3,74	3,34	3,11	2,96	2,85	2,77	2,70	2,65	2,60	2,56	2,53	2,48	2,44	2,39	2,35	2,31	2,27	2,24	2,21	2,19	2,16	2,14	2,13	6,91	6,01	5,06	4,52	4,18	3,94	3,76	3,62	3,51	3,43	3,34	3,26	3,21	3,14	3,11	3,06	3,02	3,00																				
15	4,54	3,68	3,29	3,06	2,90	2,79	2,70	2,64	2,59	2,55	2,51	2,48	2,43	2,39	2,33	2,29	2,25	2,21	2,18	2,15	2,12	2,10	2,08	2,07	6,24	5,36	4,42	3,88	3,54	3,30	3,12	3,00	2,92	2,83	2,74	2,66	2,60	2,54	2,48	2,42	2,36	2,30	2,24	2,18	2,12	2,06	2,00	1,94	1,88													
16	4,49	3,63	3,24	3,01	2,85	2,74	2,66	2,59	2,54	2,49	2,45	2,42	2,37	2,33	2,28	2,24	2,20	2,16	2,13	2,09	2,07	2,04	2,02	2,01	5,57	4,69	3,75	3,21	2,87	2,63	2,45	2,33	2,24	2,15	2,07	2,00	1,92	1,84	1,76	1,68	1,60	1,52	1,44	1,36	1,28	1,20	1,12	1,04	0,96	0,88	0,80	0,72	0,64	0,56	0,48	0,40	0,32	0,24	0,16	0,08	0,00	
17	4,45	3,59	3,20	2,96	2,81	2,70	2,62	2,55	2,50	2,45	2,41	2,38	2,33	2,29	2,23	2,19	2,15	2,11	2,08	2,04	2,02	1,99	1,97	1,96	5,91	5,03	4,09	3,55	3,21	2,97	2,79	2,67	2,58	2,49	2,40	2,31	2,22	2,13	2,04	1,95	1,86	1,77	1,68	1,59	1,50	1,41	1,32	1,23	1,14	1,05	0,96	0,87	0,78	0,69	0,60	0,51	0,42	0,33	0,24	0,15	0,06	0,00
18	4,41	3,55	3,16	2,93	2,77	2,66	2,58	2,51	2,46	2,41	2,37	2,34	2,29	2,25	2,19	2,15	2,11	2,07	2,04	2,00	1,98	1,95	1,93	1,92	5,24	4,36	3,42	2,88	2,54	2,30	2,12	2,00	1,92	1,83	1,74	1,65	1,56	1,47	1,38	1,29	1,20	1,11	1,02	0,93	0,84	0,75	0,66	0,57	0,48	0,39	0,30	0,21	0,12	0,03	0,00							
19	4,38	3,52	3,13	2,90	2,74	2,63	2,55	2,48	2,43	2,38	2,34	2,31	2,26	2,21	2,15	2,11	2,07	2,02	2,00	1,96	1,94	1,91	1,89	1,88	4,57	3,69	2,75	2,21	1,87	1,63	1,45	1,33	1,24	1,15	1,06	0,97	0,88	0,79	0,70	0,61	0,52	0,43	0,34	0,25	0,16	0,07	0,00															
20	4,35	3,49	3,10	2,87	2,71	2,60	2,52	2,45	2,40	2,35	2,31	2,26	2,23	2,18	2,12	2,08	2,04	1,99	1,96	1,92	1,90	1,87	1,85	1,84	3,91	3,03	2,09	1,55	1,21	0,97	0,79	0,67	0,58	0,49	0,40	0,31	0,22	0,13	0,04	0,00																						
21	4,32	3,47	3,07	2,84	2,68	2,57	2,49	2,42	2,37	2,32	2,28	2,25	2,20	2,15	2,09	2,05	2,00	1,96	1,93	1,89	1,87	1,84	1,82	1,81	3,24	2,36	1,42	0,88	0,54	0,30	0,12	0,00																														
22	4,30	3,44	3,05	2,82	2,66	2,55	2,47	2,40	2,35	2,30	2,26	2,23	2,18	2,13	2,07	2,03	1,98	1,93	1,91	1,87	1,84	1,81	1,80	1,78	2,57	1,69	0,75	0,21	0,00																																	
23	4,28	3,42	3,03	2,80	2,64	2,53	2,45	2,38	2,32	2,28	2,24	2,20	2,14	2,10	2,04	2,00	1,96	1,91	1,88	1,84	1,82	1,79	1,77	1,76	1,91	1,03	0,09	0,00																																		



LAMPIRAN V

TABEL UJI 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 W

### TABEL UJI T

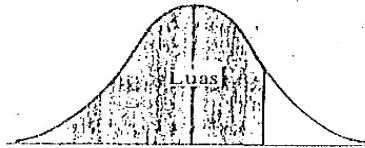
v	$\alpha$				
	0.10	0.05	0.025	0.01	0.005
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.451	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.561	3.365	4.012
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
inf.	1.282	1.645	1.960	2.326	2.576

Sumber : Ronald E. Walpole (1995) : Pengantar Statistika.

# LAMPIRAN X

## TABEL UJI Z

Tabel 4 Luas di bawah kurva normal



z	0,00	0,01	0,02	0,03	0,04	0,05	0,06	0,07	0,08	0,09
3,4	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003	0,0003
3,3	0,0005	0,0005	0,0005	0,0004	0,0004	0,0004	0,0004	0,0004	0,0004	0,0004
3,2	0,0007	0,0007	0,0007	0,0006	0,0006	0,0006	0,0006	0,0006	0,0006	0,0006
3,1	0,0010	0,0009	0,0009	0,0009	0,0008	0,0008	0,0008	0,0008	0,0008	0,0008
3,0	0,0013	0,0013	0,0013	0,0012	0,0012	0,0011	0,0011	0,0011	0,0011	0,0011
2,9	0,0019	0,0018	0,0017	0,0017	0,0016	0,0016	0,0015	0,0015	0,0014	0,0014
2,8	0,0026	0,0025	0,0024	0,0023	0,0023	0,0022	0,0021	0,0021	0,0020	0,0020
2,7	0,0035	0,0034	0,0033	0,0032	0,0031	0,0030	0,0029	0,0028	0,0027	0,0026
2,6	0,0047	0,0045	0,0044	0,0043	0,0041	0,0040	0,0039	0,0038	0,0037	0,0036
2,5	0,0062	0,0060	0,0059	0,0057	0,0056	0,0054	0,0053	0,0051	0,0049	0,0048
2,4	0,0082	0,0080	0,0078	0,0076	0,0073	0,0071	0,0069	0,0068	0,0066	0,0064
2,3	0,0107	0,0104	0,0102	0,0099	0,0096	0,0094	0,0091	0,0089	0,0087	0,0084
2,2	0,0139	0,0136	0,0132	0,0129	0,0125	0,0122	0,0119	0,0116	0,0113	0,0110
2,1	0,0179	0,0174	0,0170	0,0166	0,0161	0,0158	0,0154	0,0150	0,0146	0,0143
2,0	0,0228	0,0222	0,0217	0,0212	0,0207	0,0202	0,0197	0,0192	0,0188	0,0183
1,9	0,0287	0,0281	0,0274	0,0268	0,0262	0,0256	0,0250	0,0244	0,0239	0,0231
1,8	0,0359	0,0352	0,0344	0,0336	0,0329	0,0322	0,0314	0,0307	0,0301	0,0294
1,7	0,0446	0,0436	0,0427	0,0418	0,0409	0,0401	0,0392	0,0384	0,0375	0,0367
1,6	0,0548	0,0537	0,0527	0,0516	0,0505	0,0495	0,0485	0,0473	0,0465	0,0455
1,5	0,0668	0,0655	0,0643	0,0630	0,0618	0,0606	0,0593	0,0582	0,0571	0,0559
1,4	0,0808	0,0793	0,0778	0,0764	0,0749	0,0735	0,0722	0,0708	0,0694	0,0681
1,3	0,0968	0,0951	0,0934	0,0918	0,0901	0,0883	0,0869	0,0851	0,0833	0,0816
1,2	0,1151	0,1131	0,1112	0,1093	0,1075	0,1056	0,1038	0,1020	0,1003	0,0985
1,1	0,1357	0,1335	0,1314	0,1292	0,1271	0,1251	0,1230	0,1210	0,1190	0,1170
1,0	0,1587	0,1562	0,1538	0,1515	0,1492	0,1469	0,1446	0,1423	0,1401	0,1379
0,9	0,1841	0,1814	0,1788	0,1762	0,1736	0,1711	0,1683	0,1660	0,1635	0,1611
0,8	0,2119	0,2090	0,2061	0,2033	0,2005	0,1977	0,1949	0,1925	0,1894	0,1867
0,7	0,2420	0,2389	0,2358	0,2327	0,2296	0,2266	0,2235	0,2206	0,2177	0,2148
0,6	0,2743	0,2709	0,2676	0,2641	0,2611	0,2578	0,2546	0,2514	0,2483	0,2451
0,5	0,3085	0,3050	0,3015	0,2981	0,2946	0,2912	0,2877	0,2843	0,2810	0,2776
0,4	0,3446	0,3409	0,3372	0,3336	0,3300	0,3264	0,3228	0,3192	0,3156	0,3121
0,3	0,3821	0,3783	0,3745	0,3707	0,3669	0,3632	0,3594	0,3557	0,3520	0,3483
0,2	0,4207	0,4168	0,4129	0,4090	0,4052	0,4013	0,3974	0,3936	0,3897	0,3859
0,1	0,4601	0,4562	0,4522	0,4483	0,4443	0,4404	0,4364	0,4325	0,4286	0,4247
0,0	0,5000	0,4960	0,4920	0,4880	0,4840	0,4801	0,4761	0,4721	0,4681	0,4641
0,0	0,5000	0,5040	0,5080	0,5129	0,5160	0,5199	0,5239	0,5279	0,5319	0,5359
0,1	0,5398	0,5438	0,5478	0,5517	0,5557	0,5596	0,5636	0,5675	0,5714	0,5753
0,2	0,5793	0,5832	0,5871	0,5910	0,5948	0,5987	0,6026	0,6064	0,6103	0,6141
0,3	0,6179	0,6217	0,6255	0,6293	0,6331	0,6368	0,6406	0,6443	0,6480	0,6517
0,4	0,6554	0,6591	0,6628	0,6664	0,6700	0,6736	0,6772	0,6808	0,6844	0,6879
0,5	0,6915	0,6950	0,6985	0,7019	0,7054	0,7088	0,7123	0,7157	0,7190	0,7224
0,6	0,7257	0,7291	0,7324	0,7357	0,7389	0,7422	0,7454	0,7486	0,7517	0,7549
0,7	0,7580	0,7611	0,7643	0,7673	0,7704	0,7734	0,7764	0,7794	0,7823	0,7852
0,8	0,7881	0,7910	0,7939	0,7967	0,7995	0,8023	0,8051	0,8078	0,8106	0,8133
0,9	0,8139	0,8186	0,8212	0,8238	0,8264	0,8289	0,8313	0,8337	0,8360	0,8384
1,0	0,8413	0,8438	0,8461	0,8485	0,8508	0,8531	0,8554	0,8577	0,8599	0,8621
1,1	0,8643	0,8665	0,8686	0,8708	0,8729	0,8749	0,8769	0,8789	0,8809	0,8829
1,2	0,8849	0,8869	0,8888	0,8907	0,8925	0,8944	0,8962	0,8979	0,8997	0,9015
1,3	0,9032	0,9049	0,9066	0,9082	0,9099	0,9115	0,9131	0,9147	0,9162	0,9177
1,4	0,9192	0,9207	0,9222	0,9236	0,9251	0,9265	0,9278	0,9292	0,9306	0,9319
1,5	0,9332	0,9345	0,9357	0,9370	0,9382	0,9394	0,9406	0,9418	0,9429	0,9441
1,6	0,9452	0,9463	0,9474	0,9484	0,9495	0,9505	0,9515	0,9525	0,9535	0,9545
1,7	0,9554	0,9563	0,9573	0,9582	0,9591	0,9599	0,9608	0,9616	0,9625	0,9633
1,8	0,9641	0,9649	0,9656	0,9664	0,9671	0,9678	0,9686	0,9693	0,9699	0,9706
1,9	0,9713	0,9719	0,9726	0,9732	0,9738	0,9744	0,9750	0,9756	0,9761	0,9767
2,0	0,9772	0,9778	0,9783	0,9788	0,9793	0,9798	0,9803	0,9808	0,9812	0,9816
2,1	0,9821	0,9826	0,9830	0,9834	0,9838	0,9842	0,9846	0,9850	0,9854	0,9858
2,2	0,9861	0,9864	0,9868	0,9871	0,9873	0,9876	0,9878	0,9881	0,9883	0,9885
2,3	0,9893	0,9894	0,9898	0,9899	0,9901	0,9902	0,9903	0,9904	0,9905	0,9906
2,4	0,9918	0,9920	0,9922	0,9923	0,9925	0,9927	0,9929	0,9931	0,9932	0,9934
2,5	0,9938	0,9940	0,9941	0,9943	0,9945	0,9946	0,9948	0,9949	0,9951	0,9952
2,6	0,9953	0,9955	0,9956	0,9957	0,9959	0,9960	0,9961	0,9962	0,9963	0,9964
2,7	0,9965	0,9966	0,9967	0,9968	0,9969	0,9970	0,9971	0,9972	0,9973	0,9974
2,8	0,9974	0,9975	0,9976	0,9977	0,9977	0,9978	0,9979	0,9979	0,9980	0,9981
2,9	0,9981	0,9982	0,9983	0,9983	0,9984	0,9984	0,9985	0,9985	0,9986	0,9986
3,0	0,9987	0,9987	0,9987	0,9988	0,9988	0,9989	0,9989	0,9989	0,9990	0,9990
3,1	0,9990	0,9991	0,9991	0,9992	0,9992	0,9992	0,9993	0,9993	0,9993	0,9994
3,2	0,9993	0,9994	0,9994	0,9994	0,9994	0,9994	0,9995	0,9995	0,9995	0,9995
3,3	0,9995	0,9995	0,9995	0,9995	0,9996	0,9996	0,9996	0,9996	0,9996	0,9997
3,4	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9997	0,9998

**LAMPIRAN Y**  
**CERTIFICATE ANALYSIS PIROKSIKAM**

南通精华制药股份有限公司检验报告

NANTONG JINGHUA PHARMACEUTICAL CO. LTD.  
- CERTIFICATE OF ANALYSIS

APIs.ADD:43 Yaogang Road,Nantong Jiangsu China  
Tel:86-513-85609405/85609406

吡罗昔康

**PIROXICAM**

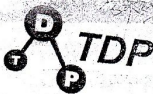
MICRONIZED

Batch No. PRX2011045M      Manufacture Date 2011.11.7  
Total Quantity 200.0KG      Report Date 2011.11.8  
Commercial Quantity 200.0KG      Re-test Date 2014.11.6  
Inspection No. 110300298

TEST	SPECIFICATIONS (USP)	RESULTS
Characteristics	off-white to light tan or light yellow odorless powder	Complies
Identification	A. IR B. UV C. TLC	Complies
Water	≤0.5%	0.27%
Residue on ignition	≤0.3%	0.13%
Heavy metals	≤0.005%	<0.005%
Particle size	D(0.98) ≤13um	11.1 um
Assay	97.0-103.0%	99.62%

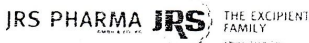
Conclusion The product meets the requirements of USP 34 and the additional items defined by customer

Analyst 李洪 2011.11.8      Supervisor 李洪 2011.11.8      Chief of Laboratory 李洪 2011.11.8  
QA Release Date 李洪 2011.11.8



# LAMPIRAN Z

## CERTIFICATE ANALYSIS ACDISOL



### VIVASOL<sup>®</sup> / Acorda Croscarmellose Sodium Ph. Eur., NF, JP CERTIFICATE OF ANALYSIS

Batch-no. 3201022039 ✓ Manufacturing site: Pirna, Germany  
 Re-evaluation date: 05 / 2016  
 Manufacturing date: 05 / 2012

Description	Almost white, very hygroscopic powder, practically insoluble in acetone, ethanol, ether and toluene.		
Standards	Specification	Batch Result	Reference
Particle size (retained on air jet sieve)			T226F (MCW)
> 75 µm (200 mesh)	max. 2 %	< 2 %*	
> 45 µm (325 mesh)	max. 10 %	< 10 %*	
Pharmacopoeial test items	Specification	Batch Result	Reference
Identification (A, B, C), (1, 2, 3)	passes	passes*	Ph. Eur., NF, JP
Degree of Substitution	0.60 – 0.85	0.78*	Ph. Eur., NF, JP
Loss on drying	max. 10.0 %	4.8 %	Ph. Eur., NF, JP
pH	5.0 - 7.0	6.2	Ph. Eur., USP, JP
Content of water-soluble material	1.0 - 10.0 %	6.2 %	Ph. Eur., NF, JP
Sulphated ash	14.0 – 28.0 %	passes*	Ph. Eur., JP
Settling volume	10.0 – 30.0 ml	18.3 ml	Ph. Eur., NF, JP
Sodium chloride and Sodium glycolate	max. 0.5 %	< 0.5 %*	Ph. Eur., NF, JP
Heavy metals	max. 10 ppm	< 10 ppm*	T CC 043 (CHP)
Arsenic	max. 2 ppm	< 2 ppm*	T CC 043 (CHP)
Residue of Methanol	max. 1.0 %	< 1.0 %*	T CC 019 (CHP)
Total aerobic microbial count	< 100 CFU / g	< 100 CFU / g*	Ph. Eur., USP
Fungi / molds and yeasts	< 20 CFU / g	< 20 CFU / g*	Ph. Eur., USP
E. coli, Pseudomonas aeruginosa	absent in 10 g	absent*	Ph. Eur., USP
Staph. aureus, Salmonella spec.	absent in 10 g	absent*	Ph. Eur., USP

\* Results reported are expected results based on periodic testing.

The batch described by this certificate meets the requirements of Ph. Eur., NF and JP monographs for "Croscarmellose Sodium" current edition. It is released on the basis of the results ascertained.

The raw materials, manufacturing process, and product do not contain any of the solvents listed in the Residual Solvents (Ph. Eur. <5.4>, USP<467>) except for Methanol limited to max. 1.0%.

This product may contain raw materials derived from unauthorized genetically modified cotton and is not suitable for the production or marketing of food or dietary supplements in the EC.

**Storage recommendation:** Protect from excessive heat and moisture.  
 Keep containers closed.

July 27, 2012  
 AB: 21146101  
 vscL P09

Mathias Winkelmann  
 QUALITY CONTROL  
 CHP Carbohydrate Pirna

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 info@jrspharma.com www.jrspharma.com

LAMPIRAN AA

CERTIFICATE ANALYSIS MANITOL

DUPLICATA



LC 1 EEJ5 CERTIFICATE OF ANALYSIS / COMPLIANCE

PAGE 1

PT SIGNA HUSADA  
 JALAN DAAN MOGOT KM 17  
 JAKARTA 11840  
 INDONESIA

PEARLITOL 160 C

CUSTOMER.... SIGNA HUSADA/INDONES

450001 D

INVOICE..... PPY60E1  
 TONNAGE..... 13.000 KG  
 CONTRACT.... F92365G  
 ORDER..... RQF-15/12  
 BATCH..... E664R  
 MANUF&TESTED 15 MARCH 2012

EXPIRY DATE.

15 MAR 2017

E.P./U.S.P.

DESCRIPTION

WHITE CRYSTALLINE POWDER  
 ODOURLESS, SWEET TASTE

MEANING TESTED = ANALYZED  
 MONITORED = MONITORING PLAN  
 GUARANTEED = COMPLIANCE DATA

APPEARANCE		CONFORM	TESTED
APPEARANCE IN SOLUTION		CONFORM	TESTED
LOSS ON DRYING	%	0,08	TESTED
INFRA-RED		CONFORM	TESTED
MELTING POINT	DEG	166	TESTED
START OF MELTING	DEG	166	TESTED
END OF MELTING	DEG	167	TESTED
SPECIFIC ROTATION(BORATE)	DEG.	+ 23,5	TESTED
SPECIFIC ROT.MOLYBDATE	DEG	+ 140,1	TESTED
CONDUCTIVITY	MICROS/C	0,8	TESTED
REDUCING SUGARS	*(USP)	CONFORM	TESTED
D-MANNITOL BY HPLC	%	99,1	TESTED

# LAMPIRAN AB

## CERTIFICATE ANALYSIS SLS



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Certificate of Analysis  
BASF Indonesia

Please note that the certificate of analysis are also conveniently available online and around the clock at [www.worldaccount.basf.com](http://www.worldaccount.basf.com)

Fax No 00620247627001

PT. BAHTERA ADI JAYA  
JL. BETENG NO.108, KRANGGAN  
50137 SEMARANG  
SEMARANG TENGAH - JAWA TENGAH  
Indonesia

2012-11-02  
Quality Control  
A. Muklis  
0218711096  
Certificate No 1191  
Page 2 of 2

**Certificate of Analysis according to DIN 56350-19-4.2.2**

Texapop® DC-P / Soda Laundry Sulfa

20KG Paper Bags  
Purchase Order/Customer Product#  
P685/BAJ/SBY/XI/2012

Material	50210676
Order	6000547404 000030
Delivery	6200481457 000030
Lot	0006901774
Lot/City	140.000 KG
Total	200.000 KG
Transport	N 9546 UG

PARAMETER	RESULTS	STANDARD
Appearance; -	Pass	white to slightly yellow
Anionic Surfactant (NW 299); % DIN ISO 2271 mod	95.4	Min. 95.0
pH-Value (1%); - ISO 4316	9.3	7.0 - 10.5
Water Content; % ISO 4317	1.0	Max. 1.2
Sodium Sulphate; % Method 948622-01	2.1	Max. 2.5
Sodium Chloride; % Method 936186-01	0.05	Max. 0.2
Bulk Density; g/L Method 928037-01	582	350 - 600
Color APHA (5%); - ASTM D 1209	16	Max. 25
Alkalinity; - GCI A-13	0.18	Max. 0.5
Unsulphated Substance; % HPLC	1.4	Max. 1.5
Manufacturing Date : 13.10.2012		
Expiry Date : 12.10.2013		

The aforementioned data shall constitute the agreed contractual quality of the product at the time of passing of risk. The data are controlled at regular intervals as part of our quality assurance program. Neither these data nor the properties of product specimens shall imply any legally binding guarantee of certain properties or of fitness for a specific purpose. No liability of cure can be derived therefrom.

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